From: Laura Robinson

Sent: Fri Oct 29 13:58:07 2021

To: Samantha Meysohn; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA; bgruber@ziontzchestnut.com; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7; Cody.desautel@colvilletribes.com; william_gale@fws.gov

Cc: Liz Mack; william_gale@fws.gov; Renner,Marcella P (BPA) - E-4; SHoefer@usbr.gov; nulacky@usbr.gov; Mike.J.Langeslay@usace.army.mil; Zelinsky,Benjamin D (BPA) - E-4; Conor Giorgi - Spokane Tribe of Indians (conor.giorgi@SpokaneTribe.com); 'casey.baldwin@colvilletribes.com'; tbiladeau@cdatribe-nsn.gov; Rick Raymondi

Subject: [EXTERNAL] DRAFT Equipment needs list for Phase 2

Importance: Normal

Attachments: image001.jpg; DRAFT Equipment Needs for Phase 2.xlsx

As promised in today's ISP meeting, attached is a *draft* working list of equipment needs for Phase 2. The full reintroduction team has not yet included their list of needs, and generally this list will change and evolve over time, but hopefully this will give you an idea of equipment gaps the UCUT tribes are facing right now.

Laura Robinson

Policy Analyst

Upper Columbia United Tribes

25 W. Main, Suite 434

Spokane, WA 99201

Office 509-209-2411

Cell (b)(6) [redacted]

Fax 509-209-2421

laura@ucut-nsn.org

www.ucut.org

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Friday, October 22, 2021 11:34 AM
To: Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA <Timothy.M.Fleeger@usace.army.mil>; bgruber@ziontzchestnut.com; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; btmiles@bpa.gov; Laura Robinson <laura@ucut-nsn.org>; Cody.desautel@colvilletribes.com; william_gale@fws.gov
Cc: Liz Mack <Lmack@kearnswest.com>; william_gale@fws.gov; mprenner@bpa.gov; SHoefer@usbr.gov; nulacky@usbr.gov; Mike.J.Langeslay@usace.army.mil; bdzelinsky@bpa.gov
Subject: Agenda and Materials UC BAAF: 10/29 ISP Working Team Meeting

Greetings,

Thank you for your efforts on the UC BAAF Implementation Strategies and Principles Working Team. We are writing to provide you with meeting information, a proposed agenda, reminder of 9/23 Action Items, and meeting materials for the ISP Working Team Meeting on **Friday, 10/29 from 1-2:30pm PT/ 2-3:30pm MT**.

-

Meeting Information

Below please find the meeting information:

- Web-link: https://kearnswest.zoom.us/j/84699354454?pwd=ckEyMzFDMWFYaFdIeUdVcGxMUHpTQT09
- Dial-in: +1 253 215 8782
- Meeting ID: 846 9935 4454
- Passcode: 477
- One tap mobile: +17207072699,,84699354454#,,,,*477# US (Denver)

-

Proposed Agenda

Below are proposed topics for the 10/29 ISP Working Team Meeting. Please let us know if you have any additions or changes:

- Welcome, agenda review, and updates
    - Check-in on ISP Action Items
- 10/26 Joint SA - ISP Working Team discussion debrief
- Funding options spreadsheet
- Equipment needs and rearing space

- Outstanding questions for the Corps' Authorities
- Confirm next steps, upcoming meeting topics, and summary

Action Items from 9/23

Below please find the Action Items from the 9/23 meeting:

- Scott: Coordinate with Matt and set up a call to connect with Chris/Matt/Laura to talk through Reclamation's Native American Affairs TAP by 10/15
- All: Review 638 Contract Vehicle by 10/15
- Tucker: Add details to BPA Fish and Wildlife Program item in the Funding Options Spreadsheet by 10/1
- Ben: Reach out to DC liaison about connecting with Department of Energy to learn more about Fish Passage Programs by 10/15
- UCUT: Provide a list of equipment that could be used for the P2IP studies, and see if partners can donate surplus items by 10/15
- Megan: Reach out to Chris Donley regarding potential fish hatchery facilities that may be available by 10/1
- Brian: Coordinate with Casey Baldwin to connect with USFWS around potential hatchery facilities by 10/1
- The Corps: Share answers relating to the Corps' authorities related to the Northwest Power Act by 10/15
- Leanne: Look into the Cougar Dam passage authority and provide example at future ISP Working Team Meetings by 10/15
- KW: Draft an ISP Working Team meeting summary and circulate by 9/30
- All: Complete the Doodle Poll below for future meeting scheduling by 9/30

Meeting Materials

Attached please find the following materials for your review and consideration:

- Funding Options Spreadsheet - 9-23-21

Feel free to contact Scott Hoefer or us with any questions. We look forward to hearing from you.

Best,

Liz and Sam

Study or Purpose	Equipment need
Pilot study, Year 2	Model SS400 acoustic transmitters
	PIT tags
Pilot study , Year 3	Model SS400 acoustic transmitters
	PIT tags
Sockeye study, Year 1	PIT tags
	JSATS acoustic tags
	JSATS acoustic receivers
Sockeye study, Year 2	PIT tags
	JSATS acoustic tags
Sockeye study, Year 3	PIT tags
	JSATS acoustic tags
PIT tag study, Year 1	PIT tags
	JSATS acoustic tags
	Vemco tags
PIT tag study, Year 2	PIT tags
	JSATS acoustic tags
	Vemco tags
PIT tag study, Year 3	PIT tags
	JSATS acoustic tags
	Vemco tags

Fish transport/Culture *Availabiltiy= What ever is available please notify of surplus	Net pens Circular tanks Transport trucks Fry Transport tanks FSD Complete V detector 8" Fish Pump 16' Circular Fish Accl-Metalite 20' Goose Neck Trailer Alum.20' Gooseneck Trailer Head Tank - Alum. 20' Alum. Circular Tanks 4" Electric Fish Pump 16'-20' Fiberglass raceways 6' Semi-circular Fiberglass Tanks 5' Circular Fiberglass Tanks Van Gaalen Egg Sorter Jensorter egg counter Heath Stacks (egg incubation) 8" flex hose (ring lock) 12" flex hose (ring lock) 8" aluminum irrigation pipe 12" aluminum irrigation pipe 1 Ton, 2 Ton flatabed trucks Misc. Aluminum Perforated/Slotted Screen Emergency Eye Wash Station (new)

	Flyt Ready 4 submersible Pump
	Olympian Generator
	2' submersible pumps
	Caterpiller Diesel Generator
	Portable Gas Generator
	2" Gas Water Pump
	Pressure Washer
	3" Honda Trash Pump WT30X
Heavy Equipment	John Deere Tractor
	John Deere Auger
	John Deere Roto Tiller
	John Deere Fork Attachment
	John Deere Mower Deck
	John Deere Plow Blade
	John Deere Road Rake
	UTV
	Utility Cargo Trailers
	Toyota Propane Forklift
	Park Model Trailer
	Reach Forklift
	Case Backhoe
	Front End loader
Misc. Power Tools/Equipment	Pipe Bender Angle Roll
	Electromagnetic drill press
	14" multicutter/chop saw
	Heavy Duty band saw
	Orbital super sawzall
	Evolution Extreme 230 TCT steel cutting Circular Saw 9"
	Orbit Jig Saw
	Makita HR 300 OC/ Hammer Drill
	Cutmaster Air Plasma System 80XL
	Gas Chop Saw
	Toyota Pallet Jack
	Large Air Compressor
	Small Air Compressor
	Ladder (misc. 4', 8', 12', extension)

# needed	Date needed	Date aquired	Entity providing equipment
750	2/1/2023		
750	2/1/2023		
750	2/1/2024		
750	2/1/2024		
1200	2/1/2023		
	2/1/2023		
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1200	2/1/2024		
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1200	2/1/2025		
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160,000	2/1/2024		
	2/1/2024		
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160,000	2/1/2025		
	2/1/2025		
	2/1/2025		
	6/1/2022		
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12

20' fiberglass raceway troughs

From: Brian Gruber

Sent: Tue Sep 21 11:02:21 2021

To: Zelinsky,Benjamin D (BPA) - E-4; Samantha Meysohn; Liz Mack; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA); ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7; Hoefer, Scott E; Ulacky, Nicole M; mike langeslay; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com

Cc: Rick Eichstaedt

Subject: [EXTERNAL] RE: Chief Joe Hatchery Funding Authorization

Importance: Normal

Attachments: 2008 Appropriations Act, PL 110-161 - p. 121 excerpt.pdf

Here is the legislative text in full.

P.L. 110-161 (Dec. 26, 2007), 121 STAT. 1964 – page 121.

From: Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Sent: Tuesday, September 21, 2021 10:56 AM
To: Samantha Meysohn <smeysohn@kearnswest.com>; Liz Mack <Lmack@kearnswest.com>; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA) <Timothy.M.Fleeger@usace.army.mil>; Brian Gruber <bgruber@ziontzchestnut.com>; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com;

Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7 <btmiles@bpa.gov>; Hoefer, Scott E <SHoefer@usbr.gov>; Ulacky, Nicole M <nulacky@usbr.gov>; mike langeslay <Mike.J.Langeslay@usace.army.mil>; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com
Cc: Rick Eichstaedt <rick@region10rtoc.net>
Subject: Chief Joe Hatchery Funding Authorization

Attached is a 2016 email from Bill Maslen, then BPA FW Program Director to Bill Towey and Randy Friedlander. The email includes a summary and excerpt of the CJH fish and Capital funding language.

Ben

-----Original Appointment-----
From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Tuesday, September 14, 2021 10:47 AM
To: Samantha Meysohn; Liz Mack; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA); bgruber@ziontzchestnut.com; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7; Hoefer, Scott E; Ulacky, Nicole M; mike langeslay; Zelinsky,Benjamin D (BPA) - E-4; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com
Cc: Rick Eichstaedt
Subject: UC BAAF - Joint SA-ISP Working Teams Meeting
When: Tuesday, September 21, 2021 10:30 AM-11:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: https://kearnswest.zoom.us/j/88943353265?pwd=Umh6YlVQK3FudGl2MWpidVNGQmxoUT09

Meeting Information

Below please find the meeting information:

- Web-link: https://kearnswest.zoom.us/j/88943353265?pwd=Umh6YlVQK3FudGl2MWpidVNGQmxoUT09
- Dial-in: +1 253 215 8782
- Meeting ID: 889 433 53265
- Passcode: 308364
- One tap mobile: +12532158782,, 88943353265#,,,,*308364# US (Tacoma)

Public Law 110–161
110th Congress

An Act

Dec. 26, 2007
[H.R. 2764]

Making appropriations for the Department of State, foreign operations, and related programs for the fiscal year ending September 30, 2008, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Consolidated Appropriations Act, 2007.

SECTION 1. SHORT TITLE.

This Act may be cited as the "Consolidated Appropriations Act, 2008".

SEC. 2. TABLE OF CONTENTS.

The table of contents of this Act is as follows:

ENVIRONMENTAL AND OTHER DEFENSE ACTIVITIES

DEFENSE ENVIRONMENTAL CLEANUP

(INCLUDING TRANSFER OF FUNDS)

For Department of Energy expenses, including the purchase, construction, and acquisition of plant and capital equipment and other expenses necessary for atomic energy defense environmental cleanup activities in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion, and the purchase of not to exceed three passenger motor vehicles for replacement only, $5,398,573,000, to remain available until expended, of which $463,000,000 shall be transferred to and deposited in the "Uranium Enrichment Decontamination and Decommissioning Fund".

OTHER DEFENSE ACTIVITIES

(INCLUDING TRANSFER OF FUNDS)

For Department of Energy expenses, including the purchase, construction, and acquisition of plant and capital equipment and other expenses, necessary for atomic energy defense, other defense activities, and classified activities, in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion, and the purchase of not to exceed twelve passenger motor vehicles for replacement only, $761,290,000, to remain available until expended: *Provided,* That of the funds provided under this heading in Public Law 109–103, $4,900,000 are transferred to "Weapons Activities" for special nuclear material consolidation activities associated with safeguards and security.

DEFENSE NUCLEAR WASTE DISPOSAL

For nuclear waste disposal activities to carry out the purposes of Public Law 97–425, as amended, including the acquisition of real property or facility construction or expansion, $201,000,000, to remain available until expended.

POWER MARKETING ADMINISTRATIONS

BONNEVILLE POWER ADMINISTRATION FUND

Expenditures from the Bonneville Power Administration Fund, established pursuant to Public Law 93–454, are approved for the Lower Granite Dam fish trap, the Kootenai River White Sturgeon Hatchery, the Nez Perce Tribal Hatchery, Redfish Lake Sockeye Captive Brood expansion, hatchery production facilities to supplement Chinook salmon below Chief Joseph Dam in Washington, Hood River Production Facility, Klickitat production expansion, Mid-Columbia Coho restoration, and Yakama Coho restoration, and in addition, for official reception and representation expenses in an amount not to exceed $1,500. During fiscal year 2008, no new direct loan obligations may be made.

From: Brian Gruber

Sent: Thu Jul 01 07:33:50 2021

To: Cody Desautel (L&P ADM); Foster,Marchelle M (BPA) - DI-7; Cummings,Adam H (CONTR) - EW-4; Welch,Dorothy W (BPA) - E-4; Ball,Crystal A (BPA) - EW-4; Lofy,Peter T (BPA) - EWU-4; Connor,Joseph W (BPA) - EWU-4; Read,Christine L (BPA) - EWB-4; Key,Philip S (BPA) - LN-7; Miles,Tucker (BPA) - LN-7; Zelinsky,Benjamin D (BPA) - E-4; Tim Dykstra (Corps); Leanne Holm (Corps); Scott Hoefer (BOR); Jeremiah Williamson (BOR); Jarod Blades (BOR); Lisa Lance (BOR); Neeka Somday (CBC); Charles Brushwood (FNW); Joe Peone (FNW); Jeannette Finley (FNW); Amelia Marchand (ENV); Beth Baldwin; Charissa Eichman (ORA); Anna Brady; James,Eve A L (BPA) - PG-5; Sullivan,Leah S (BPA) - EWP-4; Bettin,Scott W (BPA) - EWP-4

Cc: Tabitha Parr (CBC); Richard Swan, Sr. (CBC); Deanna James (CBC); Derek Palmanteer (CBC)

Subject: [EXTERNAL] RE: Colville / AA Long-term Successor Agreement discussion 6/28 @ 3pm PT

Importance: Normal

Attachments: image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image006.jpg

Adam,

When you provide the Powerpoint slides from Monday's meeting, please include slides that were part of the hydro operations presentation by Scott, Leah and Eve. Staff may want to follow up on this given we did not cover the full presentation to prioritize discussion of Accord issues.

Thanks,

Brian

From: Cody Desautel (L&P ADM) <Cody.Desautel@colvilletribes.com>
Sent: Monday, June 28, 2021 4:53 PM
To: Foster,Marchelle M (BPA) - DI-7 <mmfoster@bpa.gov>; Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>; Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; Ball,Crystal A (BPA) - EW-4 <caball@bpa.gov>; Lofy,Peter T (BPA) - EWU-4 <ptlofy@bpa.gov>; Connor,Joseph W (BPA) - EWU-4 <jwconnor@bpa.gov>; Read,Christine L (BPA) - EWB-4 <clread@bpa.gov>; Key,Philip S (BPA) - LN-7 <pskey@bpa.gov>; Miles,Tucker (BPA) - LN-7 <btmiles@bpa.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Tim Dykstra (Corps) <Timothy.A.Dykstra@usace.army.mil>; Leanne Holm (Corps) <Leanne.V.Holm2@usace.army.mil>; Scott Hoefer (BOR) <shoefer@usbr.gov>; Jeremiah Williamson (BOR) <jeremiah.williamson@sol.doi.gov>; Jarod Blades (BOR) <jblades@usbr.gov>; Lisa Lance (BOR) <lisa.lance@sol.doi.gov>; Neeka Somday (CBC) <Neeka.Somday@colvilletribes.com>; Charles Brushwood (FNW) <Charles.Brushwood@colvilletribes.com>; Joe Peone (FNW) <Joe.Peone.FNW@colvilletribes.com>; Jeannette Finley (FNW) <Jeannette.Finley@colvilletribes.com>; Amelia Marchand (ENV) <Amelia.Marchand@colvilletribes.com>; Brian Gruber <bgruber@ziontzchestnut.com>; Beth Baldwin <bbaldwin@ziontzchestnut.com>; Charissa Eichman (ORA) <Charissa.Eichman.ORA@colvilletribes.com>; Anna Brady <abrady@ziontzchestnut.com>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>; Bettin,Scott W (BPA) - EWP-4 <swbettin@bpa.gov>
Cc: Tabitha Parr (CBC) <Tabitha.Parr.CBC@colvilletribes.com>; Richard Swan, Sr. (CBC) <Richard.SwanSr.CBC@colvilletribes.com>; Deanna James (CBC) <Deanna.James.CBC@colvilletribes.com>; Derek Palmanteer (CBC) <Derek.Palmanteer.CBC@colvilletribes.com>
Subject: RE: Colville / AA Long-term Successor Agreement discussion 6/28 @ 3pm PT

Hey Marcy,

I text the council to see if they wanted to share the election changes, but didn't hear back until after the meeting. It

may be best to wait until after July 8th when we reorganize the council. The chairman lost his re-election, so we will have a new chairman. After the 8th we will know who the new chairman is, and who the committee chairs are as well. We can report that at the next meeting.

From: Foster,Marchelle M (BPA) - DI-7 [mailto:mmfoster@bpa.gov]
Sent: Monday, June 28, 2021 2:56 PM
To: Cummings,Adam H (CONTR) - EW-4; Welch,Dorothy W (BPA) - E-4; Ball,Crystal A (BPA) - EW-4; Lofy,Peter T (BPA) - EWU-4; Connor,Joseph W (BPA) - EWU-4; Read,Christine L (BPA) - EWB-4; Key,Philip S (BPA) - LN-7; Miles,Tucker (BPA) - LN-7; Zelinsky,Benjamin D (BPA) - E-4; Tim Dykstra (Corps); Leanne Holm (Corps); Scott Hoefer (BOR); Jeremiah Williamson (BOR); Jarod Blades (BOR); Lisa Lance (BOR); Cody Desautel (L&P ADM); Neeka Somday (CBC); Charles Brushwood (FNW); Joe Peone (FNW); Jeannette Finley (FNW); Amelia Marchand (ENV); Brian Gruber (CTCR); Beth Baldwin (CTCR); Charissa Eichman (ORA); Anna Brady (CTCR); James,Eve A L (BPA) - PG-5; Sullivan,Leah S (BPA) - EWP-4; Bettin,Scott W (BPA) - EWP-4
Cc: Tabitha Parr (CBC); Richard Swan, Sr. (CBC); Deanna James (CBC); Derek Palmanteer (CBC)
Subject: RE: Colville / AA Long-term Successor Agreement discussion 6/28 @ 3pm PT

It might be a good idea to get an update from the Tribe on the recent tribal elections…?

Marcy

From: Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>
Sent: Monday, June 28, 2021 2:42 PM
To: Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; Ball,Crystal A (BPA) - EW-4 <caball@bpa.gov>; Lofy,Peter T (BPA) - EWU-4 <ptlofy@bpa.gov>; Connor,Joseph W (BPA) - EWU-4 <jwconnor@bpa.gov>; Read,Christine L (BPA) - EWB-4 <clread@bpa.gov>; Key,Philip S (BPA) - LN-7 <pskey@bpa.gov>; Miles,Tucker

(BPA) - LN-7 <btmiles@bpa.gov>; Foster,Marchelle M (BPA) - DI-7 <mmfoster@bpa.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Tim Dykstra (Corps) <Timothy.A.Dykstra@usace.army.mil>; Leanne Holm (Corps) <Leanne.V.Holm2@usace.army.mil>; Scott Hoefer (BOR) <shoefer@usbr.gov>; Jeremiah Williamson (BOR) <jeremiah.williamson@sol.doi.gov>; Jarod Blades (BOR) <jblades@usbr.gov>; Lisa Lance (BOR) <lisa.lance@sol.doi.gov>; Cody Desautel (CTCR) <cody.desautel@colvilletribes.com>; Neeka Somday (CBC) <Neeka.Somday@colvilletribes.com>; Chuck Brushwood (CTCR) <Charles.Brushwood@colvilletribes.com>; Joe Peone (CTCR) <joe.peone.fnw@colvilletribes.com>; Jeannette Finley (CTCR) <jeannette.finley@colvilletribes.com>; Amelia Marchand (ENV) <Amelia.Marchand@colvilletribes.com>; Brian Gruber (CTCR) <bgruber@ziontzchestnut.com>; Beth Baldwin (CTCR) <bbaldwin@ziontzchestnut.com>; Charissa Eichman (CTCR) <Charissa.eichman.ora@colvilletribes.com>; Anna Brady (CTCR) <abrady@ziontzchestnut.com>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>; Bettin,Scott W (BPA) - EWP-4 <swbettin@bpa.gov>
Cc: Tabitha Parr (CBC) <Tabitha.Parr.CBC@colvilletribes.com>; Richard Swan, Sr. (CBC) <Richard.SwanSr.CBC@colvilletribes.com>; Deanna James (CBC) <Deanna.James.CBC@colvilletribes.com>; Derek Palmanteer (CBC) <Derek.Palmanteer.CBC@colvilletribes.com>; Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>
Subject: Colville / AA Long-term Successor Agreement discussion 6/28 @ 3pm PT

Greetings,

Please see the proposed agenda below for today's meeting.

INVITEES:

- BPA: Dorie Welch, Ben Zelinsky, Peter Lofy, Joe Connor, Philip Key, Tucker Miles, Marcy Foster, Chris Read, Adam Cummings (CONTR), Eve James, Leah Sullivan, Scott Bettin

- Corps: Tim Dykstra, Leanne Holm
- BOR: Scott Hoefer, Jeremiah Williamson, Lisa Lance, Jarod Blades
- Colville: Colville Business Council, Cody Desautel, Joe Peone, Jeannette Finley, Chuck Brushwood, Amelia Marchand, Charissa Eichman, Brian Gruber, Beth Baldwin, Anna Brady

AGENDA:

1. Introductions as needed / agenda review
2. Hydro system updates
3. Long-term successor agreement negotiation – small team report-outs (reference slides)
4. Meeting planning

a. Tentative: aim for 7/29 10am or 11am for next LTSA meeting

5. Next steps

WEBEX INFO: (copied from calendar invite)

When it's time, join your Webex meeting here.

Join meeting

More ways to join:

Join from the meeting link

(b)(2)

Join by meeting number

Meeting number (access code): (b)(2)

Meeting password: (b)(2)

Tap to join from a mobile device (attendees only)

(b)(2) US Toll

Join by phone

(b)(2) US Toll

Global call-in numbers

Join from a video system or application

(b)(2)

Join using Microsoft Lync or Microsoft Skype for Business

(b)(2)

If you are a host, click here to view host information.

Need help? Go to https://help.webex.com

We look forward to meeting.

Regards,

Adam

--

Adam Cummings
(ContR) Aerotek

Project Manager | Fish and Wildlife / EW-4

Bonneville Power Administration
bpa.gov | P 503-230-7631 | C (b)(6)

From: Brian Gruber

Sent: Fri Oct 22 13:53:34 2021

To: Samantha Meysohn; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com; william_gale@fws.gov

Cc: Liz Mack; william_gale@fws.gov; Renner,Marcella P (BPA) - E-4; SHoefer@usbr.gov; nulacky@usbr.gov; Mike.J.Langeslay@usace.army.mil; Zelinsky,Benjamin D (BPA) - E-4; Anna Brady

Subject: [EXTERNAL] RE: Agenda and Materials UC BAAF: 10/29 ISP Working Team Meeting

Importance: Normal

Attachments: RE: Meeting Info and Agenda - 6/7 ISP Working Team Meeting, UC BAAF

Thanks Liz and Sam.

We would like to focus the Corps' Authorities item on the CRFMP. The email exchange Mike and I had following the June 7 meeting (attached) prompted some additional thinking about this issue.

Brian

From: Samantha Meysohn <smeysohn@kearnswest.com>

Sent: Friday, October 22, 2021 11:34 AM
To: Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA <Timothy.M.Fleeger@usace.army.mil>; Brian Gruber <bgruber@ziontzchestnut.com>; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; btmiles@bpa.gov; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com; william_gale@fws.gov
Cc: Liz Mack <Lmack@kearnswest.com>; william_gale@fws.gov; mprenner@bpa.gov; SHoefer@usbr.gov; nulacky@usbr.gov; Mike.J.Langeslay@usace.army.mil; bdzelinsky@bpa.gov
Subject: Agenda and Materials UC BAAF: 10/29 ISP Working Team Meeting

Greetings,

Thank you for your efforts on the UC BAAF Implementation Strategies and Principles Working Team. We are writing to provide you with meeting information, a proposed agenda, reminder of 9/23 Action Items, and meeting materials for the ISP Working Team Meeting on **Friday, 10/29 from 1-2:30pm PT/ 2-3:30pm MT**.

-

Meeting Information

Below please find the meeting information:

- Web-link: https://kearnswest.zoom.us/j/84699354454?pwd=ckEyMzFDMWFYaFdIeUdVcGxMUHpTQT09
- Dial-in: +1 253 215 8782
- Meeting ID: 846 9935 4454
- Passcode: 477
- One tap mobile: +17207072699,,84699354454#,,,,*477# US (Denver)

-

Proposed Agenda

Below are proposed topics for the 10/29 ISP Working Team Meeting. Please let us know if you have any additions or changes:

- Welcome, agenda review, and updates
    - Check-in on ISP Action Items
- 10/26 Joint SA - ISP Working Team discussion debrief
- Funding options spreadsheet
- Equipment needs and rearing space
- Outstanding questions for the Corps' Authorities
- Confirm next steps, upcoming meeting topics, and summary

Action Items from 9/23

Below please find the Action Items from the 9/23 meeting:

- Scott: Coordinate with Matt and set up a call to connect with Chris/Matt/Laura to talk through Reclamation's Native American Affairs TAP by 10/15
- All: Review 638 Contract Vehicle by 10/15
- Tucker: Add details to BPA Fish and Wildlife Program item in the Funding Options Spreadsheet by 10/1
- Ben: Reach out to DC liaison about connecting with Department of Energy to learn more about Fish Passage Programs by 10/15
- UCUT: Provide a list of equipment that could be used for the P2IP studies, and see if partners can donate surplus items by 10/15
- Megan: Reach out to Chris Donley regarding potential fish hatchery facilities that may be available by 10/1
- Brian: Coordinate with Casey Baldwin to connect with USFWS around potential hatchery facilities by 10/1
- The Corps: Share answers relating to the Corps' authorities related to the Northwest Power Act by 10/15

- Leanne: Look into the Cougar Dam passage authority and provide example at future ISP Working Team Meetings by 10/15
- KW: Draft an ISP Working Team meeting summary and circulate by 9/30
- All: Complete the Doodle Poll below for future meeting scheduling by 9/30

Meeting Materials

Attached please find the following materials for your review and consideration:

- Funding Options Spreadsheet - 9-23-21

Feel free to contact Scott Hoefer or us with any questions. We look forward to hearing from you.

Best,

Liz and Sam

From: Brian Gruber

Sent: Mon Sep 20 11:19:17 2021

To: Samantha Meysohn; Liz Mack

Cc: Hoefer, Scott E; Ulacky, Nicole M; mike langeslay; Zelinsky,Benjamin D (BPA) - E-4

Subject: [EXTERNAL] RE: REMINDER: Action Items - 8/24 UC BAAF Working Group

Importance: Normal

I apologize that this is after the requested deadline for additional funding options, but I think it is important to include BPA/Bonneville Fund as an option in the table. I do not see it included in the updated (9/10 draft). An agency program that funds approximately $250 million annually in fish and wildlife mitigation related to the CRS, substantial portions of which are in the upper Columbia, should be part of the discussion.

Brian

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Thursday, September 9, 2021 2:26 PM
To: Liz Mack <Lmack@kearnswest.com>; Samantha Meysohn <smeysohn@kearnswest.com>
Cc: Hoefer, Scott E <SHoefer@usbr.gov>; Ulacky, Nicole M <nulacky@usbr.gov>; mike langeslay <Mike.J.Langeslay@usace.army.mil>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Subject: REMINDER: Action Items - 8/24 UC BAAF Working Group

Greetings,

Thank you for your efforts on the UC BAAF Working Group. We are writing with a friendly reminder for action items from the August 24th UC BAAF Working Group Meeting.

Funding Options

Please send the project team any additional funding options to add to the Funding Option Spreadsheet (attached) by **end of day, Thursday, September 16th.**

External Communications Working Team

Please send us contact information for your organization's representative for the External Communications Working Team by **end of day today, Thursday 9/9.**

Feel free to contact Scott Hoefer or us with any questions. We look forward to hearing from you soon.

Best,

Sam and Liz

--

Samantha Meysohn

Associate
Kearns & West

cell: (b)(6)

email: smeysohn@kearnswest.com

Pronouns: she/her

Liz Mack

Director

Kearns & West

phone: (971) 269-0788

email: lmack@kearnswest.com

web: www.kearnswest.com

Pronouns: she/her

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Tuesday, August 24, 2021 4:06 PM
To: Liz Mack <Lmack@kearnswest.com>; Samantha Meysohn <smeysohn@kearnswest.com>
Cc: Blades, Jarod J <jblades@usbr.gov>; Hoefer, Scott E <SHoefer@usbr.gov>; Ulacky, Nicole M <nulacky@usbr.gov>; Springer, Roland K <rspringer@usbr.gov>; mike langeslay <Mike.J.Langeslay@usace.army.mil>
Subject: Action Items - 8/24 UC BAAF Working Group

Greetings,

Thank you for your hard work and efforts at the August 24th Upper Columbia Blocked Areas Anadromous Fish (UC BAAF) Working Group Meeting. We are writing to provide you with action items and updated documents from the meeting.

Action Items

The following include action items offered during the August 24th Meeting. Please let us know if you have any additional action items.

- All: Provide comments and questions on the Phase 2 Implementation Plan (P2IP) by November 1st to Laura Robinson at laura@ucut-nsn.org
- All: Review your representative(s) on the Implementation Strategies and Principles (ISP) Working Team and the proposed ISP meeting topics for year 2 and let us know if you'd like to make any changes to better align with subject matter expertise
- All: Share potential funding opportunities with the KW team to be added to the spreadsheet
- Project Team: Coordinate with the work group to convene an External Communications Working Team

- KW: Schedule ISP meetings in close collaboration with the Studies and Actions (SA) Working Team
- KW: Share final presentation slides from the UC BAAF Working Group meeting (attached)
- KW: Circulate draft funding spreadsheet for contributions from work group members (attached)
- KW: Draft and share August 24th UC BAAF Working Group Meeting summary

-

Meeting Documents

Attached please find the following documents:

- UCUT P2IP – Originally sent on August 9th, but attached here again for your consideration.
- UC BAAF Working Group Small Team Overview – Please review your representatives on the ISP Working Team and ensure appropriate people are on the working team
- UC BAAF Working Group – August 24th 2021 Presentation Slide Deck
- UC BAAF Working Group Draft Funding Options Spreadsheet – 8-24-21 – Please review and send additions to the KW team

Feel free to reach out to Scott Hoefer or us with any questions or concerns. Thank you again for your efforts and we look forward to seeing you soon.

Best,

Sam and Liz

Samantha Meysohn

Associate
Kearns & West

cell: (b)(6)

email: smeysohn@kearnswest.com

Pronouns: she/her

Liz Mack

Director

Kearns & West

phone: (971) 269-0788

email: lmack@kearnswest.com

web: www.kearnswest.com

Pronouns: she/her

From: Samantha Meysohn
Sent: Tuesday, August 31, 2021 1:14 PM
To: Liz Mack Lmack@kearnswest.com; Samantha Meysohn smeysohn@kearnswest.com
Cc: Hoefer, Scott E SHoefer@usbr.gov; Ulacky, Nicole M nulacky@usbr.gov; mike langeslay Mike.J.Langeslay@usace.army.mil

Subject: Reply Requested UC BAAF: Seeking Participants - External Communications Working Team

Greetings,

Thank you for your efforts on the UC BAAF Working Group. We are writing to request your input on participation for the External Communications (EC) Working Team.

At the August 24 UC BAAF Working Group Plenary Meeting, the group discussed conducting outreach with external stakeholders and local governments around the activities of the UC BAAF Working Group, and the need to develop common talking points to communicate about this forum. The group decided to form a small working team of people with expertise in public affairs and communications to work on this throughout Year 2 of the UC BAAF Working Group project. We anticipate meeting at least quarterly to discuss the outreach process and talking points.

Reply Requested: If you or your organization would like to participate in the EC Working Team, please reply to this email with contact information for your organization's representative **by end of day Thursday, 9/9**. We will work with them directly to schedule a meeting.

Feel free to contact Scott Hoefer or us with any questions. We look forward to hearing from you soon.

Best,

Sam and Liz

Samantha Meysohn

Associate
Kearns & West

cell: (b)(6)

email: smeysohn@kearnswest.com

Pronouns: she/her

From: Langeslay, Michael J CIV USARMY USACE (USA)

Sent: Wed Jun 09 10:14:40 2021

To: Samantha Meysohn; Brian Gruber; ceder@usbr.gov; Holm, Leanne V CIV USARMY CENWD (USA); lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7; Fredericks, Jim K CIV USARMY CENWD (USA); Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA); Inglis, Junior L (J. R.) CIV USARMY CENWD (USA)

Cc: Gale, William; Debra Nudelman; shoefer@usbr.gov; Blades, Jarod J; Zelinsky,Benjamin D (BPA) - E-4; Dysart, Dana M CIV USARMY CENWS (USA)

Subject: RE: Meeting Info and Agenda - 6/7 ISP Working Team Meeting, UC BAAF

Importance: Normal

Attachments: Albeni Falls Signed Director's Report_07112019.pdf; 20180617-AFD-PADD-EA-main-report-SIGNED.pdf

All, here is the follow-up on the Corp's action items in Samantha's e-mail below:

The Seattle District Section 408 Coordinator is Dana Dysart (206) 316-3970, dana.m.dysart@usace.army.mil . Dana is currently coordinating with USGS on installing telemetry equipment on the Chief Joseph project for the survival study we have been talking about at the SA workgroup.

Existing authorities used for CRFM: 1933 Federal Emergency Administration of Public Works; 1935, 1945 and 1950 River and Harbor Acts; 1937 Bonneville Project Act; 1938, 1948, 1950 and 1954 Flood Control Acts; Water Resources Development Act (WRDA) 1986, WRDA 1996, Section 511, as amended by WRDA 1999, Sec.582 and

WRDA 2007, Sec. 5025

From Tim: Post authorization report and Director's report are attached. The Appendices are pretty large so if there are any in particular that they want to see, let me know and I can send them separately. There is not a separate economic appendix. For this effort they identified the least cost alternative to meet the objectives. That discussion starts in Section 3.5.2.

Mike

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Tuesday, June 8, 2021 3:49 PM
To: bgruber@ziontzchestnut.com; ceder@usbr.gov; Holm, Leanne V CIV USARMY CENWD (USA) <Leanne.V.Holm2@usace.army.mil>; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; btmiles@bpa.gov; Fredericks, Jim K CIV USARMY CENWD (USA) <Jim.K.Fredericks@usace.army.mil>; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA) <Timothy.M.Fleeger@usace.army.mil>; Inglis, Junior L (J. R.) CIV USARMY CENWD (USA) <Jr.L.Inglis@usace.army.mil>
Cc: Gale, William <william_gale@fws.gov>; Debra Nudelman <dnudelman@kearnswest.com>; shoefer@usbr.gov; Blades, Jarod J <jblades@usbr.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Langeslay, Michael J CIV USARMY USACE (USA) <Mike.J.Langeslay@usace.army.mil>
Subject: [Non-DoD Source] RE: Meeting Info and Agenda - 6/7 ISP Working Team Meeting, UC BAAF

Greetings,

Thank you for a productive call yesterday. We are writing to provide you with Action Items from the June 7th ISP Working Team Meeting.

Action Items

- Mike Langeslay: Share the Point of Contact at the Corps, Seattle District, to connect regarding 33 U.S.C. § 408
- Mike Langeslay: Share the list of authorities related to the Columbia River Fish Mitigation Program
- Tim Fleeger: Share the Post-authorization Change Report, Director's Report, and economic analysis with the group
- KW: Follow-up with a small group to continue talking about outstanding questions; cost-share and other funding authorities; and the WRDA and Secretary Report
- KW: Draft a meeting summary and send to the ISP Working Team for review by Monday, 6/14.

Feel free to contact Scott Hoefer or us with any questions or concerns. We look forward to meeting with you again soon.

Best,

Samantha and Deb

From: Samantha Meysohn
Sent: Tuesday, June 1, 2021 11:31 AM
To: bgruber@ziontzchestnut.com; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; btmiles@bpa.gov
Cc: Gale, William <william_gale@fws.gov>; Debra Nudelman <dnudelman@kearnswest.com>; shoefer@usbr.gov; Blades, Jarod J <jblades@usbr.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Langeslay, Michael J CIV USARMY USACE (US) <Mike.J.Langeslay@usace.army.mil>
Subject: Meeting Info and Agenda - 6/7 ISP Working Team Meeting, UC BAAF

Greetings,

Thank you for your efforts on the UC BAAF Implementation Strategies and Principles (ISP) Working Team. We are writing to provide you with webinar information and a proposed agenda for the ISP Working Team Meeting. We heard at the May 26th UC BAAF Working Group Meeting that the plenary members would like to be copied on the agendas of these small working teams, so we are BCC'ing everyone to avoid triggering spam filters.

Meeting Information

The meeting will be on **Monday, June 7th, 10am-11:30am PT/ 11am-12:30pm MT.** Webinar information is below:

- Web-link: https://zoom.us/j/93300223451?pwd=bE5mdXBKOENaZjM3cHZwKy81MGJvZz09
- Dial-in: +1 253 215 8782
- Meeting ID: 933 0022 3451
- Passcode: 632116
- One tap mobile: +12532158782,,93300223451#,,,,*632116# US (Tacoma)

Proposed Agenda

Below please find a proposed agenda for the meeting. Please let us know if you have any additions or revisions.

- Welcome, introductions, agenda review, updates
- Continue the authorities discussion from the May 26th UC BAAF Working Group Meeting
- Confirm next steps, upcoming meeting topics, and summary

As a reminder, please reply all with your question for the Army Corps of Engineers to the ISP Working Team by Wednesday, 6/2.

Feel free to contact Scott Hoefer or us with any questions or concerns. We look forward to meeting with you.

Best,

Samantha and Deb

Samantha Meysohn

Associate
Kearns & West

phone: (360) 536-3660

email: smeysohn@kearnswest.com

Pronouns: she/her

Debra Nudelman

Principal/Senior Mediator

Kearns & West

phone: (503) 475-2330

email: dnudelman@kearnswest.com

web: www.kearnswest.com

Pronouns: she/her

US Army Corps
of Engineers®
Seattle District

Albeni Falls Dam Fish Passage Project

Final Post-Authorization Decision Document and Environmental Assessment

June 2018

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Executive Summary

Responsible Agency: U.S. Army Corps of Engineers, Seattle District (Corps)[1].

This document is a combined Post-Authorization Decision Document (PADD) and Environmental Assessment (EA). The PADD documents the evaluation of alternatives for adding fish passage at Albeni Falls Dam (AFD). The EA portion of the document supports the alternatives evaluation and discloses, pursuant to the National Environmental Policy Act (NEPA), the analysis of potential environmental effects from the proposed alternatives and discusses how those environmental considerations were incorporated into the decision-making process for the proposed action. This PADD/EA evaluates impacts on resources in the vicinity of AFD, Bonner County, Idaho, that would be expected if the Corps were to implement its recommended plan/preferred alternative for upstream bull trout passage at AFD. **Based on the analyses described in this PADD/EA, the Trap and Haul to Upstream Release Site Alternative is the recommended plan/preferred alternative.** This PADD/EA also discusses the future without-project condition for comparison purposes. The recommended plan/preferred alternative was selected using the Corps' six-step planning process, per Engineer Regulation (ER) 1105-2-100 (Planning Guidance Notebook) and Corps engineering, environmental, and economic expertise.

Background: The Corps operates AFD to meet multiple authorized purposes: flood risk management, hydropower generation, navigation, recreation, and fish and wildlife conservation. On June 10, 1998, the Columbia River Distinct Population Segment (DPS) of bull trout (*Salvelinus confluentus*) was listed as "Threatened" under the Endangered Species Act (ESA) (USFWS 1998). A portion of this DPS resides in the Pend Oreille River, a tributary of the Columbia River located in Washington, Idaho, and British Columbia.

The United States Fish and Wildlife Service (USFWS) issued a Biological Opinion (BiOp) in 2000 on the effects of operating the Federal Columbia River Power System (FCRPS)[2], on bull trout. The 2000 BiOp addresses the actions the Corps identified for operations and maintaining its FCRPS projects and included an incidental take statement[3]. Specific to AFD, the BiOp incidental take statement requires the Action Agencies (Corps and Bonneville Power Administration [BPA]) to evaluate the feasibility of reestablishing upstream and downstream bull trout passage at AFD.

In 2012, the Corps and BPA entered into a Memorandum of Agreement (MOA) with the Kalispel Tribe of Indians (Kalispel Tribe) under which the agencies agreed, among other things, to collaborate with the

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[1] Although Bonneville Power Administration (BPA) and U.S. Bureau of Reclamation (USBR) are Action Agencies under the 2000 USFWS FCRPS BiOp, the Corps is the lead Federal agency for the purpose of conducting this planning feasibility study. Throughout this document 'Corps' refers to the U.S. Army Corps of Engineers, while 'USACE' is used to identify Corps publications.

[2] The National Marine Fisheries Service (NMFS) has also issued a BiOp regarding the effects of the ongoing operation and maintenance of the FCRPS on anadromous species.

[3] USFWS issues an incidental take statement as part of a BiOp as an estimate of the "take" of a threatened or endangered species likely to result from a federal action that can include harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt to engage in any such conduct.

tribe on the evaluation of fish passage feasibility at AFD. (See Appendix D, 2012 Kalispel Tribe MOA[4]). Passage of bull trout at AFD is of extreme importance to the tribe, as recognized in the MOA, due to the vital role of this fish resource to the tribe (See Appendix D, Kalispel MOA, and Section 4.14 on tribal resources and cultural values). This PADD/EA documents the feasibility of reestablishing upstream passage through the construction, operation, and maintenance of an upstream fish passage facility[5].

The goal of this study is to provide sub-adult[6] and adult bull trout access to habitats upstream of AFD and re-establish connectivity of bull trout critical habitat above and below AFD. The study objectives are:

1. Provide sub-adult and adult bull trout access to habitats upstream of AFD throughout the 50-year period of analysis.
2. Re-establish connectivity of bull trout critical habitat above and below AFD during the 50-year period of analysis.

Alternatives Evaluation: The Corps evaluated a range of measures and alternatives for fish passage at AFD to identify a technically feasible, environmentally acceptable, efficient plan that, if approved, funded, and constructed, would meet the study objectives and avoid the study constraints documented in this report. Based on the screening of measures and formulation and evaluation of alternatives, the Corps identified the following Final Array of Alternatives for evaluation and comparison to select a recommended plan:

- Alternative 1 - No Action (future without-project condition). This alternative assumes AFD operations would remain unchanged. Upstream fish passage would not be added to AFD.
- Alternative 2 - Trap and Haul to Upstream Release Site. This alternative would include a fishway with a ladder that would end in a holding pool and sorting facility with truck hauling capability. Bull trout would be hauled upriver for release. In addition to sorting bull trout, non-native fish would be sorted from native fish. Non-native fish would not be passed above the dam. The destination of other native fish (forebay versus tailrace) is pending discussions with fish managers (Idaho Department of Fish and Game [IDFG], Washington Department of Fish and Wildlife [WDFW], and the Kalispel Tribe.).
- Alternative 3 - Trap with Release to Forebay Exit. This alternative would include a fishway with a ladder that would end in a holding pool and sorting facility with a chute or flume to the forebay for release of bull trout and other fish above the dam. The same sorting scenario would occur as Alternative 2 for all other fish.

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[4] The Kalispel Tribe MOA can also be found online at https://www.bpa.gov/efw/Analysis/NEPADocuments/Pages/Kalispel-MOA.aspx

[5] While the incidental take statement in the 2000 BiOp refers to two-way passage, at this time the feasibility study documented in this PADD/EA is focused on upstream passage of adult and sub-adult (6 inch minimum length) bull trout because a previous study (Normandeau 2014) showed high survivability of fish passing downstream at AFD. (See Section 1.3 for information on terms of the BiOp and Section 1.7 for information on the 2014 downstream survivability study).

[6] *Sub-adult* is a life history stage where a bull trout is large enough to undergo migration beyond the natal stream but is not fully mature to undertake spawning.

- Alternative 4 - Full-height Volitional Fish Ladder. This alternative would provide upstream passage for bull trout – and other native species and non-native species that access the facility – via a full-height ladder. This alternative would include no facilities or operations that require the confinement and transport of fish by mechanical means to pre-selected release locations.

The Corps evaluated this array of alternatives to identify a plan that would provide safe, timely, and effective upstream passage of bull trout at the dam. Plans were evaluated based on five criteria related to overall ecosystem quality: fallback, bioenergetics, handling stress, safe and effective passage, and the ability to monitor bull trout and manage non-native fish passage. Alternatives were also evaluated for contributions to the study objectives, the four evaluation criteria (completeness, effectiveness, efficiency, and acceptability) established in the Principles and Guidelines (P&G) by the Council on Environmental Quality, and lifecycle cost estimates. Alternative 2 – Trap and Haul to Upstream Release Site is recommended as the recommended plan based on the plan formulation and evaluation process described in this document.

This alternative fully meets both planning objectives, based on the evaluation of overall ecosystem quality. In addition, it is possible to optimize the release site to address predation and fallback, unlike the forebay exit in Alternative 3 and Alternative 4. Compared to Alternative 4, this alternative would be easier to accommodate monitoring and evaluation (M&E) when fish are already in the trap. This is the most efficient alternative. Although the construction cost is the same as Alternative 3, the construction cost is lower than Alternative 4 – and it scored highest on the overall ecosystem quality evaluation criteria (i.e. neither Alternative 3 nor 4 scored higher for less cost).

Alternative 1 (No Action) was not selected because it does not meet either of the study objectives.

Alternative 3 (Trap with Release to Forebay Exit) was not selected because it presents a risk of fallback and greater exposure to stressors than Alternative 2, and has less flexibility that Alternative 2 with regard to release location. Alternative 3 is more efficient than Alternative 4 (Full-height Volitional Fish Ladder) because it has a lower cost, but less efficient than Alternative 2 because it scored lower on the overall ecosystem quality evaluation.

Alternative 4 was not selected, in part, because it also presents a risk of fallback and greater exposure to stressors than Alternative 2. There are concerns about bio-energetics/fallback potential – i.e., whether 6" sub-adult bull trout would swim to the top of a full-height ladder (this alternative would have approximately 20 additional pools more than Alternative 2) of the size that would need to be in place at AFD. There are also concerns about whether sub-adults would have strength and energy to swim from the forebay exit to cooler habitat above AFD. In addition, there are no known examples passing 6" sub-adult bull trout and no identified information that would reduce the unknowns and risks. Alternative 4 is less efficient than either Alternative 2 or 3 because the cost is higher and it scored lowest on overall ecosystem quality, tied with Alternative 3. Alternative 4 would also result in the passage of non-native fish above the dam, some of which compete with and/or prey upon native species, including bull trout.

Recommended plan/preferred alternative: The recommended plan is a single plan the Corps has carried through feasibility-level design analysis in this feasibility study. The recommended plan is a trap and haul facility that would be a fishway with a ladder that would end in a holding pool and sorting facility with truck hauling capability. The entrance would be located on the left side (looking downstream) of the AFD powerhouse with the fish ladder on the downstream side of the rock island

between the powerhouse and spillway and ending at the right side of the spillway (Figure ES-1)[7]. A dedicated water-supply tunnel from the forebay would provide a gravity-supplied source of water to operate the fishway. Adult and sub-adult bull trout that enter the trap would be captured, sorted, and loaded on a truck for transport to a primary release location at the Bonner Park West public boat launch, approximately 5 miles upstream of the dam. The Trestle Creek Recreation Area boat launch is approximately 44 miles upriver and provides an alternate fish release point in the summer season when river temperatures surpass 18 °C (65 °F). Non-target native species would be released directly into the forebay above AFD and non-native species would be returned below AFD.

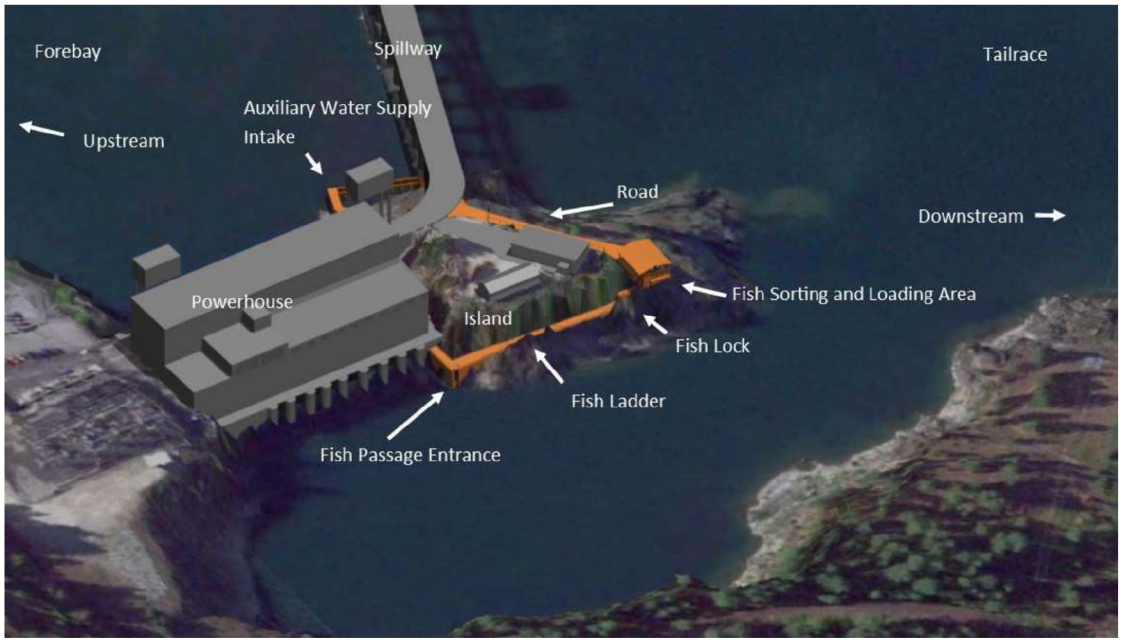

Figure ES-1. Recommended Plan/Preferred Alternative: Trap and Haul to Upstream Release Site

Expected environmental impacts: In-water blasting during construction to remove approximately 20,000 cubic yards of rock would be performed during the established in-water work window identified by IDFG of July 1 through August 31, with the potential need for extending the window into September. Blasting and drilling to remove rock would cause a temporary increase in turbidity; however, this would be mitigated by use of best management practices (BMP) such as the use of a cofferdam to isolate the area and use of exclusionary netting to act as a barrier. The blasting and drilling may disturb fish and wildlife in the vicinity, and potentially cause fish injury and mortality from the underwater acoustics.

Excavation and construction activities could affect the operations of AFD in early spring when water is being spilled for flood risk management. Spilling water unevenly through the gates (by closing the spillway bay closest to the construction) may be necessary to construct the facility and may cause

[7] Throughout this report, the terms *island* and *rock island* refer to the island between the AFD powerhouse and the spillway.

elevated total dissolved gas that could be harmful to fish. However, once construction is completed, overall operations of the dam would remain the same as current conditions.

For upstream-migrating bull trout that pass the dam, benefits would derive from regained access to foraging and spawning habitat, as well as cold water refuge during periods of elevated water temperatures in the summer months. The benefits will accrue to populations not just individuals by allowing those individuals to complete their life cycle and reproduce. The benefits of passage over AFD would outweigh temporary impacts of construction and impacts of fish handling.

Section 7 consultation under the Endangered Species Act to address specific details related to construction, operation, and maintenance of the facility described as the recommended plan/preferred alternative in this PADD/EA is complete. USFWS issued a Biological Opinion (BiOp) to the Corps dated January 11, 2018. The BiOp states that the action is not likely to jeopardize the continued existence of the species nor would it result in an adverse modification of bull trout critical habitat.

The proposed action would have an adverse effect on the AFD historic district by introducing a modern structure of notable size and scale within the district's boundary, and by altering the viewshed. The addition of the modern fish passage structure would have an incremental loss of integrity regarding the design, material, and workmanship and construction of the dam from its period of historic significance. Coordination with the Idaho State Historic Preservation Office (SHPO) resulted in a Memorandum of Agreement (MOA) executed by the Corps and SHPO. Execution of this MOA by the Corps and the SHPO and implementation of its terms evidence that the Corps has taken into account the effects of this undertaking on historic properties, thereby fulfilling its obligations under C.F.R. § 800.6 of Section 106 of the National Historic Preservation Act.

Implementation: Implementation of the recommended plan, including design and construction considerations, operation and maintenance considerations, cost estimates, and real estate requirements are described in this PADD/EA. As proposed, the recommended plan/preferred alternative is not expected to contribute significantly to negative cumulative impacts on project area resources and would be consistent with applicable local, state and Federal regulations.

Cost: Based on October 2017 price levels, the estimated project first cost is $67,505,000. (Project first cost includes the cost of construction, pre-construction engineering and design, and construction management. It includes a risk-based contingency of approximately $17,141,000, 34% of the base cost estimate.) Annual operations and maintenance (O&M) is estimated to be $676,200, with overall annual expenses including operations, maintenance, rehabilitation, repair, and replacement (OMRR&R) is estimated to be $35.7 million, or $709,000 annually over a 50-year period of analysis at the 2.75% discount rate.

Public Review: The Corps released a Draft PADD/EA for a 30-day public review and agency review from November 28-December 28, 2017, as required by NEPA and Corps Planning policy, to solicit the views of agencies, tribes, stakeholders, and other interested parties. The Corps considered comments received during public review of the Draft PADD/EA and incorporated input into this Final PADD/EA. Corps responses to comments are documented in Appendix E.

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Contents

The sections of this PADD/EA that are required for NEPA compliance are marked with an asterisk (*) in the table of contents and in the headings throughout the document. For single sections that provide dual compliance, with both NEPA and the U.S. Army Corps of Engineers planning process, dual section titles are used in some cases.

Appendices to PADD/EA:

A. Engineering Appendix
B. Environmental and Cultural Resources Appendix
C. 2015 Periodic Assessment; Fish Passage Facility Conceptual Design
D. 2012 Kalispel Tribe Memorandum of Agreement
E. Public Comment on Draft PADD/EA

List of Tables

List of Figures

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Abbreviations and Acronyms

°C	Celsius
°F	Degrees Fahrenheit
ADFG	Alaska Department of Fish and Game
AFD	Albeni Falls Dam
APE	Area of Potential Effects
ASA(CW)	Assistant Secretary of the Army for Civil Works
BA	biological assessment
BiOp	biological opinion
BLM	Bureau of Land Management
BMP	best management practice
BPA	Bonneville Power Administration
CAA	Clean Air Act
CAR	Coordination Act Report
CEQ	Council on Environmental Quality
CFD	Computational Fluid Dynamics
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIG	Climate Impacts Group (University of Washington)
Corps	U.S. Army Corps of Engineers
CRCG	Cultural Resources Cooperating Group
CWA	Clean Water Act
cy	cubic yard
dB	decibel
DPS	Distinct population segment
EA	Environmental Assessment
EC	Engineering Circular
EIS	Environmental Impact Statement
EOP	Environmental Operating Principles
ER	Engineering Regulation
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
FERC	Federal Energy Regulatory Commission
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot, feet
FTE	Full Time Employee
FWCA	Fish and Wildlife Conservation Area
FY	fiscal year
GEI	GEI Consultants, Inc.
HTRW	hazardous, toxic, and radioactive waste
ID	Idaho
IDC	interest during construction

IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Department of Fish and Game
IPNF	Idaho Panhandle National Forest
ITD	Idaho Transportation Department
KCFS	1000 cubic feet per second
kW	kilowatt
LERRD	lands, easements, rights-of-way, relocations, and disposal areas
M&E	monitoring and evaluation
MCE	minimum control elevation
MOA	memorandum of agreement
NEPA	National Environmental Policy Act
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act (16 USC 470 et seq.)
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National register of Historic Places
NWD	Northwestern Division
NWS	Seattle District
O&M	Operations and Maintenance
OMRR&R	operations, maintenance, rehabilitation, repair and replacement
OHWM	ordinary high water mark (elevation)
PADD	Post-Authorization Decision Document (PADD)
PDT	project delivery team
POVRR	Pend Oreille Valley Railroad
PUD	Public Utility District
RR&R	rehabilitation, repair and replacement
SCL	Seattle City Light
SEL	sound exposure level
SHPO	State Historic Preservation Act
TBD	To be determined
TDG	total dissolved gas
TSP	Tentatively Selected Plan
U.S.	United States
USACE	United States Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USFWS	United States Fish and Wildlife Service
VFD	variable frequency drive
WA	Washington
WDFW	Washington Department of Fish and Wildlife
2000 BiOp	2000 USFWS FCRPS Biological Opinion

1 Introduction

This integrated draft Post-Authorization Decision Document (PADD)/Environmental Assessment (EA) documents the planning process for upstream bull trout passage at Albeni Falls Dam (AFD), Bonner County, Idaho, to demonstrate consistency with U.S. Army Corps of Engineers (Corps) Planning policy and to meet the regulations that implement the National Environmental Policy Act (NEPA). The proposal to implement fish passage at AFD triggered the NEPA process recorded in this document (40 CFR 1508.23).

The Corps operates AFD to meet multiple authorized purposes: hydropower generation, flood risk management, navigation, recreation, and fish and wildlife conservation. The United States Fish and Wildlife Service (USFWS) issued a Biological Opinion (BiOp) in 2000 on the effects of operating the Federal Columbia River Power System[8] (FCRPS)[9] on bull trout (*Salvelinus confluentus*) (hereafter referred to as "the 2000 BiOp"). The Action Agencies for the 2000 BiOp are the Corps, Bonneville Power Administration (BPA), and United States Bureau of Reclamation (USBR), with the Corps and BPA being the Action Agencies specific to AFD. The 2000 BiOp addresses the actions the Corps identified for operations and maintenance of its FCRPS projects and included an incidental take statement. Specific to AFD, the BiOp incidental take statement requires the Action Agencies (Corps and Bonneville Power Administration [BPA]) to evaluate the feasibility of reestablishing upstream and downstream bull trout passage at AFD. In addition, in 2012, the Corps and BPA entered into a Memorandum of Agreement (MOA) with the Kalispel Tribe under which the agencies agreed, among other things, to collaborate with the tribe on the evaluation of fish passage feasibility at AFD. (See Appendix C, Kalispel MOA[10]). Passage of bull trout at AFD is of extreme importance to the tribe, as recognized in the MOA, due to the vital role of this fish resource to the tribe (See Appendix D, Kalispel MOA, and Section 4.14 on tribal resources and cultural values). This PADD/EA documents the feasibility of reestablishing upstream passage through the construction, operation, and maintenance of an upstream fish passage facility.

The following sections provide background information for this study. The sections of this PADD/EA that are required for NEPA compliance are denoted with an asterisk (*) following the section heading.

1.1 Study Scope

The scope of the study documented in this PADD/EA is to evaluate problems associated with upstream passage of adult and sub-adult bull trout at AFD; to formulate, evaluate, and screen potential solutions to these problems; and to recommend for construction a feasible plan for upstream passage for adult and sub-adult bull trout at AFD that is in the Federal interest. The evaluation of feasibility involved

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[8] The Federal Columbia River Power System (FCRPS) is a series of multi-purpose, hydroelectric facilities in the Pacific Northwest region of the United States, constructed and operated by the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation, and a transmission system built and operated by the Bonneville Power Administration (BPA) to market and deliver electric power. The program is currently funded by the BPA's power and transmission rates.

[9] In addition, there is a NMFS FCRPS BiOP for anadromous fish; if implemented, this project is not expected to interfere with actions required by that BiOp.

[10] The Kalispel Tribe MOA can also be found online at https://www.bpa.gov/efw/Analysis/NEPADocuments/Pages/Kalispel-MOA.aspx

consideration of technical feasibility (i.e. constructability), effectiveness, and cost. The Corps evaluated an array of alternatives to identify a plan that would provide safe, timely, and effective upstream passage of bull trout at the dam. Plans were evaluated based on five criteria related to overall ecosystem quality: fallback, bioenergetics, handling stress, safe and effective passage, and the ability to monitor bull trout and manage non-native fish passage. Alternatives were also evaluated for contributions to the study objectives, the four evaluation criteria (completeness, effectiveness, efficiency, and acceptability) established in the Principles and Guidelines (P&G) by the Council on Environmental Quality, and lifecycle cost estimates. (See Section 3 for plan formulation and evaluation of alternatives). The study scope is upstream bull trout passage. While the incidental take statement in the 2000 BiOp refers to two-way passage, the feasibility study documented in this PADD/EA is focused on upstream passage of adult and sub-adult (6-inch minimum length) bull trout because a 2014 study showed high survivability of fish passing downstream at AFD. (See Section 1.3 for information on terms of the BiOp and Section 1.7 for information on the 2014 downstream survivability study).

1.2 Authority*

Congress authorized construction of the Albeni Falls Project on the Pend Oreille River under the Flood Control Act of 17 May 1950 (Public Law 81-516) as part of a comprehensive plan for the development of the Columbia River System. The congressionally authorized purposes of AFD are flood control, power generation, navigation, recreation, and fish and wildlife conservation. AFD's authorizing documents allow for the study of fish passage feasibility at the facility and, if determined necessary, for construction of fish passage facilities. Congress, through the authorizing documents, effectively delegated the determination of this type of modification at AFD to the Assistant Secretary of the Army for Civil Works (ASA (CW)) and the Corps (see Chief's reports).

1.3 Background

On June 10, 1998, the Columbia River Distinct Population Segment (DPS) of bull trout (*Salvelinus confluentus*) was listed as "Threatened" under the Endangered Species Act (ESA) (USFWS 1998). A portion of this DPS resides in the Pend Oreille River, a tributary of the Columbia River located in Washington (WA), Idaho (ID), and British Columbia. AFD was built from January 1951 to December 1955. Prior to AFD's construction, native fish, including bull trout, passed Albeni Falls, a natural change in gradient, in both the upstream and downstream directions. Downstream fish movement is possible at AFD through entrainment, and a 2014 survivability study completed by the Corps (Normandeau 2014) revealed a downstream survivability rate through the dam of over 95 percent for bull trout surrogate species (see Sec. 1.7 for more information on this study). Because AFD was constructed without fish passage facilities, upstream fish passage ceased when AFD became operational in June 1952 and fish became isolated below the dam. Figure 1-1 and Figure 1-2 show an aerial view of the location of AFD, before construction and after.

Figure 1-1. Aerial view of Albeni Falls before construction of AFD.

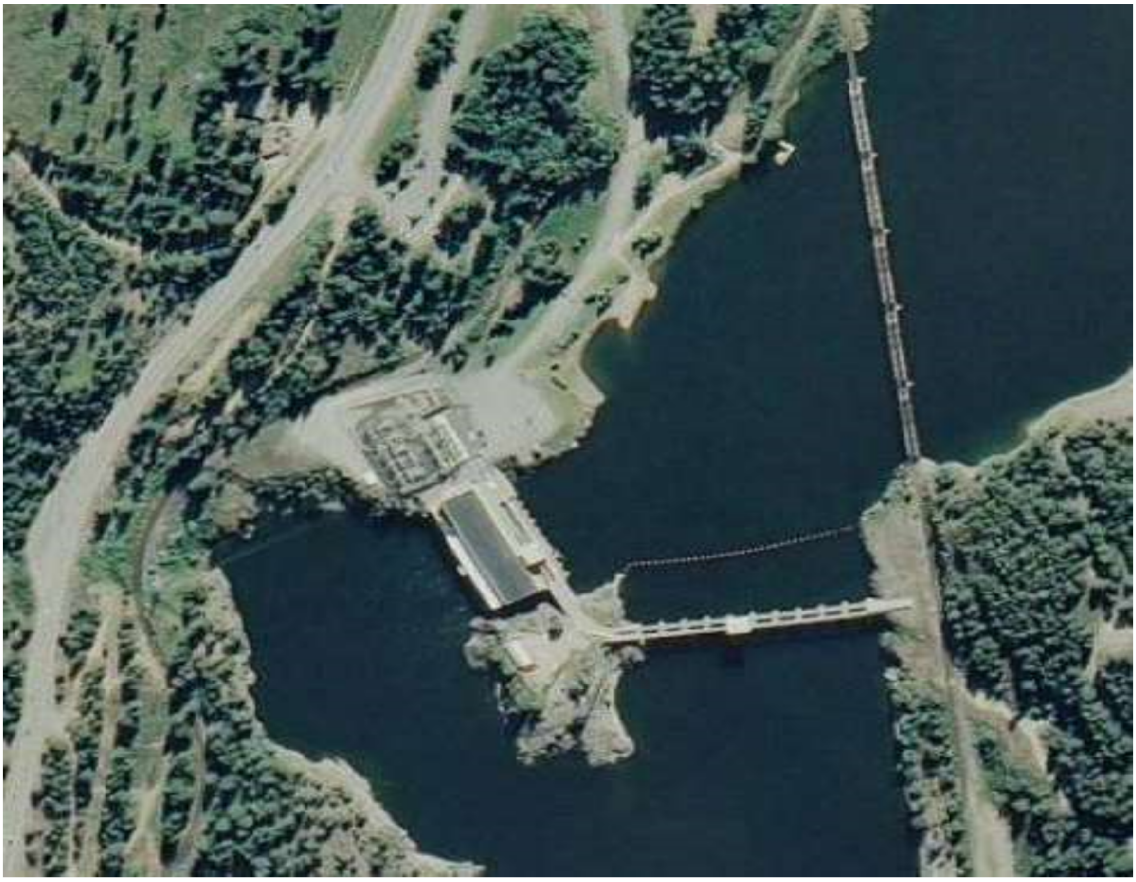


Figure 1-2. Aerial view of Albeni Falls Dam.

The 2000 BiOp notes that:

> *"...Albeni Falls Dam is a barrier isolating about 50 miles of the Pend Oreille River and its tributaries from Lake Pend Oreille. These migratory bull trout subpopulations are believed dependent upon Lake Pend Oreille for sub-adult and adult rearing...Bull trout were abundant in the Pend Oreille River through 1957, and then abruptly their numbers decreased to the point that individual fish are now noteworthy. This abrupt decline correlates with the commencement of operation of Albeni Falls Dam in 1952. No other abrupt or widespread threat can be identified for this portion of the Pend Oreille River basin during the 1950's. In the absence of passage, migratory bull trout remaining in the Pend Oreille River will continue to be harmed."*

The 2000 BiOp incidental take statement requires the Action Agencies for the FCRPS (Corps, BPA, and USBR) to implement a series of reasonable and prudent measures (RPMs) for operation of the FCRPS. Specifically, the incidental take statement requires the following for AFD:

> *Reasonable and Prudent Measure 10.A.1.3 – The action agencies shall evaluate the feasibility of reestablishing bull trout passage at Albeni Falls Dam. If the information from these studies warrants consideration of modifications to the Albeni Falls facility, then the Service will work with the action agencies to implement these measures, as appropriate, or to reinitiate consultation, if necessary.*

Terms and Conditions 11.A.1.3 – The following terms and conditions are established to implement reasonable and prudent measure #3 for the Upper Columbia River (Albeni Falls Operations):

a. By October 1, 2004, the action agencies shall conduct a feasibility study for reestablishment of two-way passage of adult and sub-adult bull trout at Albeni Falls Dam. This study must include observations of movement and survival of radio-tagged bull trout from Lake Pend Oreille, and survival of adult and sub-adult bull trout passing through or over Albeni Falls Dam. The study must also analyze the feasibility of structural improvements such as fish ladders and measures to guide fish away from turbines.

b. Based on the results of the study, by October 1, 2005, the action agencies shall consult with the Service, as necessary, on the decision to reestablish fish passage at Albeni Falls Dam. If fish passage is determined to be necessary, the action agencies will seek appropriations for the construction of the facility by October 1, 2008.

The final revised 2010 USFWS designation of bull trout critical habitat (USFWS 2010) added the Pend Oreille River from the crest of Boundary Dam upstream 162.2 km (100.8 mi) to Lake Pend Oreille (Long Bridge at Sandpoint, Idaho) (USFWS 2010, 70 FR 63898). It also added Lake Pend Oreille and much of the Clark Fork River, the entirety of the Priest River to and including Priest Lake, and other tributaries to the Pend Oreille, Priest, and Clark Fork rivers.

Although the 2000 USFWS BiOp incidental take statement refers to two-way passage, at this time this feasibility study documented in this PADD/EA is focused on upstream passage of adult and sub-adult (6 inch minimum length) bull trout, the rationale is based on a Corps study using surrogate species that showed high survival of sub-adult (99.4 percent) and adult trout (97.6 percent) passed through a spillway bay and high survival for sub-adults (99.5 percent) and relatively high survival for adults (90.1 percent) passed through a turbine (Normandeau 2014). Given the study results and available information on the dam and other facilities, AFD is a fairly benign project for impacts to entrained fish (through either the spillway or turbine). Please see Section 1.7 for a more detailed summary of the 2014 downstream survivability study.

1.4 Lead Federal Agency

Although BPA and USBR are Action Agencies along with the Corps under the 2000 USFWS FCRPS BiOp, the lead Federal agency for the purpose of conducting this planning feasibility study is the U.S. Army Corps of Engineers (Corps), Seattle District (NWS). There are no co-leads for the feasibility study.

1.5 Cooperating Agencies

During development of this PADD/EA, the Corps invited the USFWS, BPA, Kalispel Tribe, and IDFG to consider a cooperating agency role in the development of the EA portions of this PADD/EA. All four declined a formal cooperating agency role in the study, but have participated and provided special expertise in various aspects of the study development. See Section 0 (Public Involvement) of this document for more information about how these interested parties have been engaged in the feasibility study.

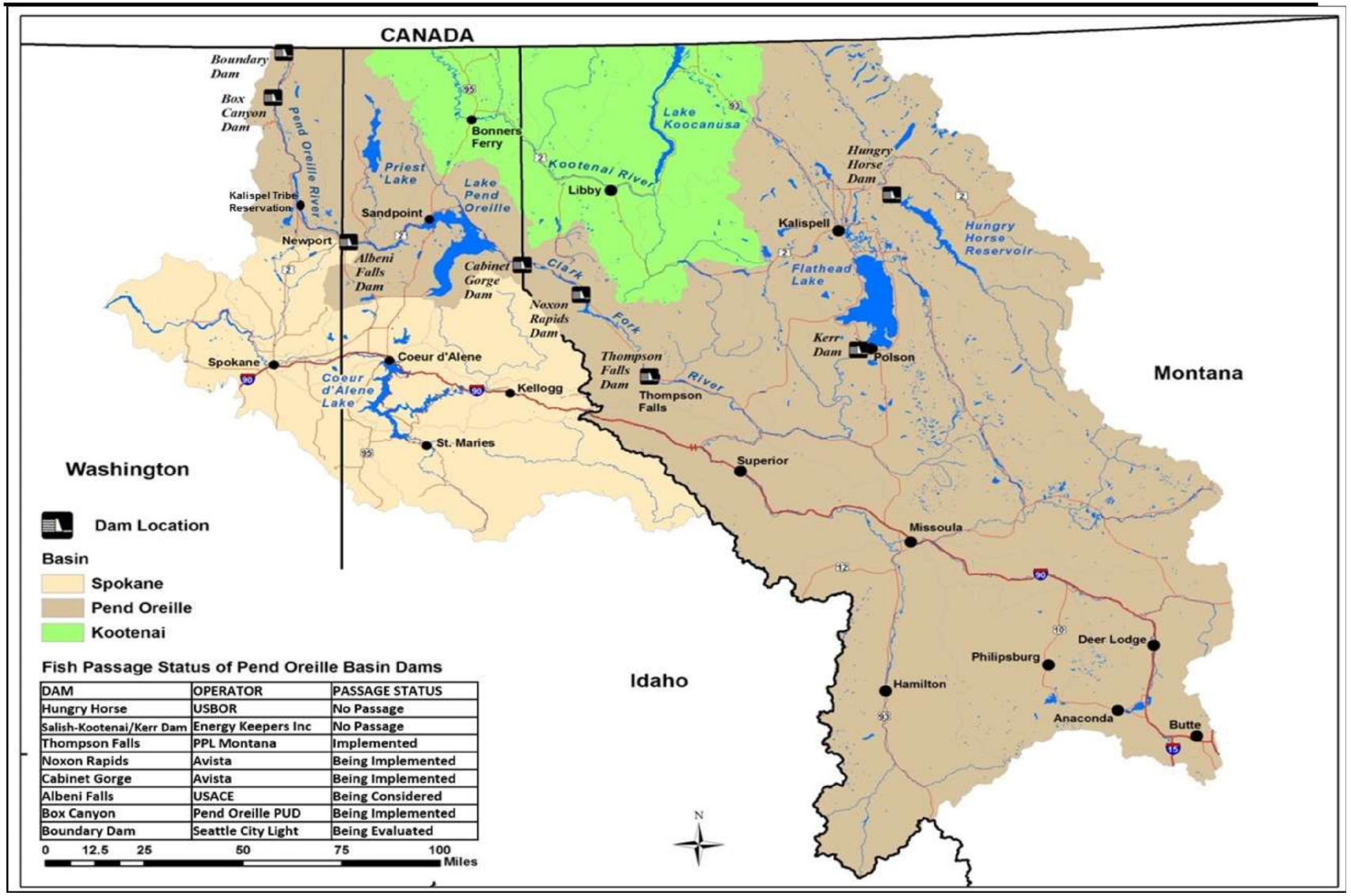
1.6 Location and Study Area

The proposed Federal (Corps) action area is focused on AFD and would include modification of the existing project to implement upstream fish passage at AFD. The study area is located at the AFD project (Figure 1-3). AFD is located at River Mile (RM) 90 on the Pend Oreille River, just east of the Washington-Idaho border, in Bonner County, ID, 50 miles northeast of Spokane, WA. Near the dam are the two small towns of Oldtown, ID, and Newport, WA. Figure 1-4 shows the location of AFD within the Pend Oreille River Basin.[11]

AFD is a 90-foot high (height of concrete) concrete gravity, gate-controlled hydropower dam. The spillway is 472 feet (ft) long and contains 10 spillway gates. The total dam length is approximately 1,080 ft which includes the powerhouse that is 301 ft long and 200 ft wide. The rock island section between the spillway and powerhouse structures is about 240 ft long. The powerhouse operates with three Kaplan turbines, creating a total power plant capacity of 42,600 kilowatts (kw) at 33,000 cubic ft per second (cfs). AFD produces approximately 200 million kw hours of power annually. Maximum operating head is about 32 ft. During periods of high flow, operating head can be much less. The dam operates with approximately an average 20 foot head differential over the course of a year based on 1961 to 2012 data. In addition to hydropower generation, a major function of AFD is flood risk management. During the summer, the project is operated to regulate Lake Pend Oreille elevations between 2060 and 2062.5 ft. In the winter, the lake elevation is drawn down to a minimum elevation of 2051.5 ft to provide flood storage capacity.

[11] The Pend Oreille Basin categorization is based on the U.S. Geological Survey (USGS) categorizations of Hydrologic Unit Codes (HUC), which break basins down into sub-basins.

Figure 1-3. Albeni Falls Dam Fish Passage Project Location



DAM	OPERATOR	PASSAGE STATUS
Hungry Horse	USBOR	No Passage
Salish-Kootenai/Kerr Dam	Energy Keepers Inc	No Passage
Thompson Falls	PPL Montana	Implemented
Noxon Rapids	Avista	Being Implemented
Cabinet Gorge	Avista	Being Implemented
Albeni Falls	USACE	Being Considered
Box Canyon	Pend Oreille PUD	Being Implemented
Boundary Dam	Seattle City Light	Being Evaluated

Figure 1-4. Location of AFD and Other Dams within Pend Oreille Basin

1.7 Relevant Prior Studies, Reports, and Existing Water Projects

In response to the requirements of the 2000 BiOp incidental take statement outlined in Section 1.3 above, the Corps initiated studies starting in 2004 to analyze specific traits of bull trout downstream of AFD and to inform the investigation of feasibility of fish passage at AFD. Key information obtained from these studies is summarized below and indicates that all of the bull trout that have been collected downstream of AFD originate from tributaries upstream and that fish collected downstream of AFD when released upstream of AFD will move to their natal tributaries to spawn. These studies also indicate that bull trout study fish released downstream of AFD did not survive through the summer during high water temperatures in selected years due to lack of thermal refuge below the dam (Scholz 2005a and 2005b, Bellgraph et al. 2010). The results from Bellgraph et al. (2010) identified the primary areas bull trout were located below the dam during seasonal migration periods and to understand fine scale movement and behavior. The data was used in the feasibility study for comparison among alternative fishway entrance locations. The studies also document that sub-adult bull trout[12] in the Pend Oreille River migrate upstream to reach their foraging and rearing areas from late fall to early summer (R2 Resource Consultants 2010). The migration of adult and sub-adult fish appears to occur year-round based on these studies and observations from monitoring of Lake Pend Oreille bull trout (see also Appendix A, Figure 5). This information along with laboratory studies of sub-adult trout swimming performance is necessary for designing fish passage facilities at AFD and Box Canyon Dam (BCD).

2004 Movement and Survival of Radio-Tagged Bull Trout near Albeni Falls Dam (Geist et al. 2004). This study examined the migratory behavior of bull trout above and below AFD by conducting radio-tracking investigations and attempting to capture bull trout during electrofishing surveys in the tailrace of the dam. The data indicated that adult bull trout below AFD spend a great deal of time at a culvert, which is a source of cool water available to them under certain flow and tailwater conditions. From there, they appeared to periodically make forays into the river, moving upstream to near the base of the dam. The coldwater refuge near a culvert became inaccessible, however, in August. Indian Creek, which has cooler water than the Pend Oreille River, also became inaccessible in August and no cool water refuge was available. This study was funded by the Corps and conducted by Pacific Northwest National Laboratory.

2005 Investigations of Migratory Bull Trout in Relation to Fish Passage at Albeni Falls Dam (Scholz et al. 2005a and 2005b). This study was funded by the Corps and conducted by the Kalispel Tribe, Eastern Washington University, and Battelle and continued work that began with the 2004 investigation. The study examined the migratory behavior of bull trout above and below AFD by conducting radio-tracking investigations and attempting to capture bull trout during electrofishing surveys in the tailrace of the dam. Results suggested that most bull trout below AFD likely originated from tributaries that flow into Lake Pend Oreille, which is upstream of AFD (recent testing shows all bull trout below AFD are from above the dam, see below). These fish would likely migrate to their natal streams to spawn given the opportunity. This study was the precursor to long-term monitoring of bull trout which has continued to present (2017). The continued monitoring confirmed these early results and has provided information on fish movements throughout the river below and above AFD. The large scale monitoring has led to extensive monitoring of fish behavior at the dams. The fine scale behavioral monitoring in the tailrace of AFD has been used in the feasibility fish passage design for AFD as described below (e.g., Bellgraph et

[12] *Sub-adult* is a life history stage where a bull trout is large enough to undergo migration beyond the natal stream but is not fully mature to undertake spawning.

al. 2010) and at Box Canyon Dam (S. Jungblom, Pend Oreille PUD, pers. comm., no published study results publically available).

2003-2009 Collection and Genetic Testing of Bull Trout. Since 2003, the Kalispel Tribe has been assisting in studies of bull trout at AFD as well as providing temporary upstream fish passage (via funding from BPA and Corps) by electrofishing for bull trout below AFD each spring, tagging the captured fish, and releasing them upstream of AFD. In this work and other Pend Oreille bull trout studies (see below), tissue samples were collected from captured fish and sent to Avista Corporation to contribute to a larger genetics study to determine the origin of bull trout in the Pend Oreille system. In the course of nine years of behavioral studies and fish collection activities at AFD, 36 bull trout have been collected below the dam and all were confirmed via the genetic testing to have originated in tributaries to Lake Pend Oreille upstream of the dam (Scholz et al. 2005a, 2005b, Bellgraph et al. 2007, 2008, 2009; Paluch et al. 2009, J. Olsen, Kalispel Tribe, unpublished data 2009-2012).

Movement Patterns of Adult Bull Trout in the Albeni Falls Dam Tailrace, Pend Oreille River, Idaho, 2008-2009 (Bellgraph et al. 2010). The study objectives were to understand fine scale bull trout movements in relation to four potential passage-structure locations. All of the locations are in the tailrace at the left and right ends of both the powerhouse and spillway. Researchers compared movements of bull trout and surrogate fish species (other trout with similar physiology) and evaluated bull trout movement in response to attractant discharges. Results indicated that bull trout and surrogates were detected at both sides of the powerhouse and both sides of the spillway in all seasons tracked. Most data was collected during the presumed upstream spring migration period March – June. However, fish were detected through many months of the year. During the spring and early summer, fish were detected more often and longer in the two powerhouse zones. This study was funded by the Corps and conducted by Pacific Northwest National Laboratory.

Sub-adult Bull Trout Biotelemetry Pend Oreille River - Albeni Falls Dam, Idaho (R2 Resource Consultants 2010). The purpose of this study was to learn about the timing of small out-migrating juvenile and sub-adult bull trout and their propensity to migrate upstream in the Pend Oreille River. The intent was to identify the mode of migration for sub-adult bull trout and use the data in design of future bull trout fishway(s)[13] on the Pend Oreille River. Unlike the typical downstream migration of juvenile salmonids, bull trout entering the Pend Oreille River migrate upstream to reach their rearing habitat in Lake Pend Oreille. This juvenile upstream migration is likely a unique life history type.

An adfluvial population of bull trout (fish that forage in Lake Pend Oreille) inhabits the Middle Fork East River, which flows into the Priest River, which empties into the Pend Oreille River at RM 95.2. Some of the juvenile and sub-adult fish detected moved downstream into the Priest River, some moved further to the Pend Oreille River, and some remained in the Middle Fork East River. Tagged sub-adult bull trout out-migrated from the East River primarily in mid-October through mid-November. However, some later migrating fish were first detected at these receivers through January and February. Timing of detection at the mouth of the Priest River and upstream into the Pend Oreille River was varied. Fish detected in the Pend Oreille River were detected within two months of leaving the Priest River; i.e., the sooner a fish left the Priest River the sooner it was detected upstream in the Pend Oreille River. Not all of the fish detected

[13] Fishways were being planned at Box Canyon Dam downstream of AFD and the Corps was evaluating fishway concepts at AFD.

at the mouth of the Priest River were subsequently detected upstream in the Pend Oreille River. None of the bull trout tagged during the two-year study were ever detected on any of the downstream receivers closer to AFD. This study also identified that these sub-adult bull trout have prolonged outmigration timing and some fish do not exhibit adfluvial behavior every year. This study was funded by the Corps and conducted by R2 Resource Consultants.

Swimming Performance of Sub-adult Fish and Fishway Design. Katipodus (1992) describes that there is a large body of literature documenting the successes and failures of fishway installations around the world. Generally, fish passage effectiveness varies with fishway design practice, species and site conditions. Fishways for the highly motivated adult Pacific salmon spawners are commonly successful, several design options are available, and numerous facilities exist as examples. Fishways for other species and juvenile and sub-adult fish are more recent and not as well documented. Most fishways are designed for the weakest swimming fish and the knowledge of the swimming performance of the life stage and species is an important component of the design process. The knowledge gained in the Sub-adult Bull Telemetry Study identified that future fishways in the Pend Oreille River should incorporate the swimming ability of juvenile (sub-adult) bull trout as they will likely need to migrate upstream through these dams to reach rearing habitat in Lake Pend Oreille. A review of swimming performance for sub-adult trout and adult salmon and specific tests for bull trout follows below. Powers et al. (1985) described the differences in swimming capability or swim speeds of juvenile trout (e.g., cutthroat; not bull trout) compared to adult salmon. "In the swimming speed trials for smaller fish (trout) in the prolonged critical speed range[14], a doubling of speed in body lengths (bl/s) from 1.5 (+) to 3.0 (+) changes the fatigue time from 200 minutes to about 20 seconds, a factor of almost 700. So for a 6-inch trout (0.5 ft.), if the velocity is doubled from 0.75 to 1.5 feet per second (fps), its fatigue time rapidly decreases from 200 minutes to about 18 seconds. In comparison, sockeye salmon, being stronger, can withstand a velocity change of from about 3 to 4.3 SBLs over the prolonged speed time range of 200 to 0.3 minutes. Assuming this application to larger fish, this means that a 2-ft. sockeye when swimming at 6 fps (8 times greater than the 200-minute speed of the 6-inch trout), can swim 8.6 fps (about 5.7 times the trout speed of 1.5 fps) for 20 seconds."

Water temperature may be an important consideration in assessing the swimming behavior of bull trout. In a study comparing the prolonged swimming ability of sub-adult bull trout, rainbow trout and Arctic char, the swimming endurance of bull trout was significantly lower than the other species at 9 °C, in this test the other fish swam up to three times longer than bull trout in multiple trials. At 15°C bull trout had similar stamina to the other species (Jones and Moffit 2004).

The U.S. Geological Survey (USGS) conducted limited trials on the swimming performance of various sizes of bull trout with varying degrees of success (Mesa et al 2004 and 2008). In the 2004 test, the critical swimming speed of bull trout ranged from 3.2 body lengths per second (bl/s) for (4.5-7 inch long fish) at 9 °C, 2.05 bl/s (12-16 inch fish) at 11 °C, 2.9 bl/s (5.5-9 inch fish) at 15 °C. The researchers noted that they could not successfully test bull trout swimming capacities at the lowest temperatures of 6 °C. The research showed that swimming speed was significantly influenced by fish length, larger fish swam

[14] Fish speeds (or velocity) is defined in three ranges: sustained, prolonged and burst (formerly called cruising, sustained and dart or burst) speeds; fish can swim sustained indefinitely without tiring; prolonged speeds are for 20 sec. to 200 min. but fish will become exhausted; and burst speeds can be maintained for 5-20 secs. and result in exhaustion. Burst speeds are used for leaping obstacles. Speeds are a function of fish size, species, condition, and life phase and water quality.

faster for longer periods before fatigue. In all tests, fish performed poorly in the enclosures used as only 16 fish were successfully tested. Bull trout that refused to swim held station, or rested and later got impinged on the screen located at the rear of the enclosure. Common techniques used to induce swimming behavior for salmonids (salmon, cutthroat and steelhead trout) did not stimulate consistent swimming activity in bull trout.

The USGS researcher's recommendation was to design passage facilities taking a conservative approach in providing swim through conditions for bull trout (Mesa et al. 2004). Further, in follow-on discussion with the USGS researchers about AFD, they suggested additional studies be performed for sub-adult bull trout to provide more realistic swimming conditions to assess their passage capability. If that was not possible, they again suggested that any fishway design for sub-adult bull trout be conservative in the design for this weakest swimming fish (M. Mesa, USGS, pers. comm, 2011-2012).

2014 Albeni Falls Dam Fish Survivability Study (Normandeau 2014). The Corps partnered with the Kalispel Tribe to investigate the survivability of fish (number of fish that survive and are injury free) that pass downstream through the spillway and powerhouse at AFD. The study used tagged rainbow trout (*Oncorhynchus mykiss*, a surrogate species) of two sizes (representing sub-adult and adult life stages) to be sent through one turbine and through one spillway to determine the detrimental effects of passage through the dam. Results showed high survival of sub-adult (99.4 percent) and adult trout (97.6 percent) passed through a spillway bay and high survival for sub-adults (99.5 percent) and relatively high survival for adults (90.1 percent) passed through a turbine. Given the study results and available information on the dam and other facilities, AFD is a fairly benign project for impacts to entrained fish (through either the spillway or turbine) as it is a low-head dam, has slow rotating Kaplan turbines, and has largely unobstructed spillways. There had been some concern that AFD has obstructions in some spillway bays where the remnants of the original islands are near the surface which could impact survival. As part of the study, spillway bay 4 was tested as it represented one of the shallowest spillways at the project and therefore was a "worst" case scenario; even with those conditions, the survival rates were still high.

2014 Temporary Denil Fishway. The Kalispel Tribe installed a temporary trap fishway at AFD in September-October 2014 below the powerhouse near the trash sluice outlet, with a goal to provide a safe and effective interim fishway for collection of bull trout until a permanent fishway can be completed. As of March 2017, no fish have been collected in the temporary trap, likely because of inadequate attraction flows. This project was funded by BPA with Corps review of project plans for potential impacts to dam operations, and human and dam safety issues.

Bull Trout Biotelemetry Pend Oreille River (2016). Bull trout monitoring below AFD has continued since the end of previously described Corps-funded studies. The monitoring is conducted by the PNNL, Kalispel Tribe, and Eastern Washington University and is funded by BPA. The objectives of the most current monitoring include 1) assessment of fish presence near the temporary fish trap, and 2) the behavior of bull trout that leave the AFD tailrace. Bull trout (mostly adult) were often found near the temporary trap and at times directly below the trap but none entered the trap. In the tailrace bull trout used water depths from 4 to 90 ft but often were in the upper 10 ft. Some bull trout that left the AFD tailrace migrated up to 50 miles downriver. Some fish completed circuits where they migrated downstream and then returned to the dam with some fish repeating this migration multiple times over several weeks.

1.8 Proposal for Federal Action*

The proposal to provide upstream fish passage at AFD triggered the NEPA process recorded in this document (40 CFR 1508.23). Subject to approval and appropriations and based on results of multiple studies of bull trout in the Pend Oreille system and at AFD, the Corps proposes implementation of upstream fish passage for adult and sub-adult bull trout at AFD. This proposal and a range of alternatives are analyzed in this document.

1.9 Overview of Planning Process and PADD/EA

The PADD documents the evaluation of alternatives to implement upstream fish passage facilities to an existing authorized project. The EA portion of the report supports the evaluation of alternatives and discloses the analysis of potential environmental effects from the proposed action. The integrated report discusses how those environmental considerations are part of the decision-making process for the proposed action. Each of the six steps of the Corps planning process aligns with a NEPA requirement. The planning steps are listed in Table 1-1 along with the NEPA element it relates to and the chapter in this document where it is discussed.

Table 1-1. Overview of PADD/EA.

Corps Planning Step	Analogous NEPA Requirement	PADD/EA Chapter
Step One – Specify Problems and Opportunities	Purpose and Need for Action	2
Step Two – Inventory and Forecast Conditions	Affected Environment	2 and 4
Step Three – Formulate Alternative Plans	Alternatives including Proposed Action	3
Step Four – Evaluate Effects of Alternative Plans	Environmental Consequences	3
Step Five – Compare Alternative Plans	Alternatives including Proposed Action	3
Step Six – Select Recommended Plan	Agency Preferred Alternative	3

Throughout this report, elevations are based on National Geodetic Vertical Datum [NGVD] 29.

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2 Need for and Objectives of Action

This chapter presents results of the first step of the Corps planning process, *Specify Problems and Opportunities*. This chapter also describes the planning objectives and planning constraints, which are the basis for formulation of alternative plans.

2.1 Problems and Opportunities

Studies indicate that bull trout originating above AFD end up downstream of the dam either on their own volition or through entrainment. From below the dam, they attempt to migrate back upstream to reach their natal spawning tributaries and the cold water refuge and forage habitat of Lake Pend Oreille. Because upstream passage at AFD is not available, bull trout are trapped and remain in the shallow waters of the Pend Oreille River below AFD. In late summer, water temperatures below AFD (and above) rise to levels adverse[15] to bull trout, which annually results in the mortality of bull trout that are entrained (originating from Lake Pend Oreille tributaries) and found below the dam.

Unlike Lake Pend Oreille, there is no thermocline[16] in the Pend Oreille River so the water temperature in the river is uniform from the top of the water column to the bottom. The water that leaves Lake Pend Oreille and feeds the river is from the warm surface waters of the lake, this water remains warm along the length of the river. The lack of a temperature gradient at AFD means colder water is not naturally available to cool the water below the dam.

Mortality of individual bull trout create a negative effect on life history and population sustainment (loss of successful spawning and future generations), and decrease the overall genetic diversity and resiliency of populations that exist above the dam.

Populations of Pend Oreille River bull trout *originating* below AFD are no longer present, based on 10 years of field surveys and genetic testing (Jason Connor, Fish Program Manager, Kalispel Tribe, pers. comm.). As a result, the Kalispel Tribe is no longer able to harvest bull trout in waters adjacent to their reservation. Bull trout present below AFD have migrated or been entrained from above AFD.

Non-native species have been introduced to Lake Pend Oreille and the Pend Oreille River (above and below AFD) via downstream migration from established populations in other rivers and lakes, upstream migration into rivers and streams (between the dams), and from legal and illegal planting of fish in lakes and rivers within the basin. Upstream passage of non-natives can occur throughout the Pend Oreille and

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[15] At water temperatures over 15-16 °C bull trout begin experiencing heat stress, at 22 °C all bull trout experience strong heat stress. Temperatures over 18-19 °C can become lethal to bull trout depending on the exposure period. In a lab study after 60 days of exposure to high temperatures 2% of bull trout died at 18 °C while 100% died at 22 °C, and at 24 °C bull trout died within 7 days (Selong and McMahon 2001).

[16] A thermocline (also known as the thermal layer) is a thin but distinct layer in a large body of water (such as an ocean, lake, or reservoir) in which temperature changes more rapidly with depth than it does in the layers above or below. In Lake Pend Oreille summer water temperature near the surface are as high as 24 °C in hot summers with similar temperatures in the Pend Oreille River. Thermal stratification in the lake occurs from late June to September, and the thermocline is usually at depths of 35–80 ft with temperatures from 9-12 °C below the thermocline. Outflow from the lake comes from depths above the thermocline.

Clark Fork system if there is no barrier to exclude them. Non-native species can compete with native bull trout for resources, or eat smaller bull trout, and one species can spawn with bull trout resulting in hybrid fish. Non-native species are considered a major risk factor for the continued existence of bull trout and would limit efforts to recover a local population. To address the spread of non-native[17] species that may harm bull trout via competition, predations, and/or interbreeding, and in some cases the greater ecosystem, agencies are using a variety of policy, regulation, and management techniques (USACE 2009; USFWS 2015; Andy Dux, IDFG, pers. comm.). This includes regulations about introduction of non-natives and control methods such as bounties, electrofishing, netting, chemical removal, and capture and removal locations at barriers such as weirs and dams (traps) on streams and rivers. Without upstream passage, restoration of bull trout populations below AFD may not be possible. If upstream passage is provided for bull trout, a trap and sorting facility would be necessary to separate bull trout from non-natives to prevent harm to bull trout from those species via predation during transport. Passage of such species above Albeni Falls would contribute to increased predation and competition that limits bull trout recovery. IDFG issued a letter dated September 5, 2017 to the Corps requesting that non-native species are not passed above AFD.

The future without-project condition describes the expected conditions if upstream fish passage is not implemented at AFD. The future without-project condition is the same as implementation of the "no action" alternative that NEPA requires the Corps to consider. The future without-project condition forecast includes anticipated actions external to the project and the anticipated consequences of these actions. The period of analysis for this study is 50 years. The Corps made the following assumptions when describing the no action alternative.

- Required upstream and downstream fish passage facilities would become operational at all other dams on the Pend Oreille River and Clark Fork River
- AFD operations and authorizations would remain unchanged

The Northeast Washington Bull Trout Recovery Team identified that the primary impediment to restoration of bull trout populations is the fragmentation of habitat within the system by hydroelectric facilities. The Northeast Washington Recovery Unit Team recommended that to achieve recovery in the Pend Oreille Core Area, connectivity is needed at AFD, Box Canyon Dam, and Boundary Dam. Other than AFD, all of the dams located on the Pend Oreille River and Clark Fork River within the U.S. are non-Federal facilities. Non-Federal dams are required to obtain licenses from FERC. As part of the FERC relicensing requirements, USFWS required the construction of fish passage facilities for ESA-listed species at all FERC licensed dams on the Pend Oreille/Clark Fork System. The licenses included plans for upstream fish passage at each project with dates ranging from 2016-2018. Passage would be available at dams both upstream and downstream of AFD. The FERC licenses also require evaluation of the need for implementing conservation hatcheries to reintroduce bull trout to the Lower Pend Oreille River. Plans for hatcheries are being developed by multiple entities that could include the non-Federal public utility districts (PUD), the Kalispel Tribe, Washington Department of Fish and Wildlife (WDFW), and IDFG depending on the specific FERC license agreement. Numerous Federal, state, and local government

[17] Non-native species that cause greater harm can be called an invasive species. "Invasive species" means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13751). The WDFW has identified northern pike as an invasive predator capable of eliminating native fish species from their preferred habitat (wdfw.wa.gov/ais).

agencies, nongovernmental organizations, and Tribes have invested and would continue to invest significant resources on efforts to protect ESA-listed bull trout.

The assumed condition for the Pend Oreille dams is that future fish runs will increase in number due to restored habitat connectivity between river reaches from completion of fish passage projects, basin-wide habitat restoration efforts, and fish management measures. Although successful efforts cannot be guaranteed, the dam operators have a series of steps (planning, studies, design, post-project monitoring, evaluation, and adaptive management) to meet their biological facility requirements, which provide a strong basis for developing effective fish passage.

As there would be no change in operations at AFD, the downstream fish passage conditions at the project would remain unchanged. The number of bull trout and other native fish that would be entrained through the powerhouse and the spillway is unknown. A high survival of sub-adult (99.4 percent) and adult trout (97.6 percent) would be expected when passing through a spillway bay and high survival for sub-adults (99.5 percent) and relatively high survival for adults (90.1 percent) would be expected when passing through a turbine, based on a 2014 study conducted by the Corps and Kalispel Tribe (Normandeau 2014; also see Section 1.7 for more details on this 2014 study).

With no upstream fish passage facilities at AFD, bull trout below the dam would not be able to reach Lake Pend Oreille. As a result, bull trout entrained through the dam would not be able to return to their spawning tributaries. In addition, bull trout from lower Pend Oreille River tributaries below AFD (initially transplanted or hatchery bull trout) would not be able to complete their migration to the lake, the required destination for successful rearing and refuge. Chapter 4 provides more details about the future without-project condition (i.e., No Action Alternative), in the section on Affected Environment and Environmental Consequences.

Several problems related to upstream bull trout passage at AFD were identified based on the existing conditions and future without-project conditions that are summarized above and described in greater detail in Section 4 of this PADD/EA. As noted in Section 1.1 above, however, the scope of this study is limited to addressing upstream bull trout passage and critical habitat connectivity problems. Alternative plans were formulated and evaluated that address only the following **problems** related to upstream bull trout passage and connectivity to habitat above the dam:

1. AFD is a fish passage barrier for bull trout that causes mortality due to lethal temperatures and inability to access cooler, upstream habitat, creating a negative effect on life history (successful spawning/rearing) and population sustainment.
2. AFD is projected to be the only upstream passage barrier in the Pend Oreille River and Clark Fork River basins once non-Federal dams in the United States (U.S.) that are above and below AFD have installed fish passage as a condition of their respective FERC licenses.[18]
3. AFD prevents entrained bull trout from accessing high quality habitat and cold water refuge above AFD in Lake Pend Oreille and upstream tributaries, and causes mortality due to inability of fish to escape lethal summer temperatures.
4. Biological connectivity for bull trout upstream migrants to critical habitat above AFD is absent.

The following **opportunities** related to upstream bull trout passage at AFD were identified:

[18] Design and implementation of fish passage at non-Federal dams in the U.S. above and below AFD is ongoing, with the latest implementation at Boundary Dam, which plans to construct passage in 2025.

1. Reestablish habitat connectivity by providing opportunities for upstream passage at AFD for adult and sub-adult bull trout.
2. Facilitate opportunity for healthy populations of bull trout that would be accessible within the Kalispel Tribe's trust-status lands.
3. Implement a project that is needed to reach full conservation potential of other actions related to habitat connectivity and restoration activities occurring within the basin. Improve system-wide connectivity for bull trout as well as non-ESA- listed species, and improve access to bull trout critical habitat.
4. Leverage system-wide restoration activities to develop a comprehensive and regional restoration initiative.
5. Reduce risk to bull trout from passage of non-native species that may harm bull trout, such as predators that can eat bull trout, competing species that use the same habitat and food source, or closely related species to bull trout that may hybridize with bull trout and compromise the genetic characteristics that are unique to bull trout behavior, life history, and morphology.

2.2 Purpose and Need for Action*

The **purpose** of the proposed Federal action is to reestablish upstream habitat connectivity to provide opportunities for bull trout populations to access habitats above and below AFD essential to their life history and survival.

The **need** for the proposed Federal action is based on the following reasons, which are based on the problems, opportunities, and objectives identified for this study as described in Section 2.3:

1. AFD is a fish passage barrier for bull trout that usually results in mortality due to lethal temperatures and inability to access cooler, upstream habitat, creating a negative effect on life history (spawning/rearing) and population sustainment.
2. AFD is projected to be the only upstream passage barrier in the Pend Oreille River and Clark Fork River basins once non-Federal dams in the U.S. that are above and below AFD have installed fish passage as a condition of their respective FERC licenses.[19]
3. AFD prevents entrained bull trout from accessing high quality habitat and cold water refuge above AFD in Lake Pend Oreille and upstream tributaries.
4. Biological connectivity for upstream migrants to critical habitat above AFD is absent.

2.3 Planning Goal and Objectives*

The goal of a planning study is the broadly defined end purpose of the study. The study planning objectives and constraints are more specific statements that guide efforts to solve the problems and achieve the opportunities identified above. Planning objectives describe the desired results of the planning process by solving the problems and taking advantage of the opportunities identified. The time scale for analysis for this study is a 50-year period beginning in 2020 and extending to 2070.The planning

[19] Design and implementation of fish passage at non-Federal dams in the U.S. above and below AFD is ongoing, with the latest implementation at Boundary Dam, which will construct passage in 2025.

objectives were used for the formulation and evaluation of alternative plans. Below are the goal and objectives of this study.

Goal: Provide sub-adult and adult bull trout access to habitats upstream of AFD and re-establish connectivity of bull trout critical habitat above and below AFD.

ESA obligations under the 2000 BiOp are for the existing bull trout population.[20] As noted above, populations of Pend Oreille River bull trout originating below AFD are no longer present in the river, based on 10 years of field surveys and genetic testing (Jason Connor, Kalispel Tribe, pers. comm.). Bull trout currently present below AFD have migrated or been entrained from above AFD.

Objectives: Based on the problems identified in the study area, planning objectives include the following and consist of an effect, subject, location, and timing per ER 1105-2-100:

1. Provide sub-adult and adult bull trout access to habitats upstream of AFD throughout the 50-year period of analysis.
2. Re-establish connectivity of bull trout critical habitat above and below AFD during the 50-year period of analysis.

Each of these two objectives addresses the four problems identified in Section 2.1 above.

2.4 Planning Constraints*

Constraints are restrictions that limit the planning process, and are statements of outcomes the Corps is seeking to avoid in formulating alternative plans to achieve the stated objectives. Constraints, like objectives, are unique to each planning study. Some general types of constraints that need to be considered are resource constraints, legal constraints, and policy constraints. Resource constraints are those associated with limits on knowledge, expertise, experience, ability, data, information, money and time. Legal and policy constraints are those defined by law, such as the Action Agencies' authority to take certain actions, obligations under existing laws and agency policy, or guidance directives. The following planning and project constraints were also identified (i.e., limitations on the range of measures and alternatives that can be proposed in this study):

1. AFD must continue to operate in accordance with the existing authorizations for flood control, power generation, navigation, recreation, and fish and wildlife conservation. This creates a variety of constraints to providing successful fish passage[21].
2. AFD must continue to operate as an integral part of the FCRPS.
3. Any proposals to modify the AFD project (i.e., the dam and its operations) must meet Corps Dam Safety requirements.

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[20] On June 11, 2013, USACE Headquarters (HQ) issued guidance related to ESA compliance and existing Civil Works Projects. This guidance addressed the issue of environmental baseline analysis for existing projects, and evaluations of the effects of ongoing operation and maintenance of existing projects on ESA listed species and designated critical habitat as distinct from the effect of an existing project's existence on such species/habitat. Discussions with the Services on this issue are ongoing.

[21] Spring spill is one such condition where fish passage should succeed in most years as this is the peak period for upstream migration of bull trout returning to spawning tributaries in Lake Pend Oreille.

4. Alternatives that include passing non-native fish should not diminish benefits of upstream bull trout passage.

2.5 Environmental Operating Principles

The Corps developed the Environmental Operating Principles (EOP), listed below, to ensure that Corps missions include integrated sustainable environmental practices. The EOP relate to the human environment and apply to all aspects of business and operations. For the purposes of this feasibility study, the Corps is conducting required NEPA analysis and documentation as a means to address principles of open and transparent processes, and has evaluated alternatives against the Principles and Guidelines (P&G) criteria and additional project-specific criteria to ensure the recommended plan is consistent with protecting the nation's environment pursuant to national environmental statutes, applicable executive orders, and other Federal planning requirements. In addition, the Corps will continue to consider these principles throughout the feasibility-level design analysis and document how implementation of the recommended plan would be consistent with these EOP.

1. Foster sustainability as a way of life throughout the organization.
2. Proactively consider environmental consequences of all Corps activities and act accordingly.
3. Create mutually supporting economic and environmentally sustainable solutions.
4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments.
5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.
6. Leverage scientific, economic, and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.
7. Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.

3 Plan Formulation

The Corps guidance for conducting civil works planning studies (Engineering Regulation [ER] 1105-2-100, Planning Guidance Notebook and Principles and Guidelines, 1983) requires the systematic formulation of alternative plans that contribute to the Federal objective. To ensure that sound decisions are made with respect to development of alternatives and ultimately with respect to plan selection, the plan formulation process requires a systematic and repeatable approach. This chapter presents the results of Step 3 of the Corps plan formulation process, Formulate Alternative Plans; Step 4, Evaluate Effects of Alternative Plans; Step 5, Compare Alternative Plans, and Step 6, Select a Plan. The environmental effects are described in Chapter 4. Alternatives were developed in consideration of study area problems and opportunities as well as study objectives and constraints with respect to the four evaluation criteria described in the Principles and Guidelines (completeness, effectiveness, efficiency, and acceptability). Figure 3-1 presents a summary of the plan formulation process that will be presented throughout this chapter.

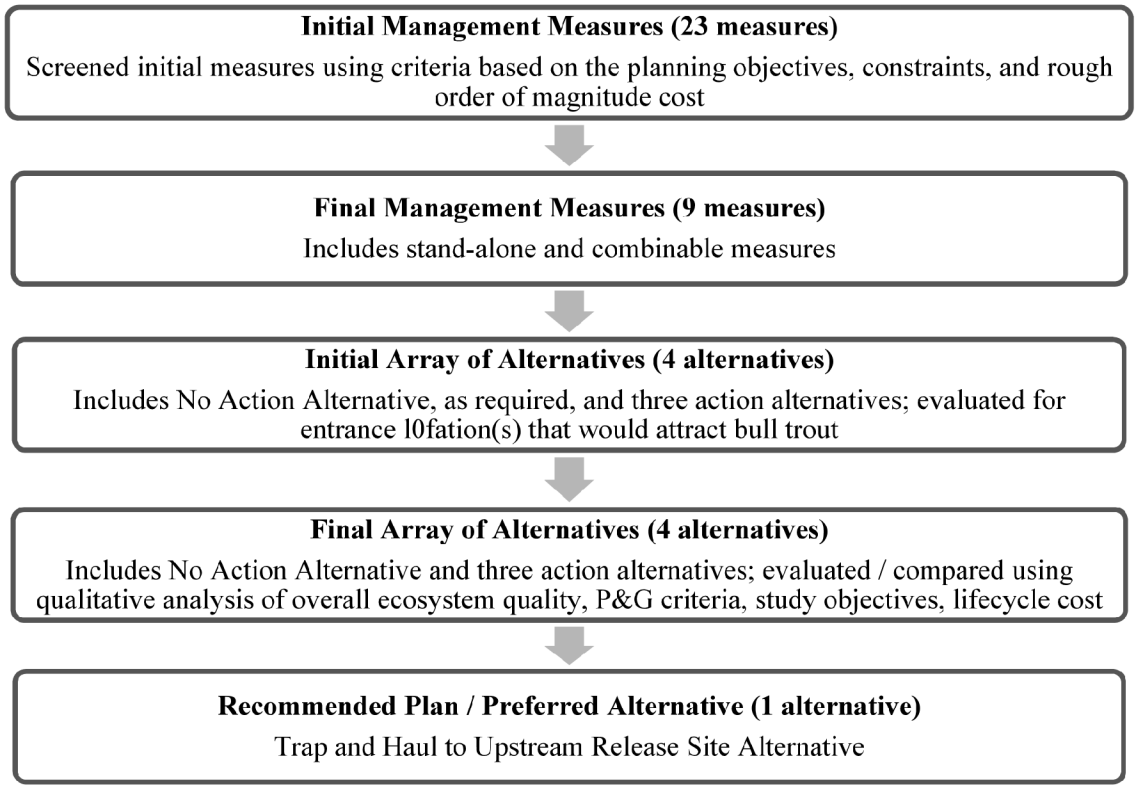

Figure 3-1. Plan Formulation Summary

3.1 Background Information that Informed Current Plan Formulation

Prior to the 2013 regional planning charette that kicked off the current planning study effort documented in this PADD/EA, the Corps (including hydraulic engineers from the Corps' Seattle District and Walla Walla District), the Kalispel Tribe and other tribes, and stakeholder groups including USFWS, fish passage engineers, fisheries biologists, BPA, and university scientists (Eastern Washington and University of Washington) completed several activities and workshops in addition to the fish studies described in Section 1.7 above to inform the plan formulation process to identify viable upstream fish

passage alternative plans at AFD. Workshops included: Fish Passage 101 (2008), Thompson Falls Fish Passage Workshop (2008), Albeni Falls Dam Fish Passage Workshop (2009), Albeni Falls Dam Prototype Design Workshop (2010), and Albeni Falls Dam Fish Passage Alternatives Formulation Workshop (2011). This section briefly summarizes the most relevant outcomes of these activities.

Over the course of this project, the first formal attempt at an AFD upstream fish passage alternatives analysis occurred in October 2008. GEI Consultants, Inc. (GEI) facilitated and documented a technical workshop for the Corps with fish passage subject matter experts from the USFWS, the Kalispel Tribe, the Selkirk Conservation Alliance, and others. The Corps also invited a group of experienced fish passage engineers from GEI, the University of Washington, and the Corps. At this workshop, participants reviewed and discussed all of the studies to-date pertaining to AFD and experience at other projects. This was an expert elicitation exercise. The discussion was followed by an alternatives brainstorming and screening exercise.

Key to the discussions at the 2008 workshop was the participants' perspective that the entrance location is the most important factor in fish passage facility design. The participants' views were that the optimum entrance location is at the upstream terminus of the watercourse below the obstruction in question. At AFD, this is the powerhouse during most of the year. However, workshop participants recognized that, during conditions of high spill, the upstream terminus could shift to the spillway side.

Participants brainstormed alternative AFD entrance locations for consideration during the study. Locations included the left and right sides of the powerhouse, the left and right sides of the spillway, the downstream end of the log chute, and at the cold water culvert about one mile downstream of the dam (Figure 3-2).

Figure 3-2. Potential Locations for Fish Passage Facility Entrance

With the exception of the culvert, the other identified entrance locations could be configured as either providing volitional passage (full height fishway) or as trap-and-transport facilities. Through this brainstorming exercise, the Corps steered away from the entrance locations at the log chute and the cold water culvert because they were not at the upstream terminus of the Pend Oreille River below the dam. A

fish passage entrance location at the upstream terminus is considered critical because migratory salmonids, including bull trout, show a strong drive to migrate to the most upstream terminus when seeking upstream passage. During non-spill periods, it would likely be necessary to spill voluntarily for fish attraction. Thus, the two spillway locations were eliminated as primary entrance locations during this workshop. However, one or both of these spillway locations may have value as secondary locations. Of the remaining powerhouse locations, the right side poses more construction challenges than the left side. Telemetry data collected in 2008 and 2009 subsequently indicates that bull trout (and surrogates) traverse the length of the powerhouse when seeking upstream passage (Bellgraph et al. 2010). For this reason, along with consideration of the challenges posed by the right side, and the fact that the powerhouse is operating almost continuously, the workshop participants felt that the left powerhouse location was the best choice to explore further as the location of a primary fish facility entrance, given the currently available information and expertise.

Subsequent workshops in 2009 and 2010 included generally the same participants. Discussions at these workshops, as well as workshops pertaining to the design of a proposed prototype entrance structure described below, indicated that the workshop participants' general thinking regarding upstream bull trout passage at AFD, particularly entrance location, remained essentially unchanged from the 2008 workshop with the powerhouse left as the preferred location. In addition, the 2008-2009 telemetry study described in Section 1.7 reinforced the assumptions of the 2008 workshop participants (Bellgraph et al. 2010). The 2008 workshop identified entrance location and facility type as the two mutually exclusive types of measures for screening and combining into alternatives.

3.1.1 Facility Type

The two primary facility types for upstream fish passage are *volitional* and *non-volitional*. A summary of each is provided below. Specific conveyance methods for each are identified below but are not identified as individual measures. Specific measures for AFD fish passage are identified in Section 3.2.

Volitional Passage. *Volitional* fish passage systems comprise fishways or other facilities that fish freely enter, and through which they are able to travel in an upstream direction. The term volitional refers to the ability to adapt or adjust behaviorally in response to external stimuli. For purposes of this report, volitional passage systems exclude facilities or operations that require the confinement and transport of fish by mechanical means to pre-selected release locations. By this definition, volitional upstream passage facilities include fish ladders or similar bypass systems that enable fish to travel under their own power through, over, or around a barrier to an egress point located immediately upstream. Volitional systems may require additional measures to ensure that fish are guided into bypass structures and are not injured, killed, or delayed by predation, entrainment in spill and turbine intakes, etc.

Non-Volitional Passage. *Non-volitional* fish passage, typically referred to as trap and haul and sometimes as trap and transport, involves collecting fish and physically transporting them to pre-selected release points that are typically, but not always, located a substantial distance from the place they were collected. This differs from volitional fish passage in that the movement of fish upstream is dependent on the operation of the transport cycle, which a fish has no ability to affect. Trap-and-haul can be distinguished further to two general types based on the distance that fish are transported. Onsite upstream trap-and-haul facilities are designed to collect fish at the base of a dam and then haul them around the dam to a release location on the other side. The most common onsite trap facilities include lifts, trams, locks, and other devices that collect fish near the base of a dam and convey them to a release point located

immediately upstream of the dam. Offsite trap-and-haul requires facilities similar to those used to capture and move fish over short distances. However, offsite transportation usually entails some form of motorized transport such as trucks or barges that have been specially equipped to keep fish alive during transit. A typical offsite scenario involves inducing fish to ascend a short fish ladder to a holding area where, after a sufficient number have been collected, they are transferred along with water to a tanker truck. The truck is driven to one or more release locations, and the fish are transferred back to a natural body of water where they can resume their migration.

The feasibility and relative advantages and disadvantages of volitional and non-volitional systems depend on the targeted species, the physical characteristics, and engineering features of the facility and surrounding waterways. The biological requirements and behaviors of the targeted species and life stages also impact the decision to implement a volitional or non-volitional passage.

3.1.2 Prior Identification and Evaluation of Feasible Alternatives

In October 2008, the Corps developed initial fishway design concepts for evaluation of a full height fish ladder, trap and transport facilities, and pool and chute. Principal facility entrance locations identified were the powerhouse left and right and spillway left and right. In December 2009, an initial concept to use a prototype facility was developed to help reduce the risk in constructing a permanent facility given the large amount of unknowns regarding bull trout fish passage. The primary purpose of a prototype facility was to deliver a facility to provide data for the planning study. This would have been accomplished by evaluating different entrance configurations during different seasons and flow conditions.

The prototype facility was not implemented due to lack of a viable means of funding a temporary prototype given the costs. The Corps and partner agencies also determined that available information from new and existing bull trout passage facilities was available to answer many of the data-gaps intended to be answered by the prototype. Beginning in 2013, the Corps then focused efforts on the feasibility study documented in this PADD/EA. The information gathered through the prior studies and workshops discussed above has informed this study.

3.2 Management Measures

The Corps identified 23 management measures and screened these measures against the planning objectives. Measures were identified as either dependent on combination with other measures or as stand-alone measures not dependent on other measures. Table 3-1 below lists measures and the screening results based on the following three criteria.

1. Addresses at least one planning objective.
2. Avoids planning constraints.

If the answer is 'No' to either criterion 1 or 2, the measure was screened out. Measures screened out during the initial screening are shaded in the table below.

Table 3-1. Initial Measures Screening (2013 screening, revised in 2017 to include new data)

Measure	Stand-alone measure or Dependent?	Meets Objectives	Avoids Constraints
1. Full-height volitional/swim through fish ladder at a single location with an entrance, ladder, and exit into the forebay.	Stand-alone	Yes -- but without additional features it may have less effective passage than other alternatives due to the variable forebay fluctuation at AFD, bioenergetics demands of ascending the full length of the ladder, and fallback risk of being released into the forebay. Without sorting capability it is unclear how monitoring and evaluation (M&E) could be accommodated for evaluating effectiveness of the facility and management of non-native species.	Maybe – without sorting facilities, non-native fish could pass upstream presenting potential harm to bull trout and potentially violating Corps invasive species policy or regulations. Passage of non-native fish that compete with and prey upon bull trout could cause an increase risk to them and other native fish. The outlet location through the dam could present issues for dam safety and fish movement. Insufficient information about inclusion of sorting or the potential dam safety risk associated with the dam safety at the measures screening stage to make definitive determination about whether this measure would avoid constraints.[22]
2. Fish trap	Dependent on entrance, ladder, and release measures	Yes, if combined with other measures that allow for separation of bull trout, and native and non-native species, and provides monitoring and evaluation capability.	Yes
3. Fishway entrance with a ladder that fish can ascend part of the way over the dam (partial ladder).	Dependent on conveyance and release measures.	Yes – but sorting for non-native species, and monitoring and evaluation, would have to be accommodated in other features.	Yes
4. Fish Lock - to raise fish from the end of the ladder a fish lock (fish stay in water) is one device used to lift fish up to the top of the dam where they can be transferred for release above the dam.	Dependent on entrance, exit/release measures. Not combinable with other vertical conveyance measures.	Yes, but sorting for non-native species, and monitoring and evaluation, would have to be accommodated in other features.	Yes
5. Fish Lift – a fish lift (fish lifted in dry basket) can be used; fish are then transferred for release above the dam.	Dependent on entrance, exit/release measures. Not combinable with other vertical conveyance measures.	Yes, but sorting for non-native species, and monitoring and evaluation, would have to be accommodated in other features.	Yes
6. Sorting – after the lift, fish are brought to a location where they are separated for delivery to different destinations or evaluated for injury or mortality.	Dependent on entrance, ladder, and exit/release measures.	Yes, for the purpose of sorting out bull trout from other species, management of non-native species, and monitoring and evaluation.	Yes
7. Release fish via a flume to the forebay	Dependent on entrance, vertical conveyance, sorting measures.	Yes, but may risk fallback as the most likely release location is in the center of the island between the spillway and powerhouse. This requires that fish pass in front of areas where they can be entrained as they swim toward the shoreline.	Yes
8. Release via hauling in a truck to an upstream release site	Dependent on entrance, vertical conveyance measures.	Yes	Yes
9. Remove AFD	Stand-alone	Yes	**No –** Impacts project operations by removing power generation, lake level management and impacts the FCRPS power system.
10. Provide an extended flume that crosses the upstream face of the powerhouse and reaches the right bank shoreline	Dependent on entrance, vertical conveyance, sorting measures.	Yes – However, while the chute exit to the shoreline would get fish farther from the dam, potentially reducing entrainment, actual change in entrainment risk is highly uncertain. Utility of this measure cannot be ascertained w/o computational fluid	**No** – Unlikely to be technically feasible to construct to extend far enough to avoid potential fallback risk.

[22] Newer information about this measure changed the evaluation from Yes in 2013 to Maybe in 2017, which is why this measure is carried forward for further evaluation.

Measure	Stand-alone measure or Dependent?	Meets Objectives	Avoids Constraints
		dynamics (CFD) modeling which may not be within the scope of the study. Utility of this feature would be better evaluated during the design phase.	
11. Bypass channel or natural fishway channel around the dam on powerhouse right bank or spillway left bank. The basic idea for a bypass is to simulate a river channel without the structural features of a fish ladder or trap, using natural materials and flow conditions.	Stand-alone	Yes – but it may have less effective passage due to variable tailrace elevations and forebay fluctuation. Without sorting capability it is unclear how monitoring and evaluation (M&E) and separation of non-native species could be accommodated.	**No** – A powerhouse right bank channel excavation would likely impact the electrical transmission system and access to the powerhouse. It could be a dam safety issue. A left bank channel could impact spillway operation.
12. Capture fish below AFD using electrofishing to stun the fish and then collect with a net	Dependent on transport and release measures.	**No** – Stresses the fish; and ineffective at locating/capturing fish.	Yes
13. Build a barrier dam downstream of AFD with a new trap and haul facility	Dependent on trap, haul, release measures.	**No -** Biologically would create connectivity problem for entrained fish and possibly downstream migrants. Entrained fish would need to migrate below barrier dam to get in trap to be transported upstream above AFD. Could result in unacceptable delay. If connects to island, then redundant.	Yes
14. Put fish traps on individual tributaries above and below AFD and haul fish to Lake Pend Oreille	Dependent on trap, haul, release measures.	**No -** Does nothing for entrained fish that don't seek shelter in the tributaries. May help with re-introduction efforts of downstream populations, but currently temperatures below the dam are lethal in the summer and result in mortality of bull trout.	Yes
15. Deploy a temporary floating trap below the dam	Dependent on haul, release measures.	**No -** Cannot properly locate/attract fish without attraction flow or upstream terminus; could not operate during an assumed bull trout migration season (spring high flow)	Yes
16. Trap bull trout at the Box Canyon dam fish passage project (55 miles downstream) and transport them upstream around AFD to Lake Pend Oreille	Dependent on trap, transport, release measures.	**No** – Connectivity problem remains for fish entrained below AFD, it also isolates 55 miles of critical habitat in the Pend Oreille River from Box Canyon Dam to AFD.	Yes
17. Take one turbine out and create a passageway through the dam	Stand-alone	Yes	**No –** Impacts project operations by removing 1/3 of power generation and impacts the FCRPS power system.
18. Convert spillway for passage through the dam	Dependent onother measures such as an entrance and lift	**No –** Would still likely require entrance and some type of lift. The river elevation is too low in certain parts of the year to allow use of the spillway.	**No –** Impacts project operations by reducing spillway capacity to pass high flows and would result in increased total dissolved gas.
19. Add bull trout prey items like small kokanee and other forage fish to lower river areas below AFD	Dependent on transport, release measures	**No** – Does not address connectivity and passage of entrained fish or reproducing populations below AFD. Does not address escape from lethal temperatures below the dam. Bull trout are a fish eating fish and Lake Pend Oreille is the source of cold water and abundant prey fish, there are existing prey fish in the river, so stocking fish would have no added benefit. Stocking is restricted by state fish management regulations.	**No -** Impacts project operations by removing power generation and lake level management, and impacts the FCRPS power system.
20. Remove all dams	Stand-alone	Yes	**No -** Impacts project operations by removing power generation and lake level management, and impacts the FCRPS power system. Corps does not own the other hydropower dams on the Pend Oreille River.
21. Build a conservation hatchery for re-introducing bull trout to tributaries of the Pend Oreille River below AFD.	Dependent on trap, transport, release measures.	**No** – Does not address connectivity and passage of entrained fish or reproducing populations below AFD. Does not address escape from lethal temperatures below the dam. A conservation hatchery designed to re-introduce bull trout to tributaries	N/A

Measure	Stand-alone measure or Dependent?	Meets Objectives	Avoids Constraints
		in the lower Pend Oreille River could accelerate recovery of bull trout populations with passage.	
22. Stock the river with bull trout transplanted from Lake Pend Oreille river tributaries.	Dependent on trap, transport, release measures.	**No** – Does not address connectivity for entrained fish, newly released transplanted fish. Does not address escape from lethal temperatures below the dam. Transplanted fish could help accelerate recovery of bull trout populations given fish passage at AFD.	N/A
23. Kalispel Tribe of Indians – to provide fishing opportunity for bull trout, tribal members could go to Lake Pend Oreille and catch fish.	Stand alone for providing tribal resources	**No** – Does not address connectivity and passage of entrained fish or reproducing populations below AFD.	N/A

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3.3 Initial Array of Alternatives

The Corps considered the eight remaining measures in the formulation of the following initial array of four alternative plans. Measures were combined to form alternatives based on the need for an entrance, some means for conveyance, and release method/location. The initial array of alternatives was then evaluated based on siting of each action alternative at AFD, with a specific focus on entrance locations where bull trout would be most likely to go as they approach the dam. Concept-level design information was not prepared at this stage of the study. The purpose of the evaluation of the initial array of alternatives was to identify alternatives that would be further evaluated during the subsequent evaluation and comparison steps of the planning process.

Alternative 1 – No Action. This alternative assumes AFD operations and authorizations would remain unchanged. Upstream fish passage would not be added to AFD. Required upstream and downstream fish passage facilities (at U.S. hydropower projects) would become operational at all other dams on the Pend Oreille River and Clark Fork River, both upstream and downstream of AFD. FERC licenses on other dams on the river also require evaluation of the need for implementing conservation hatcheries to reintroduce bull trout to the Lower Pend Oreille River. Although successful efforts cannot be guaranteed, dam operators have a series of steps (planning, studies, design, post-project monitoring, evaluation, and adaptive management) to meet their biological facility requirements which provide a strong basis for developing effective fish passage. As there would be no change in operations at AFD, the downstream fish passage conditions at the project would remain unchanged. More details about the No Action alternative (i.e., future without-project condition) are described in Section 2.1 (Problems and Opportunities) and in Chapter 4 (Affected Environment and Environmental Consequences).

Alternative 2 - Trap and Haul to Upstream Release Site. This alternative would include a fishway with a ladder that would end in a holding pool and sorting facility with truck hauling capability. Adult and sub-adult bull trout that enter the trap would be sorted from other fish and loaded on a truck for transport to one or more release location(s) upstream of the dam. Non-target native species could be released directly into the forebay above AFD and non-native species could be returned below AFD. Two dedicated chutes would be used to route non-target (native and non-native) species from the sorting facility to either the tailrace or the forebay. Final details of the sorting plan is pending discussions with fish managers including IDFG, WDFW, and the Kalispel Tribe. IDFG issued a letter to the Corps requesting that only bull trout and cutthroat trout be passed above the dam, all other native fish be returned to the tailrace, and non-native fish be removed from the system.

Alternative 3 – Trap with Release to Forebay Exit. This alternative would include a fishway with a ladder that would end in a holding pool and sorting facility. Adult and sub-adult bull trout that enter the trap would be released directly into the forebay using a flume or chute on the upstream side of the dam. The sorting of other fish would be the same as alternative 2.

Alternative 4 - Full-height Volitional Fish Ladder. This alternative would provide upstream passage for bull trout – and other native species and non-native species that access the facility – via a full-height ladder. This alternative would include no facilities or operations that require the confinement and transport of fish by mechanical means to pre-selected release locations. Fish would travel under their own power to an egress point located immediately upstream where they would release into the forebay.

3.3.1 Entrance Location Evaluation

The Corps evaluated the six potential fish passage facility entrance locations identified above in Section 3.1 – regardless of fish passage method – using biological and hydraulic considerations and qualitative evaluation of cost. This screening further reduced the potential locations for alternatives. Table 3-2 summarizes results of this evaluation/screening, which was based in part, on information from results from CFD modeling and from the Kalispel Tribe, and on the following:

1. Whether the location is an upstream terminus (i.e., a physical terminus that a fish will swim to and stop at if no path around the barrier can be found).
2. Volume and persistence of flow to provide clear hydraulic 'signal' that would attract bull trout to a fish facility. This looks largely at persistence given the locations that were considered for this study. If located on the spillway side, and the spillway is not operating, fish attraction may not be sufficient; fish may not think this is an upstream location and continue to look. Volume would be evaluated more at places away from the dam or away from a spillway or powerhouse to get enough water to communicate that this is the end of the system. (Once at a terminus, attraction flow is needed to get bull trout to the entrance of a fishway – i.e., most fish follow most flow; attraction may be necessary for sub-adults; predictability, continuity of flow is important).
3. Hydraulic conditions (complexity, turbulence, direction, entrance elevation, required entrance number needed) at selected site(s) A minimum flow rate was identified through CFD modeling (rather than selecting flows based on the five to ten percent values of existing river flows) that was determined to adequately achieve fish attraction.
4. Adaptability of a single location for future modification (i.e., addition of a second entrance to the fishway). Would it be possible to modify or add an entrance in the future to increase fish attraction (adaptive management), and could it be done more easily in one location versus another?

Based on this evaluation, the left side of the powerhouse (when looking downstream) was identified as the most appropriate location for a fish passage facility entrance because it would be at an upstream terminus, provides year-round strong flow path that can attract fish (in most cases), good hydraulic conditions, and would be the most adaptable. The Corps screened out the downstream end of log chute and downstream culvert as potential fish passage facility entrance locations based, in part, on information from a 2008 AFD fish passage workshop (see Section 3.1 for information on this workshop and outcomes). This information (and from other projects) was firm that facilities are best when fish approached the upstream terminus of a dam. At AFD, this is most likely to happen on the powerhouse side. Follow-on fish migration study (fine scale) indicated that, on the powerhouse side of AFD, fish migrated the entire front of the powerhouse. This indicates that an entrance on one side can be used to attract fish. The left side was chosen as the build would be the easiest here.

Table 3-2. Location Evaluation and Screening Summary

Location	Screened out?	Upstream Terminus	Volume and persistence of flow	Hydraulic conditions	Adaptability	Other Considerations
Island / Downstream End of Log Chute	Yes	No. Tailwater location of log chute (where fishway entrance would be) is not attractive to bull trout as upstream terminus	No natural attraction flow; flows from spillway and powerhouse, further upstream, would likely distract fish away from log chute entrance most of the time	Hydraulic conditions could be made acceptable with enough attraction flow but this location is not at the upstream terminus.	Not adaptable	Potential cost savings using existing infrastructure; would alleviate need for new tunnel through dam; later determined not structurally sound and would have to be rebuilt
Downstream Culvert	Yes	No	Existing culvert approx. 5,000 ft downstream of AFD spillway on left bank; located in a conservation wetland that is part of Pend Oreille State Wildlife Management Area; the culvert drains the area and during late summer may cease to provide adequate cold water; becomes cold-water refuge when discharging into Pend Oreille River that attracts bull trout in some years, especially during periods of high water temperatures	Would need significant modifications to take advantage of the cold water attractant. The volume of cold water available as an attractant probably not adequate. This location has served more as a secondary attractant after fish first tried to pass the dam and then found this location after converting to more of a survival mode.	Not adaptable	• Potential area to collect and tag fish • Unrestricted area where poaching could occur • Could be potential secondary trapping site to an AFD fish passage facility • Not owned by the Corps
Powerhouse Right Bank	Yes	Yes - Shoreline available; upstream terminus	Powerhouse locations have year-round strong flow path that can be used to attract fish to a fishway entrance – (right side hydraulics generate eddies that confuse fish).	This location would have good conditions right in the tailrace. Fish are thought to migrate along the left or right bank.	Could provide opportunity for a second fishway entrance to powerhouse left by transport channel	• Constructability issues associated w/ the geology – difficult access • Need to avoid switch yard
Powerhouse Left Bank	**No**	Yes - Upstream terminus	Powerhouse locations have year-round strong flow path that can be used to attract fish to a fishway entrance – clear signal to fish (better than powerhouse right).	This location would have good conditions. The drawback is this site is not connected directly to the right back. Telemetry studies however indicate the most fish approaching on the right back search the full width of the powerhouse.	Most adaptable / future potential for secondary entrance via transport channel from other location	

Location	Screened out?	Upstream Terminus	Volume and persistence of flow	Hydraulic conditions	Adaptability	Other Considerations
Spillway Right Bank	Yes	Yes - Upstream terminus	• Spillway only operates May-June most years, maximum April-June/July under normal operating conditions; would need volitional spill 9-11 mos/yr for continuous spill; spill may disorient fish - flow from both sides of project with countercurrents; hydraulics would not likely provide as clear a signal to fish as powerhouse locations. • More auxiliary attraction flow may be needed than powerhouse locations = higher pump O&M costs	Good hydraulic conditions when the project is spilling. Since this location is on the island it is not directly connected to a bank. Since the power house operates more than the spillway this site is probably does not have good conditions for as long as a powerhouse site.	Not adaptable	Voluntary spill = power generation loss; foregone revenue
Spillway Left Bank	Yes	Yes - Shoreline available; upstream terminus	• Spillway only operates May-June most years, maximum April-June/July under normal operating conditions; would need volitional spill 9-11 mos/yr for continuous spill; spill may disorient fish - flow from both sides of project with countercurrents; hydraulics would not likely provide as clear a signal to fish as powerhouse locations • More auxiliary attraction flow may be needed than powerhouse locations = higher pump O&M costs	Good hydraulic conditions and connected to a fish migration bank. However, the spillway does not operate for the duration that the powerhouse does.	Could be considered a second fishway under low flow conditions used during periods of non-spill	Voluntary spill = power generation loss; foregone revenue

3.4 Summary of Measures and Alternatives Considered but Eliminated from Detailed Study*

The Corps considered the following upstream fish passage measures and alternatives during the plan formulation process and eliminated the following alternatives from further study. The basis for eliminating these alternatives from further study is found in Sections 3.2 and 3.3.

1. Remove AFD
2. Electrofishing
3. Barrier dam with trap & haul
4. Traps on tributaries above and below AFD and transport to Lake Pend Oreille
5. Temporary trapping (floating trap below dam)
6. Trapping at Box Canyon, transport to Lake Pend Oreille
7. Take one turbine out / passage through dam
8. Convert spillway for passage
9. Add food to areas where fish are below AFD
10. Remove all dams
11. Bypass channel or natural fishway channel around AFD
12. Build a hatchery
13. Stock the river
14. Kalispel Tribe fish in Lake Pend Oreille
15. Any alternatives sited on the powerhouse right location, spillway left or right location, downstream culvert location, or with the entrance using the downstream end of the existing log chute

3.5 Final Array of Alternatives

Based on the evaluation and screening described in the sections above, the Corps identified the following Final Array of Alternatives for evaluation and comparison:

- Alternative 1 - No Action
- Alternative 2 - Trap and Haul to Upstream Release Site
- Alternative 3 - Trap with Release to Forebay Exit
- Alternative 4 - Full-height Volitional Fish Ladder

3.5.1 Design Criteria and Project Data for Final Array

The Corps developed concepts for use in evaluation and comparison of the Final Array of Alternatives based on the following criteria and project data. The location, flow rate, and features of the facility were developed during this study based on guidance and expertise of regional fish passage engineers, fisheries biologists, hydraulic engineers from the Corps, Kalispel Tribe, BPA, USFWS, GEI Consultants, and other agencies and organizations. A series of meetings and workshops were conducted to seek advice from the experts to develop and agree on criteria that could be suitable for bull trout passage, since there is limited information on bull trout passage criteria. This analysis involved using existing information, information from other dams designing or operating fish passage (bull trout and other fish), professional expertise (Corps Seattle District, Portland District, Walla Walla District, and Northwestern Division; BPA; and Kalispel Tribe), and best professional judgment. This section summarizes these criteria and project data

used for the concept development. Please see Section 3.1 for details on workshops and see Appendix A (Engineering Design Appendix) for detailed discussion of the basis for these design criteria.

Attraction Flow and Entrance Structure Criteria and Project Data

- Number of entrances: two, at powerhouse left location based on the evaluation of locations described above in Section 3.3; one perpendicular to flow and one parallel to flow; parallel entrance downstream about 50 ft.
- Total entrance attraction flow: 300 cfs, (approximately 150 cfs per entrance, or up to 300 cfs at one entrance if the other is not used). The 300 cfs recommendation is within the range of what other projects are using, but below National Marine Fisheries Service (NMFS) design guidelines[23] (NMFS 2011); the recommendation is based on CFD modeling of the AFD tailrace and input from fish passage technical resources at Walla Walla District and Kalispel Tribe and others. USFWS has not developed design criteria for bull trout. The flow rate is similar to the facility being constructed downstream at Box Canyon Dam. The two-entrance flow structure does give some flexibility to have flow in two different locations. It is unknown, but this may be needed for high-flow (where powerhouse flow is cut down or turned off) or low flow where the powerhouse is running and the two entrance locations are required. Because it is not certain what is needed, the design includes multiple entrance possibilities. In terms of problems with fish passing Box Canyon Dam due to design flow, a couple of items are considered for the AFD design. Changes to the design could be considered in the post-construction engineering and design (PED) phase, following this study. Some design changes could be based on adjusting entrance locations. Lastly, the Corps expects to get Box Canyon Dam information before a facility is built at AFD. If there are problems, this would inform whether the Corps needs to update the AFD design
- Forebay elevations: 2047 ft to 2062 ft Based on statistical analysis of historical data.
- Tailrace elevations: 2031 ft to 2048 ft Based on statistical analysis of historical data.
- Minimum operating forebay to tailrace differential: 4 ft. Based on statistical analysis of historical data.

Vertical Conveyance: Alternatives would include either a partial or full-height half Ice Harbor type of ladder (see Appendix A, part 2, Design Documentation Report for detailed discussion of ladder design criteria).

Anticipated Number of Fish Using Facility: The maximum number of fish that would be expected to enter the fishway per day upon completion of construction was identified by fish species (bull trout vs. cutthroat trout), origin (native, non-native), and size (total weight) were estimated to properly size the concept-level fish facility structures (i.e., to calculate volume for holding and number for transport). Table 3-3 summarizes the number of fish by type. The number is based on a comparison to a recently completed project at Thompson Falls Dam, the first operational mainstem fishway in the basin, and to Box Canyon Dam the next facility downstream of AFD. In addition, the Kalispel Tribe provided data from fish captures below AFD collected by electrofishing for five years from 2008-2012 that was used to estimate

[23] *Attraction flow* from the *fishway* entrance should be between 5% and 10% of fish passage design high flow (see Section 3) for streams with mean annual streamflows exceeding 1000 cfs. For smaller streams, when feasible, use larger percentages (up to 100%) of streamflow (NMFS 2011).

the relative abundance by native and non-native species to estimate proportion of fish that could be sorted for delivery to different destinations.

Table 3-3. Details of Fish Species

Species		Life Stages	Maximum Number of Fish Per Day
Target Species	Bull trout.	Sub-adult and adult.	20 (0.4% of total). For truck sizing, assume greater number of bull trout may be hauled at some time in the future based on other native species (see below).
Non-target Species	**Native Species:** Largescale Sucker, Mountain Whitefish, Northern Pikeminnow, Longnose Sucker, Peamouth, , Westslope Cutthroat Trout	Sub-adult and adult.	2830 (56.6% of total number of fish).
	Non-native Species: Brown Trout, Yellow Perch, Smallmouth Bass, Tench, Brook Trout, Lake Trout, Northern Pike, Brown Bullhead, Pumpkinseed, Largemouth Bass, Black Crappie, Walleye, Rainbow Trout, Kokanee Salmon, Lake Whitefish.	Sub-adult and adult.	2150 (43% of total number of fish).
Source: Corps analysis of data from Thompson Falls Dam, Box Canyon Dam, and Kalispel Tribe.			

Facility Alignment: An island trench alignment is recommended because it is considered to have less risk associated with in-water work (due to amount of cofferdam work) than other alignments considered around the island and in the ravine between the island and the powerhouse, and likely lower cost as a result.

Facility auxiliary water supply: The recommended facility auxiliary water supply to provide the flow to attract fish to the facility entrance is a gravity water supply feature. This is based on a comparison with a

pump system, which would cost more than a gravity supply as defined in this document due to the additional cost to pump water.

Timing of facility operation: The recommended timing of facility operation for all three action alternatives in the Final Array would be year-round for a minimum of the first three years to evaluate trends – *except for the following*:

- No passage for periods in the month of August, based on protocol for bull trout presence or absence (see Section 5.1.3), for annual maintenance; this is when water temperature is at its highest,
- No passage for two weeks in January for freeze up (i.e., when water freezes in the ladder). (Two weeks of freeze up in January was used as an assumption in the discussion of fishway timing of operation to acknowledge the need to plan for a period of freeze-up during fall-winter operation. Actual timing and duration of freeze-up could vary from this assumption.)
- Reassess timing of operation following monitoring and develop long-term operation plan at the end of the three year monitoring period.

3.5.2 Final Array Descriptions

Alternative 1 – No Action: Under the No Action alternative, the Corps assumes required upstream and downstream fish passage facilities would become operational at all other dams on the Pend Oreille River and Clark Fork River and that AFD operations and authorizations would remain unchanged. Upstream fish passage would not be implemented at AFD. See Chapter 4 for more details on the No Action Alternative/Future Without-Project Condition.

Alternative 2 – Trap and Haul to Upstream Release Site: This fish passage facility would be a fishway with a ladder that would end in a holding/pre-sort pool with a fish lock that transfers fish to a sorting facility with truck- hauling capability. Two entrances would be located on the powerhouse left side (looking downstream from the AFD powerhouse), and the fishway would cut through the downstream side of the rock island ending at the right side of the spillway. A dedicated water pipe from the forebay would provide a gravity-supplied source of water to operate the fishway. Adult and sub-adult bull trout that enter the trap would be sorted and loaded on a truck for transport to a primary release location at the Bonner Park West public boat launch, approximately 5 miles upstream of the dam (see part 1 of Appendix A (Engineering) for detailed evaluation of potential release sites). Other native species could be released directly into the forebay above AFD and non-native species could be returned below AFD. Final details of the sorting plan are pending discussions with fish managers including IDFG, WDFW, and the Kalispel Tribe. IDFG issued a letter to the Corps requesting that only bull trout and cutthroat trout be passed above the dam, all other native fish be returned to the tailrace, and non-native fish be removed from the system. In addition to the sorting plan, a monitoring and adaptive management plan is included in Appendix A. The plan lays out performance metrics to evaluate the alternative and proposed methods to monitor and evaluate operation of the facility during the first three years. No routine marking or tissue sampling of bull trout or other fish beyond what would be required for routine monitoring and evaluation. The collection of bull trout in the trap will be at ambient temperatures that are equivalent to those at the upstream release site, but a chilling unit can be added to the transport pod to minimize heat stress during peak temperatures (see Section 4.1.5).

Alternative 3 – Trap with Release to Forebay Exit: This fish passage facility would be a fishway with a ladder that would end in a holding pool and sorting facility with truck hauling capability, with the entrance located on the powerhouse left side (looking downstream from the AFD powerhouse), and with the fishway cutting through the downstream side of the rock island ending at the right side of the spillway. A dedicated water pipe from the forebay would provide a gravity-supplied source of water to operate the fishway. Adult and sub-adult bull trout that enter the trap would be released to the forebay directly above the dam. The sorting of other fish would be the same as Alternative 2. No routine marking or tissue sampling of bull trout or other fish beyond what would be required for routine monitoring and evaluation.

Alternative 4 – Full-Height Volitional Fish Ladder: Alternative 4 is a full-height volitional fish ladder. This alternative would include a fish entrance structure at the powerhouse left location (adjacent to the island) with a design flow rate of 300 cfs, a fish ladder, a passive water supply distribution system to accommodate varying tailwater elevations and a gravity water supply system that draws from the forebay. This alternative would also require a vertical slot transition structure (similar to the structure at John Day Dam) that could operate over the 15-foot forebay elevation range at AFD, a transport channel to connect the fish ladder to the transition structure, and an excavation through the dam that would be acceptable considering dam safety and fish passage concerns.

The transport channel would connect the fish ladder to the vertical slot transition structure. It would not have weirs, but would be a simple concrete channel for the fish to continue swimming from the fish ladder up into the vertical slot transition structure. The structure would be comprised of a series of vertical slot pools used to regulate water surface elevations and flow rates as the forebay elevation fluctuates. A picture of the vertical slot transition structure at John Day Dam is included below (Figure 3-3).

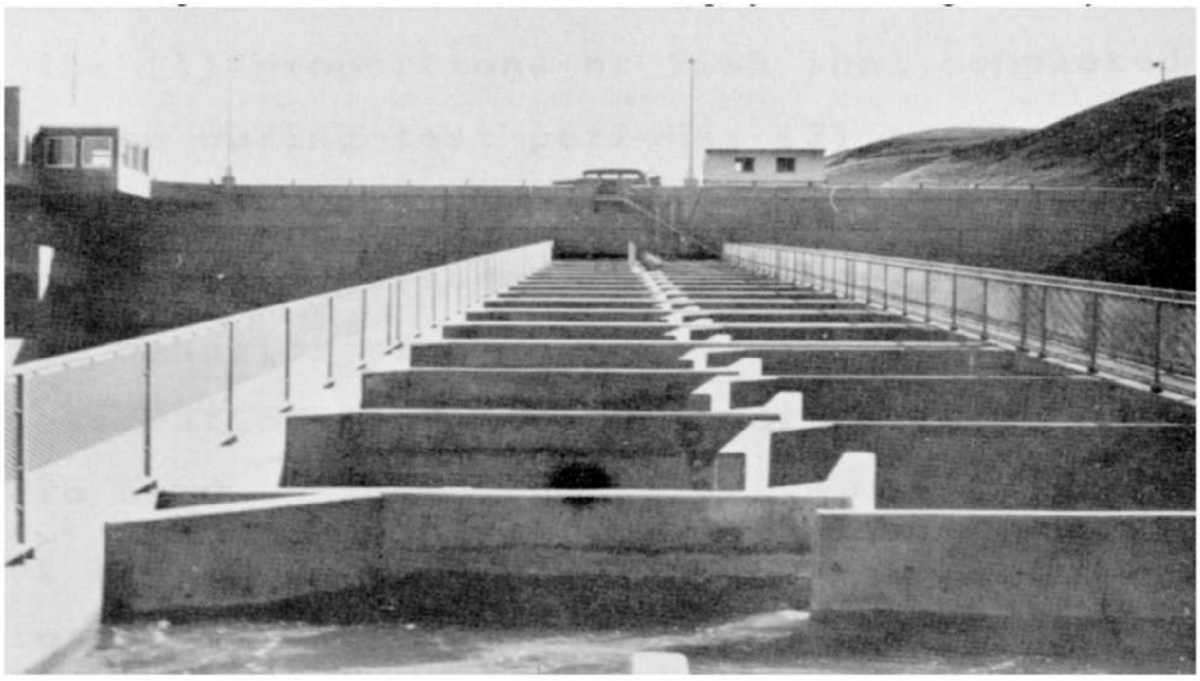

Figure 3-3. John Day Dam Transition Section

A route through the dam for the vertical slot transition structure that meets dam safety and fish passage requirements has not been identified. Given the preferred location of the fish entrance/ladder structure, and the layout of the dam and the surrounding topography, the only viable location would be the island between the left side of the powerhouse and the right side of the spillway.

Fish would swim all the way from the tailrace to the forebay through the fish ladder, transport channel, and vertical slot transition structure. By nature of a volitional system, any and all fish are allowed passage, as the system freely connects the tailrace to the forebay. The Corps would still be responsible for monitoring bull trout to ensure that the facility in this alternative meets its designed purpose of safe, timely, and effective passage for the adult and sub-adult bull trout. Monitoring could be accomplished with a small scale facility located at the forebay end of the volitional structure, but details have not been outlined or cost has not been estimated for such a facility at this time.

Table 3-4 provides a side-by-side summary of features in the three action alternatives in the Final Array of Alternatives.

Table 3-4. Final Array Action Alternatives, Comparison of Features

Features	Alternative 2: Trap and Haul to Upstream Release Site	Alternative 3: Trap with Release to Forebay Exit	Alternative 4: Full-Height Volitional Fish Ladder
Entrance Structure	Entrance structure designed to discharge 300 cfs with two openings at a single entrance – one opening parallel to flow, one perpendicular to flow	Entrance structure designed to discharge 300 cfs with two openings at a single entrance – one opening parallel to flow, one perpendicular to flow	Entrance structure designed to discharge 300 cfs with two openings at a single entrance – one opening parallel to flow, one perpendicular to flow
Vertical conveyance	Ladder consisting of 19 Half Ice Harbor pools, a pre-sort pool, fish lock and fish lock pump for lifting fish	Ladder consisting of 19 Half Ice Harbor pools, a pre-sort pool, fish lock and fish lock pump for lifting fish	Full-height ladder consisting of 19 Half Ice Harbor pools, plus transport channel and vertical slot transition structure that could operate over the 15-foot fluctuation of the forebay elevation at AFD
Trap	Yes	Yes	Not applicable
Crowder and sorting facility	Yes	Yes	No

Features	Alternative 2: Trap and Haul to Upstream Release Site	Alternative 3: Trap with Release to Forebay Exit	Alternative 4: Full-Height Volitional Fish Ladder
Truck loading area	Yes, for hauling bull trout to upriver release site	Not applicable	Not applicable
Forebay release	Yes, but not for bull trout; only for other native fish, via flume/chute	Yes, for bull trout and other native fish via flume/chute	Yes, for all fish that enter facility
Tailrace release for non-native species	Yes, for non-native fish, via return-to-river flume/chute	Yes, for non-native fish, via return-to-river flume/chute	No
Upstream release via truck (hauling)	Yes, only for adult and sub-adult bull trout	Not applicable	Not applicable
Upstream release site	Yes, at Bonner Park West public boat launch (primary site), Trestle Creek Recreation Area boat launch (alternate during warm temperatures)	Not applicable	Not applicable
Auxiliary water supply	Gravity-fed water supply system that draws from the forebay[1]	Gravity-fed water supply system that draws from the forebay[1]	Gravity-fed water supply system that draws from the forebay[1]

Note: The Ice Harbor fish ladder is the design of the fishway used at Ice Harbor Dam on the Columbia River. Each pool in the ladder has a weir and orifice on each side of the pool and a vertical concrete baffle in the center. The half Ice Harbor has narrower pools and uses one set of weir and orifice opening. Latest 10% designs during formulation used the log chute entrance at the dam as a source for water and then a pipe. This was eliminated in the feasibility-level (35%) design and a shorter excavated flow structure used that needs an entrance focused a different direction.

3.6 Evaluation and Comparison of Final Array of Alternatives*

The evaluation of alternatives is conducted by further assessing the final array of alternatives to identify a plan that cost effectively addresses safe, timely, and effective passage of bull trout at the dam. Plans were evaluated based on five criteria related to overall ecosystem quality discussed in detail below, as well as contributions to the study objectives, the four evaluation criteria (completeness, effectiveness, efficiency, and acceptability) established in the Principles and Guidelines (P&G) by the Council on Environmental Quality, and lifecycle cost estimates. This section documents the evaluation and comparison steps. The results of the evaluation and comparison of effects to significant resources are presented in Section 4.

3.6.1 Qualitative Evaluation of Overall Ecosystem Quality

Five criteria were identified by the Corps' Seattle District fish biologist, based on extensive experience in fish passage and specific expertise in bull trout. The criteria were used to evaluate the Final Array of Alternatives using qualitative scoring to derive an overall ecosystem quality score for the bull trout target species. These five criteria are fallback, bioenergetics, handling stress, safe and effective passage, the ability to monitor bull trout, and the ability to manage non-native fish passage. Each criterion was equally weighted since this is a qualitative evaluation, and scored from 1 to 3, where a higher score represents a greater qualitative benefit and a total score of 15 is possible for each alternative (i.e., 5 criteria x maximum score of 3 each). Scoring of 1 to 3 best captured conceptual and qualitative impacts of alternatives. A maximum score of 2 would not adequately differentiate alternatives from one another, and a maximum score of 4 or greater would increase subjectivity of scoring for those criteria that provide some benefit but not the maximum benefit (e.g., a maximum score of 4 would increase subjectivity when differentiating between a score of 2 or 3).

Criterion 1 – Fallback: Fallback is defined as increased injury to adult and sub-adult bull trout as they pass the dam but then pass downstream (fallback) through the turbine and spillway. A fallback causes increased risk of stress, injury, and/or mortality with passage over the spillway and/or entrainment in the turbines. It also results in bull trout ascending the fish ladder and be handled multiple times in a season, and thus increases their energy demands and stress, and reduces their potential to reach spawning grounds. Table 3-5 outlines the scoring for the fallback criteria.

Table 3-5. Fallback Criterion Score Descriptions

Score	Description
3	No fallback, fish are released at a safe distance above the dam and successfully continue their upstream migration to rearing and spawning areas.
2	Limited fallback, fish exit at the dam and some number fall back. Some of these fish are unsuccessful in reaching rearing and spawning areas.
1	Fish are trapped below the dam, cannot pass upstream, fail to reach spawning grounds. Fallback is not applicable

Criterion 2 – Bioenergetics: Bioenergetics is defined as the ability of sub-adult bull trout (their most vulnerable life stage) to pass safely upstream through the dam with least energy depletion. Energy depletion is a function of distance traveled and elevation gain required to pass the dam, which reduces successful migration upstream and modifies migratory behavior. Table 3-6 outlines the scoring for the bioenergetics criteria.

Table 3-6. Bioenergetics Criterion Score Descriptions

Score	Description
3	Higher energy retention and low stress. Shortest migration distance and least elevation gain.
2	Increased energy depletion and increased stress. Longest migration distance and greatest elevation gain.
1	Fish are trapped below the dam and cannot pass upstream. Bioenergetics demands are not applicable

Criterion 3 – Handling Stress: Handling stress is defined as upstream migration conditions that minimize exposure to factors that injure or stress fish. For upstream fish passage facilities at dams, factors that injure and stress fish include dewatering, mechanical crowding, holding, and handling. Dewatering means that water fish are travelling in is partially or fully drained off as they move through parts of the facility. Handling includes netting, anesthetizing, marking, and moving fish from one place to another by hand. Table 3-7 outlines the scoring for the handling stress criterion.

Table 3-7. Handling Stress Criteria Score Descriptions

Score	Description
3	Fish pass upstream, always in water, with no mechanical crowding, handling, or holding.
2	Some fish are exposed to dewatering, crowding, handling, and/or holding.
1	All fish are dewatered, crowded, handled, and/or held.

Criterion 4 – Safe and Effective Passage: Safe and effective passage is defined as timely and efficient upstream migration that results in reduced exposure to stressors. Safe passage means no unacceptable stress, incremental injury, or death of the fish and timely passage occurs when passage proceeds without significant impact to essential behavior patterns (feeding and migration) or life history requirements. Stressors may include time and distance traveled from the dam to reach cold water refuge (and food rich environment in Lake Pend) or cold water streams, as well as exposure to predators. Table 3-8 outlines the scoring for the safe and effective passage criterion.

Table 3-8. Safe and Effective Passage Criterion Score Descriptions

Score	Description
3	Successful movement through passage area without impact to essential behavior or life history, and can therefore move upriver to necessary habitats. Fish are passing upstream to favorable locations.
2	Exposure to stressors with release at the dam and reduced success in passing upstream.
1	Full exposure to all stressors and ultimate mortality.

Criterion 5 - Ability to Monitor Passage of Bull Trout and Manage Non-Native Fish Species: The ability to monitor bull trout passage is defined as the ability to assess the passage facility performance and adjust the passage conditions for bull trout as needed. The ability to manage non-native species is defined as the ability to reduce risk to bull trout from exclusion from or removal of predators that can eat bull trout or hybridization with closely related species to bull trout. The criteria supports agency policy for

management and removal of non-native species for multiple parties including USACE, WDFW, IDFG, and the Kalispel Tribe. Additionally, USFWS had identified a threat to bull trout recovery that includes non-native fish that compete with bull trout, may eat them, and could mate with them (hybridization). Table 3-9 outlines the scoring for the ability to monitor passage of bull trout and manage non-native fish species criterion.

Table 3-9. Ability to Monitor Passage of Bull Trout and Manage Non-Native Fish Species Criterion Score Descriptions

Score	Description
3	All fish are collected, sorted, and can be marked. The monitoring of bull trout can include evaluating attraction rate to the trap and survival through the facility. The release of marked bull trout above the dam can identify fallback rate. Sorted fish can be returned to the tailrace or forebay, transported by truck, or removed from the river.
2	Limited ability to collect, sort, and monitor bull trout and non-native fish species.
1	No ability to collect, sort, or monitor fish as facilities are not available.

Alternatives were scored against these five criteria using previous biological studies conducted on AFD, as well as best professional judgment by a Corps fish biologist with extensive experience in fish passage and specific expertise in bull trout. Some assumptions were made with regard to the conceptual alternatives to assist with the scoring. The No Action alternative (Alternative 1) assumes the interim measure for temporary collection of bull trout by electrofishing does not continue into the 50-year period of analysis. Alternative 4, Full-Height Volitional Ladder, assumes there is no sorting facility, but there would be limited monitoring to ensure the facility meets the intended purpose of safe, timely, and effective passage. Alternative 3, Trap with Release to Forebay, assumes there is no hauling of fish upriver; instead they are only released into the forebay. Alternative 2, Trap and Haul to Upstream Release Site, provides the greatest qualitative score with consideration of these five criteria with a total score of 13. Table 3-10 summarizes the scores for each of the five criteria under each alternative.

Table 3-10. Ecosystem Quality Scoring for Final Array of Alternatives

CRITERIA	Alternative 1 No Action	Alternative 2 Trap and Haul to Upstream Release Site	Alternative 3 Trap with Release to Forebay Exit	Alternative 4 Full-Height Volitional Fish Ladder
Fallback	1– No passage upstream is provided. Fish are trapped below the dam and cannot pass upstream.	3 - No fallback because bull trout would be hauled by truck and released at a safe distance above the dam to successfully continue their upstream migration to rearing and spawning areas.	2 – Forebay release would be between the powerhouse and spillway. Bull trout and other fish released would need to pass water discharge points that could draw the fish back down through the dam.	2 – Volitional release would exit somewhere at the island between the powerhouse and spillway. Bull trout and other fish that exit the volitional fishway would need to pass water discharge points that could draw the fish down through the dam.
Bioenergetics	1 - No passage upstream is provided. Fish would be trapped below the dam and could not pass upstream.	3 - Shortest migration distance and elevation gain. Higher energy retention and low stress because bull trout would not have to swim as far under this alternative, or climb as high up the ladder, which would be shorter under this alternative than in the volitional ladder alternative.	3 – Same as trap and haul alternative because of the short migration distance and elevation gain in the ladder.	2 - Increased energy depletion and increased stress because of the longer distance through the ladder, longer migration distance, and higher elevation gain
Safe and Effective Passage	1 - Full exposure to all stressors and ultimate mortality because fish passage is not provided. Stressors include temperature, threat of predation, poaching by fishers.	3 - Successful movement through passage area without impact to essential behavior or life history. Hauling would reduce bull trout exposure to stressors such as freezing temperatures in winter (sub-adult migration) and high water temperatures (sub-adult and adult) in late spring and summer, competition for food resources, and predation risk during the migration (6-44 miles) to the cold water habitats in the lake or tributary streams. Sub-adults are the most vulnerable life-stage and their migration time to reach essential habitats could be reduced by days. Alternative 2 would shorten the time from the ladder to the release location, and bull trout could then move upriver to necessary habitats. Fish would pass upstream to favorable locations.	2 – Increased exposure to stressors like distance traveled to cold water refuge or cold water streams, competition for food resources, and increased predation risk.	2 – Longer time to climb/pass the volitional ladder – approximately three times longer than for Alternative 2 or Alternative 3. Increased exposure to stressors like distance traveled to cold water refuge or cold water streams and increased predation risk.
Handling Stress	1 – Fish would not be able to pass upstream through AFD.	1 – Full exposure to dewatering, crowding, handling and holding.	1 – Full exposure to dewatering, crowding, handling and holding.	3 – Limited exposure to dewatering, crowding, handling, and holding. Monitoring would still be required where fish would be exposed to these conditions.

CRITERIA	Alternative 1 No Action	Alternative 2 Trap and Haul to Upstream Release Site	Alternative 3 Trap with Release to Forebay Exit	Alternative 4 Full-Height Volitional Fish Ladder
Ability to Monitor Passage of Bull Trout and Manage Non-Native Fish Species	1 - No ability to collect, sort, or monitor or manage any fish as fish passage facilities are not available.	3 – Design includes sorting area. All fish would be collected. Non-native species immediately sorted out from bull trout. They are either returned to forebay or fish managers elect to remove them from the river. Threats from predators or hybridization are removed. Monitoring bull trout passage can include evaluating facility performance: attraction rate to the trap, survival through the facility, and fallback rate.	3 - Design includes sorting area. All fish would be collected. Non-native species immediately sorted out from bull trout. They are either returned to forebay or fish managers elect to remove them from the river. Threats from predators or hybridization are removed. Monitoring bull trout passage can include evaluating facility performance: attraction rate to the trap, survival through the facility, and fallback rate.	2 - Limited ability to collect and sort out non-native species because Alternative 3 includes no permanent facilities for handling. Would require addition of a trap. Concept for this alternative is for full-height fully volitional passage. Alternative 4 does assume there would be limited monitoring to ensure the facility meets the intended purpose of safe, timely and effective passage.
Total Qualitative Score	**5**	**13**	**11**	**11**

3.6.2 Life Cycle Cost Comparison

The Corps developed conceptual costs for the three action alternatives based on conceptual costs of major components included as part of each of the alternatives. These costs are presented at the October 2016 price level and include a life cycle assessment of construction costs (including planning, engineering and design, and construction management), and associated operations, maintenance, rehabilitation, repair and replacement (OMRR&R) costs. Costs were annualized using a 50-year period of analysis by applying the current FY17 discount rate of 2.875 percent, and computing interest during construction assuming a 40-month construction duration. Table 3-11 summarizes the conceptual level life cycle and annual costs for the action alternatives. None of the alternatives involve involuntary spill, and, thus, no foregone hydropower is included as an opportunity cost.

Table 3-11. Conceptual Costs for Action Alternatives in Final Array

Cost Criteria[1]	Alternative 2 Trap and Haul to Upstream Release Site	Alternative 3 Trap with Release to Forebay Exit	Alternative 4 Full-Height Volitional Fish Ladder
Rough Order of Magnitude Conceptual Cost (Oct 2016 prices)[2]	$45,600,000	$45,600,000+	$63,100,000
Construction Duration (months)	40	40	40
Interest Rate	2.875%	2.875%	2.875%
Period of Analysis	50	50	50
Interest During Construction (IDC)	$2,200,000	$2,200,000+	$3,000,000+
Total Implementation Cost (Conceptual cost plus IDC)	$47,800,000	$47,800,000+	$66,100,000+
Annual Construction Cost	$1,800,000	$1,800,000+	$2,500,000+
Total OMRR&R Cost	$34,500,000	$31,300,000+	$25,600,000+
Net Present Value OMRR&R Cost	$18,100,000	$16,300,000+	$13,400,000+
Annual OMRR&R Cost	$700,000	$600,000+	$500,000+
Total Annual Cost	**$2,500,000**	**$2,400,000+**	**$3,000,000+**

[1] Costs presented in this table have been rounded to two significant digits, or the nearest $100,000.
[2] While the cost presented for Alternative 2 is complete, the construction and OMRR&R costs presented for Alternatives 3 and 4 are partial minimums developed for the sake of comparison to Alternative 2.

The construction and OMRR&R costs presented for Alternatives 3 and 4 are partial minimums developed for the sake of comparison to Alternative 2: they do not include the cost of all necessary project features or planning and design re-work, and the actual project costs would be greater than those presented. For example, the estimate for Alternative 4 includes only a partial cost for the additional length of fish ladder; because the team stopped design effort before trying to identify a viable location for the ladder and transition structure, the estimate is scaled based on the cost of the Alternative 2. As a result, the estimate does not include the cost of the additional width and depth required for a longer structure or the cost to pass through the dam. Both alternatives could require a training wall extending into the forebay to prevent excessive fallback. This feature was not included in the estimate. Operations and maintenance (O&M) is

based on a detailed estimate developed for Alternative 2, except that (1) Alternative 2 and Alternative 3 have 2 full-time employee (FTE) fish biologist technicians, and Alternative 4 has 1.5 FTE as part of annual O&M (-0.5 FTE fish biologist technician); and (2) Alternative 2 has fish truck operations and Alternative 3 and Alternative 4 do not. Rehabilitation, repair, and replacement (RR&R) cost is assumed to be similar for Alternative 2 and Alternative 3; whereas some RR&R events are not included and/or some are increased in scope as part of Alternative 4. For instance, Alternative 4 does not include RR&R cost associated with a fish lock, but includes roughly twice as much maintenance associated with a longer fish ladder.

Furthermore, Alternative 4 presents significant design and constructability challenges. Construction of the training wall would require extensive de-watering next to the power house or in-water work, and the team has not identified a viable location or method for constructing the ladder through the dam.

3.6.3 Contribution to Study Objectives

Table 3-12 summarizes how each alternative contributes to the study objectives identified in Section 2.3. Alternative 1 does not meet either objective because it does not provide any means of upstream passage and, therefore, does not provide access to upstream habitat or re-establish connectivity of critical habitat above and below the dam. While all three action alternatives meet the objectives, the evaluation described in Section 3.6.1 above shows that each alternative achieves the objectives to a different extent. While Alternative 3 and Alternative 4 do provide *access* to upstream habitats, and do re-establish connectivity with critical habitat, those two alternatives pose fallback risks to bull trout associated with release into the forebay directly above the dam. Alternative 2 most effectively meets both study objectives based on the evaluation and comparison of the Final Array of Alternatives.

Table 3-12. Comparison of Final Array of Alternatives and Study Objectives

Alternative	Objective 1: Provide sub-adult and adult bull trout access to habitats upstream of AFD throughout the 50 year period of analysis.	Objective 2: Re-establish connectivity of bull trout critical habitat above and below AFD during the 50 year period of analysis.
Alternative 1: No Action	No	No
Alternative 2: Trap and Haul to Upstream Release Site	Yes	Yes
Alternative 3: Trap and Release to Forebay Exit	Yes	Yes
Alternative 4: Full-Height Volitional Fish Ladder	Yes	Yes

3.6.4 Completeness, Effectiveness, Efficiency, and Acceptability

Corps planning guidance requires that alternatives be formulated and evaluated in consideration of the following four criteria specified in the CEQ Principles and Guidelines (P&G) (Paragraph1.6.2(c)), Table 3-13 below summarizes this evaluation.

- **Completeness** is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. This includes contributions to the study objectives identified in Section 2.3.
- **Effectiveness** is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities. This includes the qualitative evaluation of overall ecosystem quality as presented in Section 3.6.1.
- **Efficiency** is the extent to which an alternative plan is the most cost effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the nation's environment. For the purposes of this study, however, *efficiency* is defined the least cost, and includes the life-cycle cost comparison presented in Section 3.6.2.
- **Acceptability** is the workability and viability of the alternative plan with respect to acceptance by State and local entities and the public and compatibility with existing laws, regulations, and public policies.

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Table 3-13 Evaluation of Final Array of Alternatives with Principles and Guidelines Criteria

Alternative	Completeness	Effectiveness	Efficiency	Acceptability
Alternative 1 - No Action	This is not a complete plan because it does not provide a means to realize the planning objectives of this study described in Section 2.3.	This alternative is not effective because it does not achieve either of the planning objectives. Total qualitative score for ecosystem quality = 5 points.	This plan does not provide a means to realize the planning objectives of this study described in Section 2.3 and, therefore, has no cost estimate.	This alternative is not acceptable to because it does not meet the planning objectives and is not acceptable to State and local entities, tribes, and the public
Alternative 2 - Trap and Haul to Upstream Release Site	This is a complete plan because all actions required to achieve the planning objectives described in Section 2.3 are accounted for and it is not dependent on the actions of others.	The alternative is the most effective of the final array to alleviate the specified problems and achieve the specified opportunities. This alternative fully meets both planning objectives, based on the evaluation of overall ecosystem quality. In addition, it is possible to optimize the release site to address predation and fallback, unlike the forebay exit in Alternative 3 and Alternative 4. Compared to Alternative 4, this alternative would be easier to accommodate monitoring and evaluation (M&E) when fish are already in the trap. Total qualitative score for ecosystem quality = 13 points.	Total minimum rough order magnitude cost = $46 million Total minimum annualized cost including OMRR&R = $2.5 million	This alternative is acceptable because it does not violate public laws or regulations, or Corps policy on non-native fish species. A trap and haul facility is a known, viable fish passage method.
Alternative 3 – Trap with Release to Forebay Exit	This is a complete plan because all actions required to achieve the planning objectives described in Section 2.3 are accounted for and it is not dependent on the actions of others.	This alternative is less effective than Alternative 2 in alleviating the specified problems and achieving the specified opportunities. This alternative partially meets both planning objectives by providing access to upstream passage and reconnecting habitat, but presents a risk of fallback and greater exposure to stressors than Alternative 2, based on the evaluation of overall ecosystem quality. This alternative has less flexibility than Alternative 2 with regard to release location. Compared to Alternative 4, this alternative would be easier to accommodate monitoring and evaluation (M&E) when fish are already in the trap. Total qualitative score for ecosystem quality = 11 points.	Total minimum rough order magnitude cost = $46 million Total minimum annualized cost including OMRR&R = $2.4 million This is more efficient than Alternative 2 and 4 because it has a lower cost.	This is an acceptable alternative because it does not violate public laws or regulations, or Corps policy on non-native fish species. A trap and release facility is a known, viable fish passage method.

Alternative	Completeness	Effectiveness	Efficiency	Acceptability
Alternative 4 – Full-height Volitional Fish Ladder	This is a complete plan because all actions required to achieve the planning objectives described in Section 2.3 are accounted for and it is not dependent on the actions of others.	This alternative less effective than Alternative 2 in alleviating the specified problems and achieving the specified opportunities. This alternative partially meets both planning objectives by providing access to upstream passage and reconnecting habitat, but presents a risk of fallback and greater exposure to stressors than Alternative 2. There are concerns about bioenergetics/fallback potential – i.e., whether 6" sub-adult bull trout would swim to the top of a full-height ladder (this alternative would have approximately 20 additional pools more than for the trap and haul alternative) of the size that would need to be in place at AFD. There are also concerns about whether sub-adults would have strength/energy to swim from the forebay exit to cooler habitat above AFD. Potential risk to safe, timely, effective passage. In addition, there are no known examples passing 6" sub-adult bull trout and no identified information that would reduce the unknowns and risks. Total qualitative score for ecosystem quality = 11 points.	This alternative is less efficient than Alternative 2 or 3 because the cost is higher. The following cost considerations also make this less efficient than the other action alternatives: • Would use a John Day Dam-type vertical slot structure to allow for 15-ft forebay fluctuation; requires about 20 more pools and a transport channel. • Requires new hole(s) in dam; potential dam safety and fish passage issues. These concerns could be addressed, but cost is uncertain. • Higher construction cost than trap alternatives due in part to 9 inch drop required per ladder step = 40 pools, extrapolating from draft sketch. • Largest construction footprint of alternatives = greater costs for more concrete, other materials. Total minimum rough order magnitude cost = $52 million. Total minimum annualized cost including OMRR&R = $3.0 million	This alternative is only partially acceptable. A volitional fish ladder, in general, is a known, viable fish passage method. However, this alternative at AFD would not fully comply with Corps policy nor IDFG regulations on non-native species. IDFG issued a letter to the Corps requesting that non-native fish are not passed above AFD.

3.7 Identification of Recommended Plan/Preferred Alternative*

The Corps evaluated the Final Array of Alternatives to identify a plan that would provide safe, timely, and effective upstream passage of bull trout at the dam. As described in previous sections, plans were evaluated based on five criteria related to overall ecosystem quality: fallback, bioenergetics, handling stress, safe and effective passage, the ability to monitor bull trout, and the ability to manage non-native fish passage. Alternatives were also evaluated for contributions to the study objectives which focus on bull trout access to habitats upstream of AFD and connectivity of bull trout critical habitat, the four evaluation criteria (completeness, effectiveness, efficiency, and acceptability) established in the Principles and Guidelines (P&G) by the Council on Environmental Quality, and lifecycle cost estimates.

Alternative 1 (No Action) is not complete, effective, efficient, or acceptable because it does not meet either of the study objectives.

Alternative 2 (Trap and Haul to Upstream Release Site) fully meets both planning objectives, based on the evaluation of overall ecosystem quality. In addition, it is possible to optimize the release site to address predation and fallback, unlike the forebay exit in Alternative 3 and Alternative 4. Compared to Alternative 4, this alternative would be easier to accommodate monitoring and evaluation (M&E) when fish are already in the trap. This is the most efficient alternative. Although the construction cost is the same as Alternative 3 and the OMRR&R cost is slightly higher than Alternative 3, the construction cost is lower than Alternative 4 – and it scored scores highest on the overall ecosystem quality evaluation criteria (i.e. neither Alternative 3 nor 4 scored higher on effectiveness for less cost).

Alternative 3 (Trap with Release to Forebay Exit) presents a risk of fallback and greater exposure to stressors than Alternative 2, and has less flexibility that Alternative 2 with regard to release location. Alternative 3 is more efficient than Alternative 4 (Full-height Volitional Fish Ladder) because it has a lower cost, but less effective than Alternative 2 because it scored lower on the overall ecosystem quality evaluation.

Alternative 4 (Full-Height Volitional Fish Ladder) also presents a risk of fallback and greater exposure to stressors than Alternative 2. There are concerns about bio-energetics/fallback potential – i.e., whether 6" sub-adult bull trout would swim to the top of a full-height ladder (this alternative would have approximately 20 additional pools more than Alternative 2) of the size that would need to be in place at AFD. There are also concerns about whether sub-adults would have strength and energy to swim from the forebay exit to cooler habitat above AFD. In addition, there are no known examples passing 6" sub-adult bull trout and no identified information that would reduce the unknowns and risks. Alternative 4 is less efficient than either Alternative 2 or 3 because the cost is higher and it scored lowest on overall ecosystem quality, tied with Alternative 3. Alternative 4 would also result in the passage of non-native fish above the dam, which complete with and/or prey upon native species, including bull trout.

Alternative 2 – Trap and Haul to Upstream Release Site was recommended as the tentatively selected plan (TSP) in the Draft PADD/EA based on the plan formulation and evaluation process described in the sections above. The plan is complete, effective, efficient, and acceptable. It meets the study objectives and avoids the study constraints. This alternative remains the recommended plan following agency, technical, and public reviews of the Draft PADD/EA. A detailed project description, including proposed features, construction methods, and operation and maintenance considerations is included in Section 5 of this main report and detailed feasibility-level design information is in Appendix A (Engineering Design Appendix)

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4 Affected Environment and Environmental Consequences*

This chapter describes the historic, existing, and future conditions used for analysis during this study. Historic conditions provide a perspective on how existing conditions have developed for the present study scope. Existing conditions are the physical, chemical, biological, and sociological characteristics of the study area. Characterizing resource conditions is critical for understanding the probable future condition of those resources (i.e., the future without-project condition) and for defining problems and opportunities.

4.1 Resources to be Analyzed

The analysis focuses only on significant resources that are potentially affected by the alternative and have a material bearing on the decision-making process. The spatial scale of analysis focuses on the aquatic habitats found above and below AFD that are critical to the maintenance and restoration of bull trout populations to provide a comparison between the No-Action Alternative and the various scales (including design features) of the action alternative. Time scale for analysis is a 50-year period beginning in 2020 and extending to 2070.

The following table describes the resources analyzed or screened from detailed analysis including a rationale for inclusion or exclusion.

Table 4-1. Resources Analyzed and Resources Screened from Detailed Analysis

Resource	Included in Detailed Analysis (Y/N)	Rationale for inclusion or exclusion
Land Use	N	The alternatives' design features would occur on public lands so there would be no significant effect on present or forecasted land use or agricultural resources in the project area. The site location will remain in the public trust.
Geology and Soils	Y	The proposed location of the fish ladder is on the rock island between the powerhouse and spillway of AFD. Rock and rubble would need to be removed through the use of explosives or heavy equipment.
Hydraulics and Hydrology	Y	Construction of the fish ladder could potentially affect the hydraulics and hydrology associated with Albeni Falls Dam
Water Resources and Water Quality	Y	Part of the excavation and construction would be below the water line. Temporary increases in turbidity due to construction are likely.
Vegetation (Wetland, Riparian)	N	The proposed alternatives would not affect wetlands and riparian vegetation. The site location is rock/rubble fill and bedrock with a vegetated cover consisting of scrub/shrub.
Fisheries	Y	Design features and construction methods of the proposed alternatives may have a negative effect to fish populations in the mainstem river channel during construction. The alternative would provide long-term significant benefits to native resident migratory fish.
Aquatic Non-native Species	Y	The proposed actions have the ability to affect aquatic non-native species movement.
Shellfish and other Macroinvertebrates	N	Construction of the alternative may be temporarily disruptive but none of the species identified in the study area would experience significant effects from the proposed alternative.

Resource	Included in Detailed Analysis (Y/N)	Rationale for inclusion or exclusion
Mammals	N	Mink, weasel, beaver, and river otter are associated with riparian and aquatic habitats. While some construction may be disruptive, it is primarily within the river and the rocky, largely un-vegetated island that the dam spans, so the alternative would not have long term effects on the animals or their habitat.
Birds	N	Construction of the alternative may be temporarily disruptive, but would not occur near any nesting sites since no trees and very little vegetation exists on the rock island. None of the avian species identified in the study area would experience long term effects from any of the proposed alternatives.
Rare, Threatened, and Endangered Species	Y	The proposed alternative would have a beneficial long-term impact on one ESA-listed species in the Pend Oreille River.
Air Quality and Green House Gas Emissions	Y	Temporary localized increase in dust is expected during construction; and there will be increased emissions associated with construction of the facility and transport of fish to the upstream location.
Sea Level Rise	N	The project would not be affected by sea level rise so no further analysis would be prepared (USACE Engineering Circular 1165-2-212).
Noise	N	Airborne noise caused by construction would be attenuated by distance from the source to any sensitive receptors and would therefore not cause any significant impact. The area is sparsely populated and Best Management Practices would minimize elevated noise. Impacts to staff and visitors of the dam would be temporary and impacts of transport of material would be minor and temporary. Underwater noise from construction would be temporary and may have a detrimental effect on fisheries species, likely causing a flight response. In shallow water, sound waves are expected to be attenuated quickly. Underwater noise is addressed in the fisheries section. Operation of the facility would not create noise other than very minor increases in truck noise during transport; therefore there would not be long term significant impacts.
Cultural Resources	Y	The construction of a fish ladder would have an adverse effect on AFD Historic District. AFD has been determined eligible to the National Register of Historic Places (NRHP) under Criterion A, C, and D. Construction of a fish passage facility would introduce a modern structure of notable size and scale within the boundary of the historic district.
Environmental Justice Communities	N	The proposed action would not disproportionately affect minority or low-income populations nor have any adverse human health impacts.
Utilities and Infrastructure	N	Operation of the fish passage facility is expected to have negligible demands on electricity and water at the AFD project.

Resource	Included in Detailed Analysis (Y/N)	Rationale for inclusion or exclusion
Transportation and Traffic	N	Construction may cause temporary disruptions to local traffic, and construction vehicles could require additional traffic controls for the duration of work. Staging areas would utilize existing parking space or work areas and would not require additional land clearing. Transport of fish in haul trucks is unlikely to cause a discernible change in daily traffic on public roads and at the fish release site(s). Access improvements are not expected to be required at release sites.
Aesthetics and Visual Resources	Y	The design features may affect scenic resources or visual characteristics of the dam and at fish release sites at boat launches.
Recreation Resources	Y	Multiple recreation activities (boating, camping, bicycling, hunting, fishing, etc.) occur adjacent to the project site. The fish release site(s) for the trap and haul upstream alternative could affect boating activities at boat launch areas. Fish passage could affect recreational fishing based on changes in fish management. These effects would be minor and insignificant.
Hazardous, Toxic, and Radioactive Waste (HTRW)	Y	Corps policy (ER 1165-2-132) requires consideration of issues and problems associated with hazardous, toxic, and radioactive wastes (HTRW) which may be located within project boundaries or may affect or be affected by Corps Civil Works projects.
Public Health and Safety	N	The alternative would not have any effect on public health and safety. The dam's authorized flood control purpose would not be affected.
Tribal Resources and Cultural Values	Y	The proposed action would have a positive affect by restoring migration pathways and spawning opportunities for bull trout, a native fish that is of cultural importance to the Kalispel Tribe, as well as other native migratory fish that are of value to them.

4.2 Historical Conditions

At the location where AFD was constructed, the Pend Oreille River historically flowed naturally through several channels, between small islands and rock outcroppings, creating the natural waterfalls known as Albeni Falls. In spring, these islands impeded runoff causing the waters behind Albeni Falls to raise and flood lands along the river and around Lake Pend Oreille. Fish, including bull trout, were likely able to pass the falls in both directions for the majority of the year. Gilbert and Everman stated in 1895, "These falls are scarcely more than a pretty steep rapid and would not interfere at all with the ascent of salmon". Rathbun (1895) observed that trout (species not indicated) "pass freely up the falls".

Prior to the construction of dams on the Pend Oreille River and Clark Fork River Systems, native trout, including bull trout, were able to migrate freely throughout the Pend Oreille River, Lake Pend Oreille and the Clark Fork River Basin. Bull trout were able to move from at least Metaline Falls at RM 27 which is approximately 7.5 miles below Box Canyon Dam in Washington to the headwaters of the Clark Fork River basin, which originate on the slopes of the Rocky Mountains in western Montana.

Movement of bull trout throughout and between these basins allowed for many of the varied life history strategies of fluvial bull trout, adfluvial bull trout and resident bull trout[24]. For example, during warm summer months, all life history forms of bull trout upstream and downstream of Lake Pend Oreille were able to migrate into the cold deep waters of Lake Pend Oreille to seek cold water refuge.

The ability of bull trout to move freely between the Pend Oreille River basin and Clark Fork River basin allowed for two distinctly different migration patterns for adfluvial bull trout to develop. The most common migration pattern is when adult bull trout move from Lake Pend Oreille upsteam into smaller tributaries to spawn. The second migration pattern involves adult fish moving from Lake Pend Oreille down the Pend Oreille River, and spawning downstream in either a smaller river, or in a tributary stream. This downstream migration pattern occurs in the Pend Oreille River Basin. However, once AFD was constructed, those offspring that result from fish that migrate downstream of AFD are not able to return to Lake Pend Oreille. Thus, except for some remaining stocks in the Priest River basin about seven miles upstream of AFD, this unique migration pattern was eliminated with the construction of AFD in 1952 (USFWS 2002).

Downstream of AFD, native fish, including bull trout, were historically abundant between Metaline Falls (RM 27) and Albeni Falls (RM 90). These fish provided essential subsistence for the Kalispel Tribe and served as a valuable sport fishery to the region (Scholz and McLellan 2008). When AFD became operational in 1952, the section of the river became isolated by AFD at the upper end (RM 90), making it impossible for migratory (adfluvial) fish below AFD to reach natal spawning streams and the cold water above AFD. When Box Canyon Dam (RM 34) became operational in 1957, the Pend Oreille River between AFD and Box Canyon Dam became isolated on the lower end converting the river seasonal periods of high quality riverine habitat into a reservoir not conducive to bull trout production. As all dams on the Pend Oreille River were constructed without fish passage facilities, and along with other changes to the natural ecosystem, bull trout populations downstream of AFD began to decline to the point where finding individual fish from the downstream population is now noteworthy (USFWS 2002).

4.2.1 History of Impacts Related to Bull Trout Passage

Historic records suggest that salmon were able to migrate up the Pend Oreille River to Metaline Falls at RM 27 while trout migrated freely throughout the system. As stated above, however, the era of dam building in the 1950s and 1960s eliminated salmon and trout passage throughout the Pend Oreille and Clark Fork systems. As stated in the 2000 USFWS BiOp: "Based upon harvest records, the bull trout population was abruptly reduced by about 75 percent following the completion of Albeni Falls Dam and Cabinet Gorge Dam in the early 1950s. Also, bull trout are believed extirpated from eight tributaries still accessible to Lake Pend Oreille (Pratt and Huston, 1993)." Currently, there is no harvest of bull trout and a limited fishery for westslope cutthroat trout exists throughout the Pend Oreille/Clark Fork system.

The construction of AFD, Box Canyon Dam and Boundary Dam on the Pend Oreille River has fragmented habitat and negatively impacted migratory bull trout. Currently, there are no known populations of migratory bull trout on the Pend Oreille River between AFD and Box Canyon Dam. With

[24] Fluvial fish live, feed and mature in the mainstem of streams and rivers; they migrate into tributaries to spawn; adfluvial fish migrate between lakes and rivers or streams; and resident fish are non-migratory fish and complete their entire life cycle in a tributary stream to a larger water body (river, lake, and ocean).

the exception of AFD, all of the dams located on the Pend Oreille and Clark Fork Rivers within the U.S. are non-Federal facilities. All non-Federal dams are required to operate under a license administered by the FERC and recently, the non-Federal dams have been required to apply for FERC relicensing. As part of the FERC relicensing requirements, fish passage facilities are planned at all non-Federal dams on the Pend Oreille/Clark Fork System. Due to these licensing requirements, the non-Federal hydro-project owners have conducted studies on bull trout on the Pend Oreille River. Pursuant to the 2000 USFWS BiOp, the Corps has also evaluated migratory behavior of bull trout in the river. The Northeast Washington Bull Trout Recovery Team identified that the primary impediment to bull trout recovery is the fragmentation of habitat within the system by hydroelectric facilities (Andonaegui, 2003; USFWS, 2002). The Northeast Washington Recovery Unit Team recommended that to achieve recovery in the Pend Oreille Core Area, connectivity needed to be restored at Albeni Falls, Box Canyon, and Boundary Dams. FERC is requiring fish passage (both upstream and downstream) at Box Canyon and Boundary Dams. Although fish passage facilities are planned at non-Federal dams both upstream and downstream of AFD, the benefit of those restoration efforts depends in part upon how fish passage is addressed at AFD because of its location on the river system as a whole.

4.2.2 Federal Columbia River Power System (FCRPS)

In the late 1920s, the Corps began a comprehensive study of the Columbia River System. In 1931, the Corps completed the study and recommended the development of the Columbia and Snake River Systems to provide navigation and power generation to the nation (House Document 531, 81st Congress). In 1933, construction began on Bonneville Dam (Corps of Engineers) and Grand Coulee Dam (USBR) on the Columbia River. Fourteen major dams, including AFD, comprise the FCRPS (USBR dams include Hungry Horse and Grand Coulee; Corps dams include Libby, Albeni Falls, Chief Joseph, Dworshak, Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville.) Today the FCRPS dams, operated by the Corps and the USBR, function in a coordinated manner, to accomplish the projects' multiple purposes, including power production, flood control, navigation, fish and wildlife conservation, recreation and water supply. Power produced at these facilities is marketed and distributed by BPA.

There are two types of hydroelectric projects in the FCRPS: run-of-river and storage projects. Run-of-river projects are developed for navigation and hydropower production and fish and wildlife, with little storage capability and limited opportunities for reservoir regulation. Storage projects, such as Grand Coulee Dam, alter stream flow patterns, providing power peaking capability, as well as seasonal flow alteration for regional benefits such as flood control, water supply for irrigation, and flow augmentation for fish migration. AFD is one of five major Federal storage projects in the FCRPS where storage and release of water can be managed for power and other purposes, the others being Grand Coulee, Hungry Horse, Libby and Dworshak dams.

Upstream passage facilities (fish ladders) were not included for salmon or steelhead at projects upstream of Grand Coulee Dam because the USBR did not include upstream fish passage at Grand Coulee Dam (Brannon, 2004; Brennan, 1938). Prior to the construction of dams on the FCRPS, Metaline Falls was, and still is, widely thought to be the natural barrier and upstream limit of anadromous upstream fish migration. AFD was constructed upstream of Metaline Falls, which is upstream of Grand Coulee Dam. Some historians/researchers believe Metaline Falls may have been passable under some river conditions,

though salmon are not known to have passed above that point. (Gilbert and Evermann, 1895). Passage efforts (downstream of Chief Joseph Dam) were intended for anadromous salmon.

In the 1930s, the Federal government began evaluating the impacts of the FCRPS to anadromous and other fish species and the Corps tasked biologists and technicians to work to better understand and improve fish passage conditions on the river system. For House Document 531, the USFWS prepared a report on the impacts of the proposed FCRPS, including AFD, on fish and wildlife. (See H.D. 531 App. P). The USFWS determined that "the dam would block the migration of resident trout from the river to the lake; and, while the subject needs further study, tentative plans should be made for the inclusions of fishways at the [Albeni Falls]." (par. 186). In the 1970s and 1980s, evolving Corps policy emphasized that "environmental values will be given full consideration along with economic, social and technical factors" in planning and constructing water resource development projects. As research and knowledge grew, the Corps adjusted and improved fish passage facilities and operations for anadromous fish species.

In 1980, the Northwest Power Planning Council (NWPPC) was established (now called the Northwest Power and Conservation Council) and tasked with developing plans giving full consideration to fish and wildlife along with power production and flood control. Starting in the early 1990s, under provisions of the ESA, the NMFS has provided recommendations for the Corps, BPA and the USBR to consider in operating the FCRPS so that the continued existence of listed salmon species is not jeopardized (e.g., NMFS 2000).

Today, the FCRPS is a complex and heavily used resource. The region depends on these rivers for much of its energy through hydroelectric generation, crops through irrigation, transportation through navigation, recreation, fisheries, and to a lesser extent municipal and industrial water supply.

4.3 Comparison of Alternatives

The final array of alternatives presented in chapter 3 are evaluated for their impacts on various resources below to satisfy the requirements of the National Environmental Policy Act (NEPA). Note that the recommended plan presented in section 3.7 (Alternative 2: Trap and Haul to Upstream Release Site) is the same as Alternative 2 below, described as the "preferred alternative" for NEPA purposes.

4.4 Geology and Soils

4.4.1 Regional Geology

The Pend Oreille River has incised itself in a much broader ancient drainage and the river valley was significantly modified during the Pleistocene epoch, 10,000 to 2 million years before the present. Prominent glacial terraces consisting of unstratified glacial drift and glacial lake sediments border the broad flood plain. Subdued rock knobs protrude through the glacial terraces. Rock exposed in the segment of the river valley between Priest River, Idaho, and Newport, Washington is a granitic body mapped as the Silver Point quartz monzonite. This segment of the valley generally divides slightly metamorphosed Belt rocks on the north from the older metamorphosed rocks to the south. The axes of the folds within the Belt rocks trend northerly or slightly east of north. The Newport fault, a regional, low angle thrust fault, is the dominant structure in the area. The trace of the fault is arcuate with the south end of the thrust approaching within 1-1/2 miles of the Pend Oreille River and AFD (USACE, 1954). The Newport fault is an ancient structural feature and not considered an active fault. This is a region of low seismicity with no known active faults within 150 miles.

4.4.2 Site Geology

The entire dam foundation and abutments rest on bedrock. Prior to dam construction, the river, at the dam site was restricted by rock outcrops on both banks and a low falls was present at the site. A glacial terrace, with occasional rock knobs protruding through the glacial material, formed both riverbanks. Though outcrops in the abutments are mapped as part of the Silver Point quartz monzonite, the rock is truly a suite made up of granodiorite, gneiss, and schist. Jointing within the foundation consists of a north-south and east-west, nearly vertical dipping set of joints. Minor faulting occurs in the foundations of both the spillway and powerhouse sections of the dam. The foundation rock at the dam is generally uniform grained granite which shows varying degrees of alteration and weathering (USACE, 1954).

Explorations during spillway construction show that the rock joints are extremely tight except with minor areas of highly fractured rock. Major faulting was identified along the spillway at monoliths Nos. 3, 7 and 14. Fractures show that hydrothermal alternation has taken place with the deposit of calcite on the surface. Explorations during powerhouse construction indicated that the rock is moderately fractured with small areas which are highly shattered. Joints are generally tight and filled with gouge material or secondary deposition of hydrothermal alteration products. A limited number of the fractures are open, allowing a water course to develop. Major faulting was identified along the left abutment of the powerhouse excavation (Figure 4-1), passing through the abutment and floor foundations on approximately the centerline of the units and dipping downstream of the adjacent monoliths (Nos. 29 and 30).

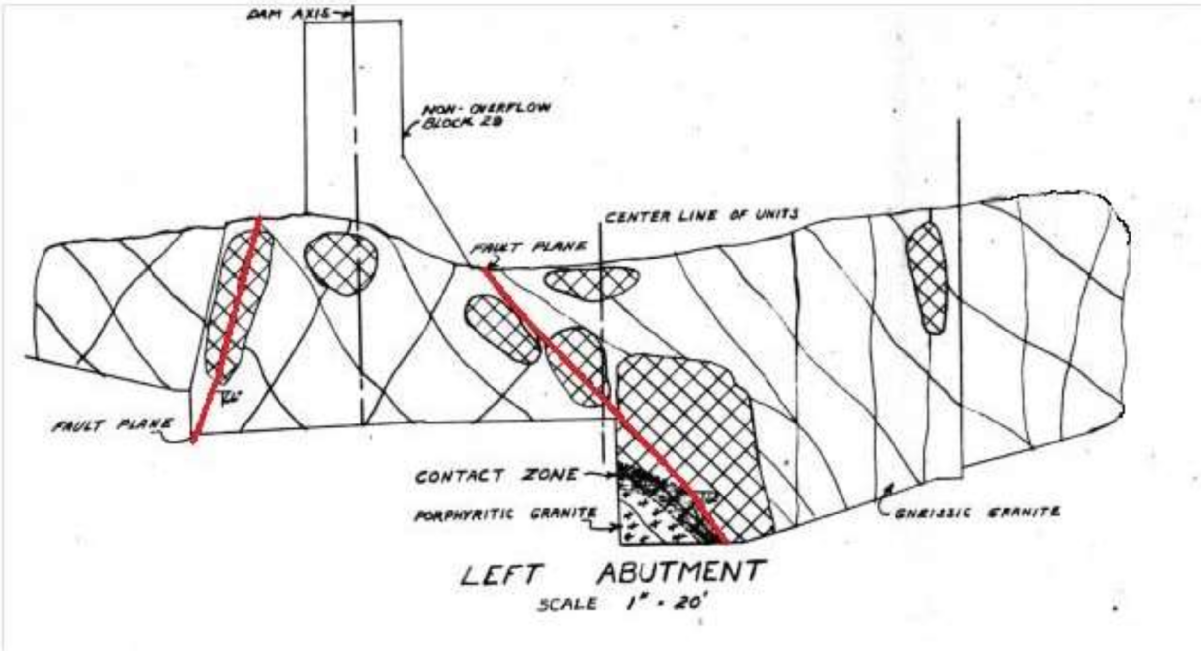

Figure 4-1. Geologic map of the AFD powerhouse left abutment with fault planes highlighted in red.

4.4.3 Soils

The soil overlying the granite is Kootenai gravelly silt loam which is found on moraines and higher terraces. This soil was formed in glacial till and outwash derived from granite, gneiss, schist and volcanic

ash (NRCS 2013). Fill material was placed on the downstream side of the monoliths on the island during AFD construction. Much of this material is likely broken rock from the blasting that was placed in an uncontrolled manner (no compaction).

4.4.4 Alternative 1 - No Action

Existing conditions are expected to continue under the no action alternative.

4.4.5 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

Approximately 20,000 cubic yards of material (mostly bedrock) would be removed from the island between the powerhouse and the spillway structure for construction of the facility; of this, approximately 9,000 cubic yards would be placed in an upland ravine adjacent to the dam that is minimally vegetated and has no connection to the river, and the remaining 11,000 cubic yards would be hauled off-site for disposal in a quarry or reuse through existing permits to build a permanent access road from the dam to the sorting facility. Since the island is bedrock with little to no vegetation, impacts of this road would be minimal. If a quarry is available, and upland disposal is necessary the appropriate NEPA documentation would be completed. Blasting near the powerhouse will require controlled blasting techniques such as variable delay patterns, small drill hole spacing, and low powder factors. Limits on maximum peak particle velocities will be developed to minimize damage to existing structures. A monitoring program will also be developed to assure that structures are not adversely affected. Given the small-scale changes to the island associated with the removal of rock compared to the geology of the surrounding area, the proposed action would not result in significant impacts to geology and/or soils.

4.4.6 Alternative 3 – Trap with Release to Forebay Exit

Impacts would be the same as those described for alternative 2 since the proposed facility and all its features would be the same with the exception of the release location for bull trout. As with alternatives 2, impacts would still be insignificant.

4.4.7 Alternative 4 - Full-Height Volitional Fish Ladder

This alternative would require up to three times as much rock removal as alternatives 2 and 3, based on scaling the volume of rock by the additional length of ladder necessary. Placement of this material in the ravine would also be 9,000 cubic yards. All additional material would need to be hauled off-site. As with alternatives 2 and 3, impacts would still be insignificant.

4.4.8 Cumulative Effects of the Preferred Alternative

Other fish passage facilities are proposed in the basin, which may require major earth work or blasting of rock including:

1. A permanent trap and haul facility at Noxon Rapids Dam on the Clark Fork River (estimated for 2019)

1. A permanent trap and haul facility on Cabinet Gorge Dam on the Clark Fork River (estimated for 2018), which replaces an interim trap and haul operation that's been ongoing for the last decade

2. An upstream passage facility at Box Canyon Dam on the Pend Oreille River (currently underway, estimated completion in 2018)

3. An upstream trap and haul facility at Boundary Dam on the Pend Oreille River (estimated temporary 2021-2030, estimated permanent 2031-2055)

None of these projects are in the immediate vicinity of the proposed action, and the impact of the proposed action is minor compared to the geologic changes that resulted from the construction of AFD and other dams in the basin No other major rock excavation and/or manipulations of geologic processes is expected to occur in project vicinity that would add a cumulative effect to the proposed action. Effects from rock blasting are limited to the area specified for removal. Therefore, cumulative impacts of the proposed action to geology in the basin would not be significant.

4.5 Hydraulics and Hydrology

The primary important operation of AFD is to manage flood control and hydropower. Other purposes AFD manages for are navigation, fish and wildlife conservation, and recreation. During flood events, if flows are high enough, spillway gates are completely opened and Pend Oreille lake elevation is determined by the Lake itself. The flood events typically occur mid-April to mid-July.

For the structure, AFD has a powerhouse that includes three Kaplan turbines with a hydraulic capacity of about 35,000 cfs at a reservoir elevation of 2062.5 ft. The spillway consists of ten 40-foot wide vertical slide gates. The average annual peak flow through the spillway is 60 kcfs. The maximum discharge through the spillway was approximately 130 kcfs, in 1997. The project provides about 1.1 million acre feet of storage above the dam in Lake Pend Oreille. The project's spillway has a capacity of 350,000 cfs with all the gates in their fully open position. For higher flows, the spill gate leaves can be removed to further increase spillway capacity. In addition to hydropower generation, a major function of AFD is flood risk management. During the summer, the project is operated to regulate Lake Pend Oreille elevations between 2060 and 2062.5 ft. In the winter, the lake elevation is drawn down to a minimum elevation of 2051.5 ft to provide flood storage capacity.

A channel constriction in the form of a natural sill exists upstream of AFD in the Pend Oreille River channel. This channel constriction, not the dam operations, controls the elevation of the lake during periods of very high inflow. During high flow events, the top of each spillway is taken out of the water to eliminate flow reduction. The fish passage facility constructed would operate over a 4 to 30 foot approximate differential because this is the range needed to meet the operation objectives. It could be a little lower or higher under infrequent conditions. Typically, the greatest variation in tailwater-forebay differential occurs in the April through June timeframe with the lowest differential occurring during this period. During this timeframe the project is sometimes in free-flow conditions, with 100 percent of the flow going through the spillway.

Typically during higher spillway flows, it is a good idea to spread the flow out over the spillway. If during construction the flow is high enough that this is required, it may put restrictions on construction during these flow conditions.

4.5.1 Alternative 1 - No Action

AFD is anticipated to remain operating within its current authorized elevations and in a manner consistent with the project's flood control rule curves. Elevations would continue to remain between a summer elevation of 2,062.5 ft mean sea level and winter elevations from 2051-2056 ft mean sea level, (measured at the Hope, Idaho gage on Lake Pend Oreille). The winter lake level elevation may continue to be established as the minimum control elevation (MCE) for kokanee spawning (either 2051 or 2055 ft), as

determined through the established regional process. Winter elevations vary between the MCE and elevation 2056 ft as implemented starting in 2012 under flexible winter power operations. Climatic modeling indicates that the northern half of the Columbia River Basin would become warmer and wetter which could lead to greater volumes of water spilling over the dam during certain times of year (Mote et al. 2014).

4.5.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

Excavation and construction activities could affect the operations of the AFD spillway in early spring when water is being spilled for flood risk management, a priority to project operation. It may be required to not open one or two of the right spill bays to allow construction to continue. If flows were high enough, all bays would need to be used potentially impacting the construction process. Once construction is completed, overall operations of the dam would remain the same as current conditions. The 300 cfs design flow of the proposed fish facility is a very small portion of the overall flow (i.e., 5% at 6,000 cfs and flows are rarely this low). Given this very small comparative flow rate, it is not anticipated that the fish facility would hinder achieving project objectives currently or under a conceivable climate change scenario and impacts would be insignificant.

4.5.3 Alternative 3 – Trap with Release to Forebay Exit

Impacts to hydrology and hydraulics would be the same as alternative 2 since the proposed facility and all its features would be exactly the same, with the only difference being the release location of bull trout. As with alternatives 2, impacts would still be insignificant.

4.5.4 Alternative 4 - Full-Height Volitional Fish Ladder

This alternative would require 300 cfs of water diverted from the forebay for operation, so impacts from operation of the facility would be similar to those described for alternatives 2 and 3. A greater amount of in-water work, and associated length of the isolation device(s), in the forebay is required for this alternative during construction to extend the ladder to scale the top of the island and into the forebay. This may have greater temporary impacts to dam operations than alternatives 2 and 3. As with alternatives 2, impacts would still be insignificant.

4.5.5 Cumulative Effects of the Preferred Alternative

Cumulative effects to hydraulics and hydrology are not anticipated since operations are not expected to change. Diverting a small amount of water through the fish passage facility would not change the total amount of water discharged downstream. The 300 cfs fishway flow is very small compared to normal Pend Oreille River flows. AFD discharges would be based on the total discharge (including fishway discharge) required to meet project objectives at hand. Therefore operation of the fishway would not have cumulative effects on hydraulics or hydrology.

4.6 Water Resources and Water Quality

4.6.1 Ground water / River water

Water temperatures in the Pend Oreille River downstream of AFD are high annually in late July through September (weather dependent) and adversely impact bull trout, whereas at depth Lake Pend Oreille provides water temperatures that support bull trout year round.

Surface water temperatures in Lake Pend Oreille and the Pend Oreille River first exceed 19 °C by the end of June, 22 °C by mid-July, and reach maximum temperatures in excess of 24 °C at the end of July and in early August. Water temperatures at depth in Lake Pend Oreille remain substantially cooler year round. In general, colder water temperatures of 10°C or less are available in Lake Pend Oreille throughout the summertime at depths greater than about 100 ft, and temperatures of 5 °C and less water are available at depths greater than about 200 ft. In contrast to the vertical temperature stratification in Lake Pend Oreille, the Pend Oreille River temperatures are fairly uniform. There is only limited transport of the colder water at depth in Lake Pend Oreille into the Pend Oreille River during the summer due to a natural shallow sill at the outlet of the lake that acts as a natural barrier. Due to shallow depth and low water residence time, the AFD forebay does not experience significant thermal stratification.

Bull trout are temperature sensitive requiring relatively cold water temperatures and are seldom found in water bodies where temperatures exceed 17 °C. Numerous research documents discuss bull trout thermal tolerances and preferences such as Fraley and Shepard (1989), and Gamett (2002). Generally 18-20 °C is considered the highest water temperatures bull trout can tolerate and if cooler water is available they will migrate into it. Although adult bull trout are observed in large rivers throughout the Columbia River basin in water temperatures up to 20 °C (Starcevich et al. 2012), long term exposure at temperatures above this level can lead to high mortality rates (Selong and McMahon 2001 and Gamett 2002). Bull trout collected at AFD and released above the dam experience similar temperatures. They would need to swim upriver to reach colder water in Lake Pend Oreille. As bull trout naturally thermoregulate between hot and cold water, they should be able to acclimate to the temperature change once they reach the lake.

4.6.2 Water Quality

Water quality data collected by the Corps (Easthouse 2016) show that, in general, concentrations of nutrients were low in the Pend Oreille River year-round. The total phosphorus concentrations ranged from 4µg/L to 13µg/L, total nitrogen concentrations ranged from less than 50 µg/L to 180 µg/L, Soluble reactive phosphorus concentrations ranged from less than 1 µg/L to 1 µg/L, and nitrate concentrations ranged from less than 10 µg/L to 30 µg/L. IDEQ proposed to add the pollutant total phosphorus to the Pend Oreille River assessment units as a cause of impairment in the 2008 Integrated Report (IR). However, monitoring conducted in 2009 did not support the addition of total phosphorus as a cause of impairment in these assessment units. Therefore, the draft 2010 IR proposes to remove total phosphorus as a cause of impairment in the Pend Oreille River assessment units. DEQ is currently evaluating comments received on the draft 2010 IR.

The Pend Oreille River in on the WDOE 303(d) list (category five; does not meet state standards and a TMDL is needed) for exceedances of pH criteria at the Washington/Idaho border (WDOE 2016), which have typically corresponded to summertime of low flow years (K. Merrill, pers. comm., July 17, 2017). There are also a 303(d) listings for pH further downstream, near the town of Usk and Ione (WDOE 2016). The general criteria for pH for aquatic life uses established by IDEQ is 6.5-9.0 (IDEQ 2014). The WDOE criteria for streams that are designated for char spawning and rearing is within the range of 6.5 to 8.5, with a human-caused variation within the above range of less than 0.2 units. IDEQ standards will be used for construction since the area below the dam is located in Idaho.

The Pend Oreille River below AFD to the Washington border and above Albeni Falls dam to the Priest River is on the 303(d) list (category five; does not meet state standards and a TMDL is needed) for temperature by the Idaho Department of Environmental Quality (IDEQ 2010). In addition, the WDOE has

placed several segments of the Pend Oreille River from the ID state line to the Canadian border on the 303(d) list for temperature (category 5), as well as category 2 (waters of concern) (WDOE 2016).

During the spring high flow runoff period, the total dissolved gases (TDG; i.e., greater than 100 percent) saturations at the AFD forebay can exceed 110 percent), the established standard set by the IDEQ and Washington Department of Ecology, due to upstream natural and anthropogenic sources (e.g., discharge from upstream dams. High levels of TDG—above 120 percent saturation—can be harmful or lethal to fish (Speare 1991). Cabinet Gorge Dam generates high levels of TDG when it spills, and this condition persists across the north end of Lake Pend Oreille and down the Pend Oreille River to AFD. The FERC relicensing of Cabinet Gorge included installation of baffle blocks in 2017 to reduce TDG, which should reduce the saturation rate coming into AFD forebay. There are no flow deflectors on the AFD spillway, but AFD spillway releases result in only small increases in TDG pressures in the Pend Oreille River when all spill bays are used to pass inflow. The small average increase in TDG saturation from AFD is attributed to the low project head, shallow stilling basin channel, and wide spillway. TDG levels generally increase in some relation to amount of water spilled per bay. To manage this, spill is spread evenly across all available spill bays, thus reducing as much as possible the spill over any given bay.

TDG saturations measured in the AFD forebay and tailwater from April through October since 2005 indicate that during high flow spring runoff, TDG saturations in the forebay of AFD often exceed 110 percent. Spill at AFD can increase downstream TDG saturations from about 0 to 5 percent above forebay saturation, depending on the amount of water spilled and the number of spillway bays operating. The maximum TDG saturation increase measured since 2005 was about 9 percent of saturation above forebay levels, which occurred in 2011 when TDG levels increased from about 115 percent in the forebay to 124 percent in the tailwater during a 36,000 cfs spill from 6 spillway bays. In general, the greatest increase in TDG saturations between the forebay and tailwater occur during spillway releases between 20,000 and 40,000 cfs when the project is not using a uniform spill pattern and the project is spilling from fewer than 6 spillway bays.

4.6.3 Alternative 1 - No Action

Spill may be greater in winter than before 2012 as a result of flexible winter power operation implementation, but amounts of spill are not expected to appreciably increase TDG levels, especially above harmful thresholds. It is likely that spill at Cabinet Gorge Dam upstream on the Clark Fork would continue to create high TDG conditions that would persist to the AFD forebay. Spill at AFD would continue to raise downstream TDG saturations about 0 to 9 percent over forebay saturations, depending on spill volume, spill pattern, and number of spillways used. Until 2016, high flows coming from AFD could result in spill at Box Canyon Dam downstream, at levels that could result in elevated TDG generation (USACE and BPA 2011). Powerhouse capacity upgrades and a spillway bypass at Box Canyon Dam are scheduled for completion by 2016, so flows up to 60,000 cfs may be passed without harmful levels of TDG being created.

4.6.4 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

Water quality would not change substantially with the construction and operation of fish passage at AFD. There may be temporary increases in turbidity during excavation and removal of rocks and soils, but these effects would be mitigated utilizing best management practices (BMP). Operation of the fish passage facility would not add any pollutants to the water column. Using a uniform spill volume across all

spillway bays minimizes TDG levels during normal spill operations. Spillway patterns would not change when the fish passage facility is operational.

There could be limited use of the first spillway during the construction of the gravity fed water supply intake. If so, TDG would be monitored below the dam during construction, and, if saturation levels are regularly over 110 percent, minimization measures would need to be considered to reduce TDG. The effects of TDG on fisheries are more fully discussed in Section 4.7 below. Given the small scale and temporary timeframe of construction activities, and minimal to no impacts to water resources and quality from the operation of the facility, the overall impacts would be insignificant.

4.6.5 Alternative 3 – Trap with Release to Forebay Exit

Impacts to water quality and TDG would be the same as alternative 2 since the proposed facility and all its features would be exactly the same, with the only difference being the release location of bull trout. As with alternatives 2, impacts would still be insignificant.

4.6.6 Alternative 4 - Full-Height Volitional Fish Ladder

Long-term impacts to water quality and TDG would be the same as Alternatives 2 and 3 since the same amount of water is required to be diverted at the dam and long-term operations of the spillways would also be the same. Impacts to water quality and TDG during construction would be greater than Alternatives 2 and 3 since the in-water work required in the forebay would be greater, thus generating more turbidity and a greater potential need for uneven flow over the spillway which could increase TDG in the tailrace. As with alternatives 2 and 3, impacts would still be insignificant.

4.6.7 Cumulative Effects of the Preferred Alternative

The project would address the existing thermal barrier to upstream migrating native fish in the Pend Oreille River by providing upstream passage past AFD to cold water refuge in Lake Pend Oreille prior to the onset of high summer temperatures. This would contribute cumulatively to the benefits of fish passage facilities in the basin that provide access to habitat with thermal refuge for migratory species. Construction of the fish passageway would not have cumulative effects to water temperature above or below the dam. Although there could be short-term cumulative impacts to TDG if the construction of the facility overlaps with a period of elevated TDG from Box Canyon Dam, there would be no long-term impacts since spillway operations at AFD would not change once the facility is built. It is unlikely that other turbidity generating activities would occur within the project vicinity during construction that would cause a cumulative effect. No long-term cumulative impacts to turbidity or other water quality paremeters would occur since the operation of the facility would not change.

4.7 Fisheries

4.7.1 Fish Species Near AFD

Lake Pend Oreille and the Pend Oreille River are home to a variety of native and non-native fish. In the late 1980's native mountain whitefish (*Proscopium williamsoni*), peamouth chub (*Mylocheilus spp*), northern pikeminnow (*Ptychocheilus oregonensis*), and redside shiner (*Richardsonius balteatus*) were the most abundant fish in the Pend Oreille River above Albeni Falls Dam (DuPont and Bennett 1993). Other native fish include cutthroat trout *(Oncorhynchus clarki)* and suckers (*Catostomus* spp.). Recent electrofishing efforts to capture bull trout below the dam provide more current information on species

composition and size ranges of fish within the project area. Some of these species are lake dwelling fish such as kokanee, lake whitefish, walleye, and lake trout. Fish species found downstream of AFD are similar to those found above the dam (See section 1.2 of Appendix A for a detailed list of fish species and abundance below and above the dam.

Non-native species have been introduced to Lake Pend Oreille and the Pend Oreille River (above and below AFD) via downstream migration from established populations in other rivers and lakes and from legal and illegal planting of fish in lakes and rivers within the basin. Non-native lake trout (*Salvelinus namaycush*) and Kamloops rainbow trout (*Oncorhynchus mykiss*) are popular trophy fisheries. Other species including several trout species (brook and brown), kokanee, bass (largemouth and smallmouth), and walleye (*Sander viteus*) are sought by sports fishers in the lake and river.

Non-native and native fish found below AFD can be passed downstream through the spillway and powerhouse (R. Entz, Kalispel Tribe, pers. comm. 2010). Winter entrainment is less likely than during the spring because discharges are generally less than the powerhouse capacity and there is limited spill occurring. In the spring, discharge can exceed 10000 cfs which can increase stream velocities in the forebay and through the dam. Fish are also beginning to become more active in spring and thus possibly moving closer to the dam. Most or all fish species above the dam may be affected by the change of velocity and potential entrainment.

Coldwater species (both native and non-native) such as trout and kokanee (*Oncorhynchus nerka*) tend to occupy the deeper waters of the main lake, while the warm water species (most of which are non-native, but some native species can tolerate warm water) are more prevalent in the near-shore areas and the Pend Oreille River between Sandpoint and the dam. AFD provides habitat value, especially to the non-native warm-water species in the summer, by decreasing velocities in the river between the lake and the dam. Conversely, available habitat for warm water species is negatively affected by the annual winter drawdown. Water velocities are generally higher and off-channel habitat more limited during winter lake elevations. Habitat with zero velocity is reduced as quiet bays and backwaters are dewatered. DuPont and Bennett (1993) stated that winter drawdown of the lake reduces numbers of non-native species like tench (*Tinca tinca)*, largemouth bass (*Micropterus salmoides*), pumpkinseed (*Lepomis gibbosus*) and black crappie (*Pomoxis nigromaculatus*). More detail on fish species in the Pend Oreille Basin can be found in the Upper Columbia Alternative Flood Control and Fish Operation EIS (USACE 2006).

Non-native lake trout are widely distributed across the western U.S. as a result of numerous introductions (Martinez et al., 2009). Stocking has been the primary introduction mechanism (Crossman, 1995), but subsequent natural reproduction and dispersal to downstream areas have contributed to additional range expansion (Fredenberg, 2002; Martinez et al., 2009). In the Pend Oreille basin lake trout are infrequently found below AFD but became established in Lake Pend Oreille in the 1990s and underwent a rapid population increase in the following decade. Lake trout can compete with native bull trout for resources as well as eat smaller bull trout. To address the regional spread of lake trout, several natural resource agencies are using suppression as a management strategy for controlling nonnative lake trout populations (Martinez et al., 2009). Attempts to suppress lake trout in other waters have been successful to a degree such as Yellowstone Lake and Lake Pend Oreille. These programs have used multiple methods (e.g., gill nets, trap nets, anglers, and electrofishing) to remove lake trout (Koel et al., 2005; Hansen et al., 2008).

Introductions of non-native northern pike have created recreational fisheries in many waters in the U.S. and Canada, yet many studies have shown that introduced northern pike may alter the composition and

structure of fish communities through predation. The northern pike has become established in Box Canyon Dam Reservoir and Boundary Dam Reservoir on the Pend Oreille River in northeast Washington where it is considered a serious threat to trout and other fish species there and throughout the region. Fish surveys conducted in the Box Canyon reservoir between 2004 and 2011 documented both a rapid increase in the number of northern pike in Box Canyon Reservoir and a decline in abundance of forage species such as native minnows and non-native sunfish, largemouth bass, and yellow perch (WDFW 2013). In other rivers with northern pike studies have shown a change in the structure and composition of native fish communities. In Flathead River, a field study and modeling effort estimated that the diet of northern pike was largely suckers, 82 percent eaten (280,000 fish total), while cutthroat trout (13,000 fish) and bull trout (3,500) comprised about 5 percent of the prey consumed (Muhlfeld et al. 2008). The study results suggested that predation by introduced northern pike is contributing to the lower abundance of native salmonids in the system and that a possible benefit might accrue to native salmonids by reducing these predatory interactions. The fish managers on the Pend Oreille River have targeted a 90 percent reduction in northern pike in Box Canyon via angler harvest, fishing derbies, and removal using pike-specific gill nets. The Kalispel Tribe is funded by BPA to oversee a major non-native fish suppression project to remove predatory (e.g., northern pike) and competitive species (e.g., brook trout) that may be impacting bull trout and cutthroat trout.

4.7.2 Alternative 1 - No Action

Impacts to fisheries from not building the facility would prevent native migratory fish, particularly bull trout, from accessing habitat above AFD. However, the transfer of native fish other than bull trout above the dam is still being evaluated by resource agencies, so it is unclear what effect not building the facility would have on those species.

Modeling by the Climate Impacts Group (CIG) (Mantua et.al. 2010) projects that climate change would result in a longer duration of water temperatures exceeding the threshold for bull trout avoidance (18 °C), and would result in increased risk of temperatures exceeding levels impacting the growth (20 °C) and survival of bull trout (22 °C). These predicted changes could exacerbate the already warm water conditions below the dam. If the climate warms, it could dramatically affect the distribution and abundance of many fish species. Cold water species, such as bull trout and cutthroat trout, are more vulnerable than warm water species, many of which are non-native species such as sunfish, bass, pike, and walleye that would likely benefit from warmer water temperatures. Given the depth of Lake Pend Oreille, which is greater than 1,000 ft deep, the lake would continue to offer cold water even given future climate warming.

Current and upcoming fish passage at a number of others dams in the basin would improve connectivity, including the following (Maroney 2016):

1. A permanent fish ladder facility at Thompson Falls Dam on the Thompson River (operational in 2011).
2. A permanent trap and haul facility at Noxon Rapids Dam on the Clark Fork River (estimated for 2019).
3. A permanent trap and haul facility on Cabinet Gorge Dam on the Clark Fork River (estimated for 2018), which replaces an interim trap and haul operation that's been ongoing for the last decade.
4. An upstream passage facility at Box Canyon Dam on the Pend Oreille River (estimated 2018).

5. An upstream trap and haul facility at Boundary Dam on the Pend Oreille River (estimated temporary 2021-2030, estimated permanent 2031-2055).
6. Operation of a temporary fish trapping at Albeni Falls Dam by Kalispel Tribe until completion of a permanent facility (estimated 2014-2024).

This basin-wide fish passage would help to address some of the negative impacts on bull trout by increasing access to forage areas and cold water refuge, increasing gene flow and subsequent genetic diversity, increasing reproduction, and decreasing mortality caused by the inability to escape lethal conditions. Without fish passage at AFD, this connectivity and increased gene flow would not be fully realized. Fish that migrate below AFD and Box Canyon would still be unable to access cool water refuge and spawning habitat in Lake Pend Orielle due to impassable conditions at AFD, and ultimately parish due to elevated summer temperatures.

4.7.3 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

4.7.3.1 Construction

The construction of the entire project would likely occur over a two-year period. The in-water blasting and drilling would be performed during the established in-water work window from IDFG of July 1 through August 31, with the potential of extending the window into September (Terra Berns, pers. comm. 2014). Work below the water line, other than cofferdam installation, occurring outside of the work window would likely occur behind such devices and thus no longer be in-water after its installation.

The proposed in-water construction activities, particularly the removal of the rock face, drilling, and pouring of the concrete, could have a direct effect to fish in the project vicinity through injury from rocks and elevated turbidity, and by disturbance as they try to avoid the activity or seek shelter. The effects would be short-term and most fish should be able to detect and avoid disturbance and would likely flee the immediate vicinity of construction activities.

There is sufficient ingress/egress for construction equipment with existing roadways and boat launches. No impacts are expected that are associated with access of equipment. There is sufficient depth to accommodate barges, if needed, in tailrace and forebay.

Acoustic Effects: In-water construction work associated with rock blasting and drilling for cofferdam installation and building of the entrance structure would involve equipment that would produce pressure waves and underwater noise within the hearing ranges of fish (DOSITS 2013 and Richardson et al. 1995). Precise noise levels generated from the underwater blasting and drilling are unknown. Blasting mitigation measures will be developed later in the design phase. However, blasting and drilling is likely to generate sound pressure levels, as measured in decibels (dB) that exceed the thresholds (Hastings 2002) discussed as follows.

Van Derwalker (1967) found that steelhead responded maximally to sounds between 35 and 170 Hz, but the fish did not move more than 60 cm from the sound source. Salmonids may be able to hear only in low ranges, generally 10Hz to 600 HZ (Blaxter and Hoss 1981and Knudsen et al. 1992). Abbott (1972) observed no response at 600 Hz in rainbow trout which otherwise responded generally to signals at 150 and 300 Hz. Below are some thresholds established in the literature for various sounds impacts on fish.

The following are salmonids noise thresholds for pile driving, which is characterized as impulsive noise, as is blasting (Hastings 2002, NMFS et al. 2008, underwater noise.org.uk 2014):

- 150 dB_{RMS}[25] for harassment for continuous noise for fish of all sizes
- 187dB cumulative sound exposure level (SEL)[26] for injury of fish ≥ 2 grams[27]
- 183dB cumulative SEL for injury of fish < 2 grams
- 206 dB_{peak}[28] for injury of fish of all sizes

The following are noise thresholds based on Popper et al. 2014 for fish:

Continuous sound (drilling and vibratory pile driving):

- For fish with swim bladders that are involved in hearing (e.g., minnows)
  - 170 dB_{RMS} for 48 hours for recoverable injury
  - 158 dB_{RMS} for 12 hours for TTS (Temporary Threshold Shift, or complete recovery of hearing loss)
- There is no direct evidence for mortality or potential mortal injury for continuous noise.
- There are no continuous noise thresholds set for fish without swim bladders or those with bladders that are not involved in hearing (salmonids).

Impulsive Pile Driving (the same type of noise as blasting)

- For fish without swim bladder (e.g., sculpin)
  - 219 dB cumulative SEL or 213 dB_{peak} for mortality or potential mortal injury
  - 216 dB cumulative SEL or 213 dB_{peak} for recoverable injury
  - 186 dB cumulative SEL for TTS
- For fish with swim bladder that is not involved in hearing (e.g., salmon)
  - 210 dB cumulative SEL or 207dB_{peak} for mortality or potential mortal injury
  - 203 dB cumulative SEL or 207dB_{peak} for recoverable injury
  - 187 dB cumulative SEL for TTS
- For fish with swim bladder that is involved in hearing (e.g., minnows)
  - 207 dB cumulative SEL or 207dB_{peak} for mortality or potential mortal injury
  - 203 dB cumulative SEL or 207dB_{peak} for recoverable injury
  - 187 dB cumulative SEL for TTS

Ketten (1995) found that underwater explosives in the marine environment exceeded the injury threshold up to 1,000 m from the source and the harassment threshold up to 10,000 m from the source. However, this study was done in an open water environment and explosives in open water produce a higher frequency and amplitude shock wave than in environments such as rivers (Hempin et al. 2007). In addition to sound waves, the detonation velocity of the explosives would produce shock waves that result in nearly instantaneous rises in pressure and a rapid fall below ambient conditions that are likely to injure or kill fish within a certain radius around the blast (Hastings 2002 and Alaska Department of Fish and

[25] Decibels root mean square over a period of time

[26] Decibels sound exposure level over a 24 hour period (cumulative)

[27] Injury thresholds are based on pile driving (pulsed noise).

[28] Peak sound in decibels

Game (ADFG) 2013a). When explosives are detonated in a confined manner (e.g., in bore holes) the pressure oscillates in a series of positive and negative pressure (ADFG 2013a). Godard et al. (2008) found that juvenile salmonids showed injury at overpressures as low as 10 pressure per square inch (psi). The ADFG (2013b) recommends limiting overpressures to no more than 7.3 psi. In addition, the operation of the crane on the barge, drilling activities on the rock face, and blasting on adjacent land would send sound and pressure waves into the surrounding waters. Hawkins and Johnstone (1978) said that Atlantic salmon were sensitive to sounds transmitted through substrate in a river environment. Impacts to fish from shock waves from explosives and elevated noise levels from blasting and drilling include mortality from internal organ damage, swim bladder rupture, internal hemorrhaging, embolisms, temporary and permanent hearing loss from middle and inner ear damage, elevated stress levels (as measured by cortisol levels); and behavioral responses like fleeing, changes in feeding patterns, and delayed migration (ADFG 2013a and Hastings and Popper 2005). Continuous noise caused by drilling is most likely to affect minnows, since their swim bladders are involved in hearing. A blasting and drilling plan would be developed to minimize mortality, injury, and harassment of fish and other aquatic life. Minimization measures could include:

- Conducting blasting when cold water species are least likely to be present (July-early September).
- Installation with an air bubble curtain to attenuate energy, if river conditions allow.
- Limiting overpressures in the blasting plan.
- Setting explosives in a borehole and placing material on top to reduce detonation velocities.
- Use appropriate stemming depth and material to confine the force of the explosion to the formation being fractured.
- Use time delay detonation initiators to reduce the overall detonation to a series of discrete explosions.
- Minimize the weight of explosives per delay.
- Use decking (separation of charges with non-explosive material) and time delays within individual boreholes.
- Avoid the use of submerged detonation cord which has an associated kill radius.
- Complete a test blast to calibrate overpressures and/or vibration to actual environmental conditions.

Water Quality Effects: A minimal amount of concrete specifically formulated to cure underwater would be poured in the river to set the cofferdam and entrance structures in place. It is unlikely the concrete mixture would affect the water quality of the river by increasing sedimentation or changing the pH because of the limited quantity required and the dissipation effect in this large of a river. Monitoring of pH would occur through the duration of the concrete pouring and curing. If there are increases above the criteria noted in the Clean Water Act Section 401 certification, acid may be used to neutralize the pH. Effects to fish could result from increases in pH (i.e., more basic conditions). A study by Scott et al. (2005) found that elevated pH can cause inhibition of sodium uptake and ammonia excretion in perch. High (>9) pH also causes damage to gills, eyes, and skin and conversion of ammonium to toxic ammonia and (Lenntech 2014).

Drilling holes into the rock face and blasting of rock on the island could cause an increased amount of sedimentation in the water, which could affect fish. Physiological effects of suspended sediment can include gill trauma (Servizi and Martens 1987; Noggle 1978; Redding and Schreck 1987), and affect

osmoregulation, blood chemistry (Sigler, 1988), growth, and reproduction. Behavioral responses include feeding disruption from olfactory and visual impairment (Sigler, 1988); gill flaring; and curtailment of territorial defense (LaSalle 1988). However, some of the work would be isolated and the substrate is clean rock in most areas so increases in suspended solids are expected to be minimal while the work is being performed. When the in-water work is complete the isolation device would be removed slowly in phases to avoid a large pulse of sediment downstream. Turbidity would be monitored through the duration of in-water work and the project would comply with turbidity criteria. If there are turbidity exceedances, construction may be halted until criteria can be met. Individual fish would mostly avoid the turbid areas of the river and seek refuge to cleaner waters such as off-channel, clean-water refugia and temporary holding at clean-water tributary mouths (Reid 1998); a behavior called a coping mechanism (Bash et al. 2001). The Pend Oreille River in the vicinity of AFD is large and affords considerable area for fish to avoid any plume, if there is one. For those that do not avoid the turbid water, exposure is expected to be brief--minutes to hours.

Total Dissolved Gas: Spilling water at dams can result in increased TDG pressures in downstream waters by plunging the aerated spill water to depth where hydrostatic pressure increases the solubility of atmospheric gases. Elevated TDG pressures generated by spillway releases from dams can promote the potential for gas bubble trauma in downstream aquatic biota (Weitkamp and Sullivan 2002). The construction activities could affect the operations of AFD in early spring when water is being spilled for flood risk management. Spilling water unevenly through the gates (by closing the spillway bay closest to the construction) may be necessary to construct the facility and could increase TDG levels to above the Idaho Department of Environmental Quality (IDEQ) and Washington Department of Ecology (WDOE) standard of 110 percent saturation. TDG would be monitored during any periods of augmented spill and reduction measures would be in place such as spilling over as many of the remaining bays as possible and spreading the spill out evenly.

TDG supersaturation levels that cause bubbles to form in fish occupying shallow water are actually less than it would be at some greater depth in the water column. The compensation provided by the hydrostatic pressure of water depth is equivalent to about 10 percent of saturation per meter of depth. Thus, TDG measurements of 120 percent of saturation relative to water surface pressure are only 110 percent of saturation at a depth of one meter. According to Weitkamp and Sullivan (2002), recent literature indicates that TDG supersaturation results in little or no gas bubble disease (GBD) at levels up to 120 percent of saturation when compensating depths (2 m or more) are available. Research has shown that fish have the capacity to rapidly recover from GBD when they reach compensating depths or TDG supersaturation is decreased. Most instances of GBD have reported low incidence and severity; however, there have been a few cases of substantial mortalities reported. The reported mortalities and severe cases of GBD are generally attributed to either TDG supersaturation in situations where available depths are shallow (approximately 1 m or less) or the TDG levels are exceptionally high (>130 percent). Compensating depths greater than 2 m exist in front of the dam.

4.7.3.2 Facility Operation

The Corps coordinated with IDFG on which species of native fish, other than bull trout, would be transferred above the dam, resulting in the decision that only cutthroat trout would be place above the dam and all other native fish would return to the tailrace. For cutthroat and bull trout species that are transferred, benefits would derive from increased foraging and spawning habitat, as well as access to cold

water refuge during elevated water temperatures (which is currently lacking below AFD). No other fish species would obtain this benefit. The facility would also require the capture and handling of fish by way of voluntary swimming up a partial ladder into a trap, sorting from other fish species, and release with the potential of recapture if they swim downstream back over the dam. It is expected that 60 percent of the fish handled at the fishway each day would be native species. The peak number of native fish handled could exceed several thousand in a day based on the rapidly increasing numbers of fish passing Thompson Falls, a newly opened fishway operating upstream of Lake Pend Oreille. The peak for passage of all fish at Thompson Falls has varied year to year based on river flow. It is unknown when the actual peak migration period for all fish will be at AFD but for analysis it was assumed the May would be the peak month (see Section 5.1.3). The expected peak in bull trout passage would be from March-June.

Handling: Physiological and behavioral changes are commonly observed in fish studies associated with fish trapping and fish handling. Fish exhibit signs of stress when being handled or in uncomfortable situations such as trap box or enclosed structures or containers. The most common signs of stress are sudden movements to escape, increased secretion of mucus around the body, rapid operculum movements, then slowing down to a calm state to a point of no movement except the fins. In prolonged exposures to stressful situations such as increased temperatures, Selong and McMahon (2001) observed a decrease of growth and food consumption while some eventually caught a disease, decreasing their survivability. Handling would be kept to a minimum and only be done if necessary to identify species. Non-native species may be turned over to fisheries managers for euthanization, if they choose to do so.

Predation in the holding pool is a risk of facility operation. Fisheries biologists operating rotary fish traps have encountered large fish preying on each other in enclosed structure for protection or for food. It is possible that native and non-native predators such as bull trout, pikeminnow, walleye, and northern pike will prey on other smaller fish in the holding pool. However, predation in the holding pool would be minimized by installing a screen that separates fish by size. Additional conservation measures that would be used to minimize trapping, handling, and transport stress including: regular monitoring of the holding pool, using aerators in all holding and transport containers, and providing enough water in the holding pool to allow for 0.25 ft3 per pound of fish for the maximum amount of fish in a day (5,000 fish averaging 1 pound each) for temps below 50°F. For temperatures above 50°C the holding area would increase by 5 percent each degree F above 50°F.

Fish other than bull trout would be released either directly above (cutthroat trout) or below the dam (non-natives and other natives), so effects of transport would be minimal. At release sites, fish either immediately flee or stay for a while before leaving the site (Geist et al. 2004, Scholz et al. 2005, Perkins et al. 2010, and Bellgraph et al. 2010).

Given the temporary nature of negative impacts of water quality and noise during construction, and the the long-term benefit of providing passage for native fish, the effects of the action would be insignificant.

4.7.4 Alternative 3 – Trap with Release to Forebay Exit

The short-term impacts of construction would have the same impacts on fish as those described for Alternative 2. The long-term impacts to all fish would also be the same since the sorting and release methods would be the same, with the exception of bull trout. Although this alternative would not require the distance of transport of bull trout and the associated stress with Alternative 2, there is a risk of fallback over the spillway and/or entrainment in the turbines with release into the forebay (for non-bull trout native species this risk is the same as Alternative 2). This would result in bull trout potentially

needing to ascend the fish ladder and be handled multiple times in a season, and thus increase their energy demands and stress and reduce their potential to reach spawning grounds. There is also an increased predation risk to bull trout at the flume release location, where ambush predators could congregate. This predation risk is the same as alternative 2 for other native fish. As with alternatives 2, impacts would still be insignificant.

4.7.5 Alternative 4 - Full-Height Volitional Fish Ladder

The short-term impacts associated with construction would result in greater impacts to bull trout than alternatives 2 and 3 due to the larger area of in-water work in the forebay and the additional blasting that is required, which could result in greater impacts to water quality and elevated noise. This alternative would also have greater long-term impacts to all fish, including bull trout. Ascending a full-height ladder will increase the energy demands of fish, and there is uncertainty whether sub-adult bull trout (and other sub-adult native fish) would be able to do so. This alternative would not require any handling of fish, including bull trout, and would therefore result in less stress than alternatives 2 and 3 for that activity. However, the risk of fallback for bull trout over the dam is likely greater than Alternative 3 since the bioenergetics demands are greater to ascend the full height ladder and fish would more easily be entrained in the spillways. Stress from fallback and inability of smaller fish to ascend the ladder outweighs the decreased stress of not being handled. Additionally, a full volitional ladder would allow upstream passage of all native and non-native fish. Native fish would benefit from the increased foraging opportunities and temperature refuge from this upstream passage. Passage of non-native fish that prey on and/or compete for resources with native fish and may dampen efforts by local fish managers to control non-native species in the waters above the dam. Predation risk on bull-trout is also greater in a volitional trap since there is three times the length as alternatives 2 and 3 so there is more opportunity to be preyed on. As with Alternative 3, ambush predators can congregate at the exit structure in the forebay and prey on bull trout, although impacts would still be insignificant.

4.7.6 Cumulative Effects of the Preferred Alternative

Cumulative impacts of construction to fish could include elevated TDG below the dam from uneven spill in combination with elevated TDG from Cabinet Gorge Dam. Cumulative effects of turbidity impacts on fish unlikely since there are not likely to be other turbidity generating activities in the area. Cumulative impacts from noise could arise from drilling and blasting in combination with elevated noise from the spillways below AFD and boat activity on Lake Pend Oreille and the Pend Oreille River. However, the cumulative impacts of construction are temporary.

There would also be cumulative effects from the operation of the dam. There are other dams in the basin that are currently providing (Thompson Falls) or are planning to provide (Noxon, Rapids, Cabinet Gorge, Box Canyon, and Boundary Dam) fish passage (Maroney 2014). There would be a cumulative effect from the stress of fish having to ascend a ladder and be handled at multiple dams, and stress from being caught and handled by anglers. However, this basin-wide fish passage could help to negate some of the negative impacts on native migratory fish by increasing access to forage areas and cold water refuge, increasing gene flow and subsequent genetic diversity, and decreasing mortality caused by the inability to escape lethal conditions. In association with the fish passage facilities, as part of FERC relicensing requirements, these dam operators would also improve habitat conditions in the mainstem and tributaries streams throughout the basin. In addition, providing passage at AFD could help alleviate the impacts of elevated water temperatures below AFD from climate change by providing native fish access to cold water refuge

above the dam. There would also be a positive cumulative effect associated with control of non-native species when combined with efforts from Idaho and Washington to control such species, particularly if the Idaho chooses to remove non-native fish from the system at the AFD fish passage facility. Overall, there would be no negative cumulative impacts to fisheries resulting from the action.

4.8 Threatened and Endangered Species

Bonner County has three species listed as protected under the Endangered Species Act (ESA), potentially occurring in the project area. Federally funded, constructed, permitted, or licensed projects mush take into consideration impacts to federally listed and proposed threatened or endangered species under the ESA. The USFWS lists the following species as potentially occurring in Bonner County (Table 4-2). Because of specific high mountain snowy habitat preferences, Canada lynx, woodland caribou, and the North American wolverine are not expected to be found in the project action area (Figure 1-2).

Table 4-2. Protected species potentially occurring in the project area

Species	Listing Status	Critical Habitat
Bull trout (*Salvelinus confluentus*)	Threatened	Designated
Lynx, Canada (*Lynx canadensis*)	Threatened	Designated – not in project area
Caribou, woodland (*Rangifer tarandus caribou*)	Endangered	--
North American wolverine (*Gulo gulo luscus*)	Candidate	--

4.8.1 Bull Trout Listing Status, Life History, and Use of Lake Pend Oreille and the Pend Oreille River

On June 10, 1998, the Columbia River and Klamath River populations of bull trout were listed as a threatened species (63 FR 31647). The effective date of the listing was July 10, 1998. On October 18, 2010, a Critical Habitat Final Rule (a revision to the 2005 critical habitat designation) was published (70 FR 56211). The final revised 2010 bull trout designated Critical Habitat added the Pend Oreille River from the crest of Boundary Dam upstream 162.2 km (100.8 mi) to Lake Pend Oreille (Long Bridge at Sandpoint, Idaho) (70 FR 63898). It also added Lake Pend Oreille and much of the Clark Fork, the entirety of the Priest River to and including Priest Lake, and other tributaries to the Pend Oreille, Priest and Clark Fork rivers.

Bull trout are members of the char subgroup of the salmon family (salmonids), which includes the Dolly Varden, lake trout and Arctic char. Bull trout in Lake Pend Oreille and the Pend Oreille River area exhibit three different and distinct behavioral patterns: a resident population, an upstream migratory population, and a downstream migratory population. In the Pend Oreille Basin, spawning primarily occurs in October. However, spawning migrations by adfluvial bull trout can begin as early as April (Tennant 2010). Bull trout spawning generally occurs when water temperature drops below 9 °C. Mature adult bull trout can spawn more than once in a lifetime. First spawning often occurs after age four and occurs annually with individuals sometimes living 10 or more years (Rieman and McIntyre 1993).

According to USFWS (2002 and 2008), some of the Lake Pend Oreille bull trout demonstrate the most common migration pattern for adult bull trout by moving upstream from Lake Pend Oreille into smaller

tributaries to spawn. However, adult bull trout may exhibit a downstream migration pattern where adult fish move downstream from a lake system and spawn in either a main stem river, or in a smaller tributary stream. This downstream migration pattern is believed to have occurred in the Pend Oreille River Basin by some fish in Lake Pend Oreille. These down-migrating adult bull trout would migrate out of Lake Pend Oreille, down the Pend Oreille River and then into tributary streams (upstream and downstream of AFD) to spawn, with the offspring eventually returning to the lake, with the exception of one remaining stock in the Priest River basin. This migration pattern however was eliminated with the construction and operation of AFD in 1952 (USFWS 2002). In addition, the remaining example of the life history is a bull trout stock that continues to spawn in the Middle Fork East River from Lake Pend Oreille (USFWS 2008). This stock is small and at high risk of extirpation. The Middle Fork East River is a tributary to the Priest River, which is upstream of AFD, but downstream of Lake Pend Oreille. Without upstream passage at AFD, Priest River fish or any other bull trout entrained below AFD will not complete their life-cycle by migrating to tributaries to Lake Pend Oreille to spawn or use the cold-water rearing conditions in the lake.

Genetic sampling of bull trout collected immediately downstream of AFD since 2000 indicates that all bull trout have originated from upstream tributaries (e.g., Geist et al 2004; Scholz et al. 2005a, 2005b, 2008; and Kalispel Tribe, unpublished data). Once below the dam, the fish attempt to migrate back upstream to Lake Pend Oreille for forage, cold water refuge, or to natal spawning streams, but because upstream fish passage is not available at AFD, they are unable to migrate to the lake. Genetic results from the Kalispel Tribe indicates a large percentage of bull trout entrained are from depressed populations, which supports concern regarding the relationship of lack of upstream passage to population recovery. Any bull trout that end up below the dam die annually with late summer temperatures in excess of 18 °C (J. Maroney and J. Connor, KTI, pers. comm.). The Kalispel Tribe stops electrofishing below AFD when temperatures reach 18 °C, which leaves no temporary passage when temperatures exceed 18 °C. Bull trout are likely to die in these conditions unless they are able to find cold water refuge below the dam.

4.8.2 Bull Trout and Non-Native Species

Non-native species interactions with bull trout can occur at several levels, via exclusionary competition with replacement in habitat areas, competitive interaction for resources, hybridization between closely related species, and predation. Climate change is also expected to increase areas where warm water tolerant species may occur, many of which are non-native, and significantly alter their distributions. A Columbia River wide regional assessment of climate change impacts and invasive species has shown that bull trout distribution is most strongly related to climatic factors (water temperature and flow) and landscape characteristics and weakly related to the presence of non-native brook trout (*Salvelinus fontinalis*), in contrast westslope cutthroat trout (*Oncorhynchus clarki lewisi*) distribution was weakly related to climate and strongly related to presence of brook trout (Wenger et al. 2011). At the scale of individual streams, brook trout have been found to out-compete juvenile bull trout where water temperatures are greater than optimum bull trout temperatures (e.g., 15-16° C) (Gunckel et al. 2002; McMahon et al. 2007). The impact of brook trout is acute in selected streams in the southern margins of the bull trout distribution where temperatures are greatest (Rieman et al. 2006). Impacts of brook trout also include hybridization with bull trout, which can reduce bull trout reproduction. The Kalispel Tribe, Seattle City Light (SCL), Pend Oreille PUD, WDFW, and IDFG are using multiple methods to remove brook trout from waters that were historical bull trout habitat areas. Other large fish species, lake trout and northern pikeminnow, can consume smaller trout, which contributes to declines in native trout in larger water bodies such as rivers and lakes.

4.8.3 Alternative 1 - No Action

AFD would continue to be a barrier isolating hundreds of miles of habitat in the mainstem Pend Oreille River from Lake Pend Oreille and many downstream tributaries. Lack of upstream fish passage would continue to cause the isolation, lost reproduction, and ultimate mortality of migratory bull trout below the dam due to high water temperatures below the dam. Populations from the Priest Lake core area are the most sensitive to loss of individuals over the dam because of its high risk of extirpation (USFWS 2008).

Bull trout are anticipated to be more vulnerable to climate change than other species due to their low thermal tolerance required for spawning and rearing. Currently, many of the cool natal headwater habitats drain into reservoirs with warmer water temperatures and migration barriers (dams) isolating them by long distances and degraded habitat creating a patchwork of natal headwater habitats (patches). Because the size and connectivity of patches also appear to influence the persistence of local populations, climate warming could lead to increasing fragmentation of remaining habitats and accelerated decline of this species. Rieman, et al (2007) found a strong association between the lower elevation limits of bull trout distributions and longitude and latitude, and that this association was consistent with the patterns in mean annual air temperature. Their research estimated bull trout habitat response to a range of predicted climate warming effects and concluded that climate does strongly influence regional and local bull trout distributions.

See section 4.7.2 for a discussion on other fish passage facilities in the basin.

4.8.4 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

The distribution of Canada lynx, woodland caribou and North American wolverines are closely associated with boreal forest and sub-alpine forests, which are not found in the project action area. Due to these habitat preferences, the proposed project would have no effect on these species.

Elevated noise, overpressure, turbidity, and general disturbance during construction would have negative impacts on any bull trout in the area. Handling and transport during the operation would cause stress to individual fish during the operation of the facility. However, the construction effects would be temporary and the stress of handling and transport would be short in duration; neither would result in significant impacts to bull trout since the operation of the facility is expected to result in a net benefit to bull trout populations.

Impacts to bull trout from the proposed action are expected to be similar to those described for native fish (section 4.7) including those from construction such as noise from blasting and drilling, and potential elevated turbidity and TDG, as well as those from operation such as holding pool predation (mostly of sub-adults) and handling stress. There would be additional stress on bull trout from transfer to the upstream release site. Additional measures beyond those described for fisheries would minimize stress of trapping, handling, and transfer of bull trout including the following:

- All fishway operators would have training working with ESA-listed fish species and identifying bull trout.
- Fish would be identified and counted only visually, to the extent possible. Some minor handling may occur to accurately identify bull trout from other trout species.
- Aeration shall be provided in all the transportation coolers.
- All bull trout shall be allowed to recover from the stress of transport fully before being released back into the water.

Overall, the stress of handling and transport would be temporary and outweighed by the long-term benefits of being able to access spawning habitat and cold water refuge above the dam. Without the handling and transport necessary to reach such habitat, bull trout below the dam would not be able to reproduce and are likely to perish due to high summer temperatures. Impacts to bull trout critical habitat from construction would be minor and temporary and minimized by conservation measures. Beneficial effects to critical habitat are expected from the operation of the facility due to its reconnection of habitat for bull trout. The fish passage facility would connect critical habitat between the upper and lower Pend Oreille River and provides opportunity for restoration of bull trout populations below AFD, which were extirpated following dam construction. Reconnecting habitat and allowing bull trout that currently parish below the dam to survive and successfully spawn, in combination with restoration efforts downstream and upstream of AFD, could lead to re-establishment of bull trout populations in areas where they are currently extirpated. A larger meta-population[29] would result in greater genetic diversity and population resilience to environmental changes like climate change.

Given the temporary nature of negative impacts of degraded water quality and elevated noise during construction to bull trout, and the long-term benefit of providing passage, the effects of the action would be insignificant. The Corps prepared and submitted a biological assessment (BA) to USFWS for section 7 ESA consultation with a determination of "may affect, likely to adversely affect" bull trout and "may affect, but not likely to adversely affect" their critical habitat. USFWS issued a Biological Opinion (BiOp) to the Corps dated January 11, 2018. The BiOp states that the action is not likely to jeopardize the continued existence of the species nor would it result in an adverse modification of bull trout critical habitat.

4.8.5 Alternative 3 – Trap with Release to Forebay Exit

The short-term impacts of construction would have the same impacts on bull trout as those described for Alternative 2. The long-term impacts to bull trout would be different due to the differences in handling and the release location. Although this alternative would not require the distance of transport and the associated stress with Alternative 2, there is a risk of fallback over the spillway and/or entrainment in the turbines with release into the forebay. This would result in bull trout potentially needing to ascend the fish ladder and be handled multiple times in a season, and thus increase their energy demands and stress and reduce their potential to reach spawning grounds. There is also an increased predation risk to bull trout at the flume release location, where ambush predators could congregate, although impacts would still be insignificant.

4.8.6 Alternative 4 - Full-Height Volitional Fish Ladder

The short-term impacts associated with construction would result in greater impacts to bull trout than alternatives 2 and 3 due to the larger area of in-water work in the forebay and the additional blasting that is required, which could result in greater impacts to water quality and elevated noise. This alternative would also have greater long-term impacts bull trout. Ascending a full-height ladder would increase their energy demands, and there is uncertainty whether sub-adult bull trout would be able to do so. This alternative would not require any handling of bull trout, and would therefore result in less stress than

[29] A metapopulation consists of a group of spatially separated populations of the same species which interact at some level.

alternatives 2 and 3 for that activity. However, the risk of fallback for bull trout over the dam is likely greater than Alternative 3 since the ladder exit to the forebay would likely be closer to the dam turbines and spillways than the forebay release location in Alternative 3. Stress from fallback and inability of smaller fish to ascend the ladder outweighs the decreased stress of not being handled. Further, a full volitional ladder would allow non-native fish that prey on and/or compete for resources with native fish, and may dampen efforts by local fish managers to control non-native species in the waters above the dam. Predation risk on bull-trout is also greater in a volitional trap since there is three times the length as alternatives 2 and 3 so there is more opportunity to be preyed on. As with Alternative 3, ambush predators can congregate at the exit structure in the forebay and prey on bull trout, although impacts would still be insignificant.

4.8.7 Cumulative Effects of the Preferred Alternative

Cumulative impacts to bull trout, including those from construction and stress of handling during operation are similar to those described for native fish section 5.5.3. As mentioned previously, other dams in the basin are currently providing or are planning to provide fish passage (Maroney 2014). This basin-wide fish passage would have the same benefits to bull trout as described for native fish including increasing access to forage areas and cold water refuge, increasing gene flow and subsequent genetic diversity, and decreased mortality caused by the inability to escape lethal conditions from high water temperatures. In addition, the Kalispel Tribe installed a temporary trap fishway at AFD in September-October 2014 below the powerhouse near the trash sluice outlet, with a goal to provide a safe and effective interim fishway for collection of bull trout until a permanent fishway can be completed. In addition, there is a beneficial cumulative effect of reconnecting bull trout critical habitat by providing basin-wide passage. This could lead a larger meta-population of bull trout with greater genetic diversity and population resilience to environmental changes like climate change. Overall, bull trout populations would benefit significantly from the cumulative effects of basin-wide fish passage.

4.9 Air Quality and Green House Gas Emissions

The ambient air quality in the area is generally good with few sources of pollution and is in an attainment zone, which means it meets EPA's standard for six criteria pollutants. In Idaho, those sources are from automobiles, recreational boats, industrial sources, smoke from wildfires, and ozone formation on hot summer days. These sources of air pollution are minor compared to the size of the region.

Anthropogenic sources of greenhouse gases (GHG) have been increasing over the past 150 years, and have reached a rate of contribution that is causing climate change. Greenhouse gas emissions are cumulative by nature, with gigatonnes of annual global emissions (Raupach, 2007). GHGs include water vapor, carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), ozone (O3), and some hydrocarbons and chlorofluorocarbons. Primary sources of emissions in the region are the same as those described above.

4.9.1 Alternative 1 - No Action

Under this alternative there would be no air quality pollutants or greenhouse gases created by the construction of and operation of the proposed facility.

4.9.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

The will be emissions associated with both the construction and operation of the fish passage facility. Table 4-3 presents the estimated emissions from the operation of the various construction equipment required using the Sacramento Metropolitan Air Quality Management District (SMAQMD) model for non-road emissions (2008). These are merely estimates since the model only calculates for 50, 500, and 1000 horsepower (HP) equipment, as such equipment below 200 HP, was entered as 50 HP in the model and equipment in the range of 200-500 HP was entered as 500 HP.

Table 4-3. Estimated Amount of Emissions from Construction Equipment of a Two-Year Construction Period

Equipment[1]	Horse-power	# of Pieces	Hours per day	# of days	tons CO	tons ROG	tons CO_2	tons NOx	tons PM^2	tons SOx
Air Compressor	50	3	10	1004.3	5.10	2.22	408.81	4.41	0.50	0.05
Boat	50	1	10	9.6	0.02	0.01	1.30	4.41	0.00	0.00016
	500	1	10	8.3	0.02	0.01	10.61	39.47	0.00	0.00014
Conveyer	50	1	10	290	0.49	0.21	39.35	4.41	0.05	0.0049
Cranes	50	3	10	86	0.44	0.19	35.01	4.41	0.04	0.0043
	500	2	10	14.4	0.05	0.11	36.80	39.47	0.01	0.00049
Dozer	500	1	10	0.4	0.00	0.00	0.51	39.47	0.00	6.73E-06
Drill	50	2	10	969	3.28	1.43	262.96	4.41	0.32	0.03
Excavator	50	2	10	51.4	0.17	0.08	13.95	4.41	0.02	0.0017
Fork Lift	50	1	10	3.2	0.01	0.00	0.43	4.41	0.0005	5.39E-05
Front End Loader	50	1	10	49	0.09	0.19	62.61	39.47	0.024	0.00083
	500	1	10	8.4	0.01	0.01	1.14	4.41	0.0014	0.00014
Generator	50	1	10	48	0.08	0.04	6.51	4.41	0.0079	0.00081
Pumps	50	5	10	491	4.16	1.81	333.11	4.41	0.41	0.04
Trucks[3]	50	1	10	34	0.06	0.03	4.61	4.41	0.0056	0.00057
	500	1	10	1	0.00	0.00	1.28	39.47	0.0005	1.68E-05
Total					**14**	**6.33**	**1219**	**246**	**1.39**	**0.14**

[1] Estimated types of equipment expected. Other types may be necessary, as determined in the Project Engineering and Design (PED) phase.

[2]Estimated amount of particulate matter less than 10 micrometers in diameter (PM^{10}), of which $PM_{2.5}$ is a fraction.

[3] Based on truck activity at the construction site.

[4]Estimates include multiple pieces of equipment

In addition to emissions from non-road equipment, there would be emissions associated with truck activity. Dump trucks would be needed to haul an estimated 11,000 cubic yards of material to an upland disposal site. There would also be long-term emissions associated with hauling fish to an upstream release site during operation of the facility. The following assumptions were made regarding emissions:

1. The nearest site to handle such disposal material is 5 miles away.
2. A 30-cubic-yard dump truck would be used that gets roughly 5 miles per gallon.
3. A 1-ton truck for hauling fish would get about 12 miles per gallon.
4. Every gallon of diesel fuel burned produces 22 pounds of CO_2 and 0.84 pounds of PM_{10}

Based on these assumptions the following calculation was done for emissions from trucks hauling material off-site and hauling fish to the release site:

Table 4-4. Estimated amount of emissions from vehicles for material haul-off (short-term) and transport of bull-trout (long-term)

Equipment	mpg	# of trips	total miles	total gas gallons	pounds CO_2/ gallon	CO_2 pounds	tons CO_2	Pounds of PM / gallon	Pounds PM	tons PM
Dump truck (construction)	5	367	3667	733	22	16133	**8.07**	0.84	616	**0.31**
Pick-up truck (per year for project life)	15	20	200	13	22	293	**0.15**	1	13	**0.0007**

Note that estimating emissions of other pollutants from vehicles more difficult and dependent on the design of the engine and emission control system, rather than fuel consumption per mile (USEPA 2014).

The U.S. EPA has set *de minimus* thresholds for 6 criteria pollutants including carbon monoxide (CO), Ground-level Ozone, lead (Pb), nitrous oxides (NOx), particulate matter (PM), and Sulfur Dioxide (SO_2) for areas that areas of non-attainment (does not meet EPA air quality standards). Although the construction of the facility is expected to occur over two years, the non-road model outputs and vehicle emissions still exceed the EPA thresholds for NO_2, which is a part of the total NO_x, of 100 tons per year. However, the project is located in an attainment zone, therefore *de minimus* thresholds do not apply and projects emissions would be insignificant compared to those in the region. There would also be dust on site associated with construction activities and operation of heavy machinery. Best management practices like the use of a water truck, would be used to control dust.

GHG emissions, mainly in the form of CO_2, would come from burning diesel fuel to operate construction equipment and to haul material to the disposal site. An estimated 1,227 tons of CO_2 (Table 4-4) for non-road emissions and for truck emissions) and 246 tons of NO_x would be emitted from this alternative. It is more difficult to estimate vehicle emissions of other GHGs like methane (CH4) and hydroflourocarbons

(HFCs) than CO2. Emissions of CH_4 are dependent on the design of the engine and emission control system, rather than fuel consumption per mile. The amount of HFC leakage from vehicle air conditioners is dependent on system design, amount of use, and maintenance. On average, CO_2 emissions are 95-99% of the total greenhouse gas emissions from a passenger vehicle, after accounting for the global warming potential of all GHGs. The remaining 1-5% is CH_4, N_2O, and HFC emissions (U.S. EPA 2014). Although GHG emissions associated with this alternative are not expected to significantly increase the rate of climate change and sea level rise, diesel fuel consumption by heavy machinery required for construction, material haul-off, and gasoline consumption for travel to the sites for all Corps projects, including this project, are a part of world-wide cumulative contributions to change in climate by way of increases in greenhouse gas emissions.

4.9.3 Alternative 3 - Trap with Release to Forebay Exit

Emissions from construction, including GHGs, would be the same as those for Alternative 2 since the facility and construction methods would be the same. There would be less emissions associated with hauling fish to a release site since it would be in the forebay and not 5 miles upstream. As with Alternative 2, impacts would still be insignificant.

4.9.4 Alternative 4 - Full Height Volitional Fish Ladder

Emissions from construction, including GHGs, would be up to three times as much as alternatives 2 and 3, because the facility would be three times as long with three times as much rock removal. There would be no long-term emissions associated with hauling fish upstream since the ladder would be volitional. As with Alternative 2 and 3, impacts would still be insignificant.

4.9.5 Cumulative Effects of the Preferred Alternative

There is potential for cumulative effects to air quality, particularly because the construction work window overlaps with the fire season, although emissions from wildfires and local industry would be much greater that those from the proposed construction activities. GHG emissions are cumulative by nature, however the emissions associated with the proposed actions are a minor fraction of global emissions.

There would also be cumulative impacts to GHGS from operation of the facility associated with truck transport. Again, these truck emissions are minor compared to global emissions.

4.10 Cultural Resources

Cultural resources are defined as prehistoric and historic sites, structures, districts, landscapes, objects, or other evidence of human activity or other places that are considered significant to a community, culture, or ethnic group. Significant cultural resources are those that meet one or more criteria for inclusion in the National Register of Historic Places (NRHP). The responsibilities of Federal agencies with respect to these resources are identified in several regulations, including the National Historic Preservation Act (NHPA) of 1966, as amended, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

Section 106 of the NHPA requires Federal agencies to take into account the effect of any undertaking upon historic properties. A historic property is defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. A building, structure,

archaeological site, or other resource is considered a historic property if it meets at least one of the following NRHP eligibility criteria:

- Is associated with events that have made a significant contribution to the broad pattern of history, or
- Is associated with the lives of persons significant in the past, or
- Embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values or that represent a significant and distinguishable entity whose components may lack individual distinction, or
- Has yielded, or may be likely to yield, information important in prehistory or history.

Please see Section 4.14 for information about Tribal Resources and Cultural Values and Section 6.5 for status of NHPA compliance.

The Corps reviewed all cultural resource information including cultural resources reports, site forms, and historic context statements related to the area of potential effect (APE).[30] A records search was not conducted at the Idaho State Historic Preservation Office (SHPO) as the Seattle District has all cultural resources information related to AFD and Corps-owned land on-file.

An archaeological survey was conducted in 2010 of Corps fee lands including the proposed project area for the fish passage. The survey confirmed that the area had been extensively disturbed during project construction, including the island which was leveled to the crest of the dam. The survey found no archeological sites at the island (Blake et. al. 010).

The Corps considers AFD and associated structures to be eligible as a historic district to the National Register of Historic Places (NRHP) under criteria A, and C with which the Idaho State Historic Preservation Officer agrees (Pitkin 2011). AFD was constructed by the Corps between 1951 and 1955 and was designed to take advantage of a natural island on the crest of Albeni Falls, a low drop on a generally westward flowing section of river. A spillway section of dam extends north-south across the river channel south of the island. The powerhouse spans the north river channel on a southwest-northeast alignment, and a non-overflow section of dam curves around the upstream side of the island between the spillway and powerhouse. The dams and powerhouse are of reinforced concrete gravity construction. Water intakes for the power generating units are integral with the powerhouse. Other resources at AFD dating to project construction include a log chute and three-bay garage, both on the island, and the combination high-tension transformer and switch yard on the north bank of the river just beyond the powerhouse.

AFD is eligible under criterion A for its significant impact on local and regional economics, specifically recreation and tourism. In addition, the dam is critical in the regional management of water in the Upper Columbia River system to ensure adequate flows for flood control and hydroelectric output (McCroskey 2005). Albeni Falls Dam is eligible under criterion C for its architectural merit as a modest but representative example of the mid-twentieth-century modernism that characterized dams of the era. Character defining qualities of the modern theme are the grid-scored concrete of the powerhouse's exterior, metal period letter above the powerhouse's visitor's entrance, tiled lobby area with built-in furniture, and modern style railings and fixtures (McCroskey 2005). The Corps has prepared a NRHP

[30] The APE is/are the geographic area(s) in which a project or undertaking may cause alterations in the character or use of a historic property's location, design, setting, materials, workmanship, feeling, or association.

nomination form for the AFD Historic District. The AFD historic district is comprised of the Dam, the log passing chute, entrance deck/public reception, observation gallery/lobby, spillway, remnant cofferdam abutments, gantry cranes/half gantry crane and BPA switchyard and transformer yard.

4.10.1 Alternative 1 - No Action

Without the proposed fish passage project there would be no adverse effect to the AFD historic district. No modern structures (i.e., the fish passage) would be introduced into the historic district.

4.10.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

Both NEPA and the National Historic Preservation Act (NHPA) require that Federal agencies consider impacts to cultural resources; however, the NHPA specifies the process by which Federal agencies determine the significance of these resources and assess a project's effects. The NHPA considers impacts to "historic properties" as opposed to "cultural resources". A historic property is defined as a cultural resource that has met certain standards of age, integrity, and significance. The phrase "adverse effect" (used in the NHPA) and "significant impact" (used in NEPA) are not equivalent terms but are similar in concept. Impacts to cultural resources are typically examined in terms of how the project would impact the qualities that make the resource eligible for listing on the National Register of Historic Places (NRHP). A finding of adverse effect on a historic property does not necessarily require an environmental impact statement (EIS) under NEPA 36 C.F.R. 800.8(a)(1).

The proposed fish passage project would have an adverse effect to the AFD historic district. The log chute is a contributing element to the AFD and would be plugged at the entrance. The altering of the log chute would have a direct effect on the integrity of the design, workmanship, construction and feeling of AFD period of historical significance. The log chute would be altered at the entrance and replaced by the gravity water supply feature for the fish passage, which is a larger and more complex element. In addition, the construction of the fish passage would introduce a modern structural element into the Historic District. The introduction of a modern structure (i.e., the fish passage) into the historic district would alter integrity of design of AFD. The fish passage would be constructed with modern materials and would introduce a larger visual element into the AFD historic district. Section 106 consultation with the Idaho SHPO and Tribes are on-going. The Corps has determined that the TSP would have an adverse effect to the AFD historic district. The Corps and the Idaho SHPO have agreed upon mitigation that would resolve the adverse effects caused by the proposed fish passage project, reducing the effects to less than significant. These mitigation options include processing a large collection of construction photographs at AFD to professional archival standards and making the collections available to researchers and production of a brochure/poster available at the AFD Visitor's Center emphasizing the history of the AFD historic district. As required by Section 106, the mitigation to resolve adverse effects to the AFD historic district has been memorialized in a Memorandum of Agreement (MOA), which was executed by the SHPO and Corps on May 1, 2018.

4.10.3 Alternative 3 – Trap with Release to Forebay Exit

Similar to Alternative 2, Alternative 3 would have an adverse effect to the AFD historic district. Altering of the log chute would adversely affect a contributing element to the AFD historic district and would directly affect the integrity of the design, workmanship, construction and feeling of the AFD period of historical significance for the district. The construction of modern features such as the fish passage facility and water pipe would introduce modern structural elements and visual elements into the historic

district that would alter the integrity of design of the AFD historic district. Since effects to the AFD historic district under Alternative 2 would be adverse, resolution of adverse effects, to potentially include mitigation, would be required in order to reduce the adverse effects to less than significant.

4.10.4 Alternative 4 – Full Height Volitional Fish Ladder

Similar to Alternative 2, Alternative 4 would have an adverse effect to the AFD historic district. Altering of the log chute would adversely affect a contributing element to the AFD historic district and would directly affect the integrity of the design, workmanship, construction and feeling of the AFD period of historical significance for the district. The construction of modern features such as the fish passage facility and water pipe would introduce modern structural elements and visual elements into the historic district that would alter the integrity of design of the AFD historic district. Since effects to the AFD historic district under Alternative 2 would be adverse, resolution of adverse effects, to potentially include mitigation, would be required in order to reduce the adverse effects to less than significant.

4.10.5 Cumulative Effects of the Preferred Alternative

The contributing elements that must be present for National Register eligibility of the AFD historic district include those fundamental aspects of the dam's historic water management functions and hydroelectric capacity, features and structures directly tied to the control of water, and the stimulation, creation, and delivery of hydroelectric power during the historic period. The core functionalities and features that represent the AFD must be present for eligibility and if there were past, present, and future actions that might affect these features there could be a cumulative effect to historic properties. However, the physical features of the dam that are considered significant to its National Register eligibility will not be altered by the proposed fish passage project in a manner that will affect their ability to convey the historic significance of the AFD. There have been a number of non-contributing resources and features that have been introduced within the district throughout its existence (two modern buildings, a resource area building on the north side of the river and a large metal warehouse/shop on the island, entrance grounds to include circulation features, drives, and landscape elements). These non-contributing elements and the effects caused by their construction or presence has not resulted in effects to the AFD that result in its inability to convey its significance for listing in the National Register. There are no known future actions that could contribute to an adverse cumulative effect to cultural resources.

4.11 Aesthetics and Visual Resources

Landscape identity is a term used to indicate the unity perceived as the various elements of the landscape are absorbed by the senses. The visual sense is generally the strong influence on our perception of landscape identity. Physical elements such as landform, water, vegetation, sky, and structural or built forms are dominant elements in interpreting landscape identity, although unseen intrinsic elements often modify feelings about site harmony.

AFD sits in a confined area of the Pend Oreille River Valley where the waters flowed through a narrow, rocky, high-walled valley. The dam was built to take advantage of the rock walls of this narrow stretch of the river. The dam and its support facilities dominate the majority of the viewshed. The island between AFD powerhouse and spillway is one of the remaining natural rock islands that bisected Pend Oreille River prior to the dam's construction. Since it is rocky, without any springs or natural seeps, vegetation is limited, somewhat stunted in growth compared to the same vegetation growing in moister conditions.

4.11.1 Alternative 1 - No Action

Under the no action alternative, existing conditions are expected to continue.

4.11.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

From downstream looking towards AFD, the rock face and historic log chute would be altered, which in turn would change the visual characteristics of the dam. To construct the fish passage facility, portions of the natural rock face and vegetation would be removed, replaced with additional concrete structures. In addition, one of the unique historic components of the dam, the log chute, would be altered. From the top of the dam, upper portions of the fish passage facility would be visible but overall views downriver would not be significantly altered. The new facilities would not be visible from the upriver side of the dam or from the Albeni Falls Vista area, which is open to the public.

Upriver fish release sites would be temporarily affected by the additional traffic from the haul trucks. However, once the trucks have left the area, the site would return to existing conditions.

Impacts to aesthetic and visual resources would be insignificant compared to the impacts of the dam itself.

4.11.3 Alternative 3 – Trap with Release to Forebay Exit

Impacts to aesthetics and visual resources would be similar to those described for Alternative 2, since the design is the same. As with alternatives 2, impacts would still be insignificant.

4.11.4 Alternative 4 - Full-Height Volitional Fish Ladder

The impacts to aesthetics and visual resources would be greater than Alternatives 2 and 3 since the facility would scale the entire island and exit into the forabay, and also require up to three times as much rock removal. There would not be a need for a sorting facility for this alternative, but there would be additional structures in the forebay for the ladder exit. As with alternatives 2 and 3, impacts would still be insignificant.

4.11.5 Cumulative Effects of the Preferred Alternative

There would be little temporary cumulative effects associated with construction since there is unlikely to be other construction activities occurring within the view shed of the proposed facility at the same time.

Long-term cumulative impacts to the aesthetics of the area are expected. The aesthetics and visual resources at the location of the dam have changed substantially since the construction of AFD began in 1951. Once a natural water fall, the site has now become a major man-made structure on the river. Other structures discussed in section 4.10 were also added to the dam. There has been a trade-off from the aesthetics of the natural falls to the visual appeal of the large engineering feat of the dam. Altering the historic log chute and replacing bedrock with man-made features would permanently change the viewshed of the downstream portion of AFD and contribute cumulatively to the visual changes of the area since construction of the dam. However, this change would be insignificant in comparison to the initial effect of altering the site from a natural waterfall to a large dam.

4.12 Recreation

Lake Pend Oreille and the Pend Oreille River are recreation destinations for boaters, fishers, hunters, and other recreationists on a year-round basis. Warm summer weather options include a variety of activities

such as camping, boating, fishing, swimming, and kayaking. Based on an IDFG survey in 2003, Lake Pend Oreille was the most popular destination for fishing trips in Bonner County, with 60,297 trips and expenditures of $17.8 million, with the average spending per trip of $295 (2003 dollars) (Grunder et. al. 2008). Cold weather activities include ice fishing, ice skating, and various hunting activities. Popular ice fishing spots are located around the lake including a spot north of Sandpoint, and another near Sunnyside (Brady 2010). Approximately 100 to 200 fishermen gather near Sandpoint to participate in ice fishing. Waterfowl hunting on and near Lake Pend Oreille and the Pend Oreille River is popular in the fall.

Motor boats and sailboats are commonly used on the lake. Some boat owners store their boats in the water year-round. Boat ramps are available for launching boats in several locations on the lake and on the river, when the lake and river are ice-free. Lake elevations affect accessibility of boat ramps, and usability of docks; many dock platforms are fixed above high pool elevation (2062 ft) and are thus well above water level when the lake is drawn down.

Corps Park Rangers offer guided tours of the dam including portions of the powerhouse and the spillway. Tours for groups are scheduled year-round, and in the summer months (between Memorial Day and Labor Day), drop-in tours are offered four times daily. The highest number of drop-in tours was in FY 11 (Table 4-5) with 1334 visitors, and the number of group tours has increased in the recent years.

Table 4-5. Visitation at AFD FY09-FY14

	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
Summer Drop-in Tours	646	964	1334	901	767	737
Scheduled Tours (groups)	13	10	6	25	31	25
Scheduled Tours (average number individuals per tour group)	28	32	22	26	23	25

Recreation opportunities downstream of AFD are similar to those above the dam, with the addition of canoeing or kayaking to travel the river. Ice fishing is less common due to river conditions.

4.12.1 Alternative 1 - No Action

Existing conditions are expected to continue under the no action alternative.

4.12.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

During construction of the fish passage facility, access to some areas of AFD may be limited on Park Ranger-led visits of the dam. Once construction is complete, the new fish passage facility could be included on the Ranger-led tours. Interpretive information could be provided at the adjacent AFD Visitor's Center. At the fish release site(s) (presented in section 5.7), which includes boat ramps in Priest River and Laclede, ID, as wells near Trestle Creek , recreational access to the area could be temporarily affected such as restricting boat launch/retrieval at a launch ramp during release, which would likely be no more than 15-30 minutes. No additional permanent structures are proposed for the release site as fish will be released directly from the truck to the river. Once the fish have been released, the area restrictions would be lifted. In the near term, the number of days that would require release would be minimal (roughly 20 or less per year) given how few bull trout are expected to enter the facility. During peak bull trout migration (late spring/early summer) this interruption may occur daily. During non-peak migration

the interruption is expected to be no more than once or twice per week. Impacts to recreational fishing during the summer months of July-August would be minor since temperatures are elevated and bull trout migration is low. The number of days could increase if bull trout populations rebound. The facility would be closed for the month of August, so there would be no impacts to fishing access during that period. Due to the limited amount of time need to release fish at the boat launch and the temporary impacts to recreation at the dam during construction, impacts would expected to be insignificant. There is a possibility that recreational fisheries would be impacted in Lake Pend Oreille by not allowing non-native fish to pass above the dam (improvement for those that target native species and impact to those that target non-native species), however it's unlikely this would have any measurable impacts on non-native populations above the dam.

4.12.3 Alternative 3 – Trap with Release to Forebay Exit

Construction impacts to recreation would be the same as those described for alternative 2 since the facility is essentially the same. There would not be the impacts to fish access at the release sites described for alternative 2 since the release site would be in the forebay, on USACE land. As with alternatives 2, impacts would be insignificant.

4.12.4 Alternative 4 - Full-Height Volitional Fish Ladder

Construction related impacts to recreation would be similar to Alternatives 2 and 3, but greater due to the increased length of the ladder and additional rock blasting, both of which would result in a longer construction period that could limit public access to the dam. There would be no impacts to fishing access at release sites since the proposed facility is volitional. The passage of non-native fish that prey on and/or compete with native fish could have a long-term impact on recreational fishing above the dam, with a greater proportion of non-native fish being caught by anglers. Some anglers may favor catching of non-native fish like bass, walleye, and brook trout. Others may prefer the native bull trout, and be opposed to passing fish that compete with and/or consume them. As with alternatives 2 and 3, impacts would be insignificant.

4.12.5 Cumulative Effects of the Preferred Alternative

Cumulative impacts from construction to recreation would be minor as there is unlikely to be other activities occurring in the area that would impact recreation.

Cumulatively the addition of a fish passageway to the infrastructure is not expected to change visitation at AFD and have only minor impacts to fishing access at the release locations. Fish passage may affect recreational fishing based on potential future changes in fish management by IDFG and the flow of native cutthroat above the dam.

4.13 Hazardous, Toxic, and Radioactive Waste (HTRW)

For construction of a fish passage facility at AFD, there are no known or suspected areas of contamination or areas where an uncontrolled release of contamination has occurred. All of the existing environmental conditions identified at the site would not pose a concern to construction of a fish passage facility. Further, review of all real estate documents associated with AFD indicates no legacy contamination that could be encountered during the project.

Given the limited nature of construction at the two sites proposed for fish release associated with the trap and haul alternatives, the investigation was reduced in scope relative to investigative efforts for AFD. At the Priest River Boat Launch, two leaking underground storage tanks were identified; one at the wastewater treatment facility and another at the former dock and shop. Both these storage tanks were remediated and have since been cleared. Given that these two storage tanks have been remediated, and no construction is expected at the site, there is no concern that known or suspected contamination would interfere with the project.

There were no notable findings at the Trestle Creek Recreation Area that would be indicative of any known or suspected contamination.

4.13.1 Alternative 1 - No Action

The no action/future without project condition is not expected to vary from the affected environment (see section 4.13).

4.13.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

Under alternative 2, no known or suspected contamination or uncontrolled release of contamination has been found in the area. There are no concerns for the alternative in regards to HTRW. See Appendix D (Environmental Appendix) for more information.

4.13.3 Alternative 3 – Trap with Release to Forebay Exit

Under alternative 3, no known or suspected contamination or uncontrolled release of contamination has been found in the area. There are no concerns for the alternative in regards to HTRW. See Appendix D (Environmental Appendix) for more information.

4.13.4 Alternative 4 - Full-Height Volitional Fish Ladder

Under alternative 4, no known or suspected contamination or uncontrolled release of contamination has been found in the area. There are no concerns for the alternative in regards to HTRW. See Appendix D (Environmental Appendix) for more information.

4.13.5 Cumulative Effects of the Preferred Alternative

This is not applicable to the HTRW assessment.

4.14 Tribal Resources and Cultural Values

Under the Federal trust doctrine (the trust obligation of the U.S. government to tribes) the U.S. owe a fiduciary duty to Indian tribes. The nature of that duty depends on the underlying substantive laws (i.e., treaties, statues, agreements) creating that duty. Where agency actions may affect Indian lands or off-reservation treaty right, the trust duty incudes a substantive duty to protect these lands and treaty rights "to the fullest extent possible". Specific to the Corps, Department of Defense (DoD) trust responsibilities include ensuring DoD is fulfilling its Federal responsibilities and addressing tribal concerns related to protected tribal resources, tribal rights, or Indian lands (Department of Defense American Indian and Alaska Native Policy, 20 OCT 1998).

Two Indian tribes in particular have significant historic and current interests in the resources in the study area: the Kalispel Tribe of Indians (Kalispel Tribe) and the Kootenai Tribe of Idaho (Kootenai Tribe). As

stated above, the Corps has a trust responsibility for both the Kalispel and Kootenai Tribes. Below is a description of the Kalispel and Kootenai Tribes' presence in the region and how they depend on fisheries in the Pend Oreille Basin. Some of this information was provided by the Kalispel Tribe (Kalispel Tribe of Indians, 2017).

The Kalispel Tribe

The historic record—mainly consisting of fur trader, missionary, and military accounts, as well as census data of the Pend Oreille Valley—consistently refers to the ancestors of the Kalispel Tribe as the resident population in what is now the AFD project area. Generally referred to as Upper Kalispel/Pend Oreille east of Sandpoint and Lower Kalispel/Pend Oreille west of Sandpoint, the forbears of the Kalispel Tribe occupied five principal winter villages across 72.9 km of the river valley. The two uppermost principal villages in the valley were located on Lake Pend Oreille (Bayview and Ellisport Bay) and the lowermost was located near the confluence of Cee Cee Ah Creek and the Pend Oreille River. There were also several occasional villages in the valley, including one just below Albeni Falls (Chittenden 1905), where encampments would move when resources were scarce. Relying on this historical information, the Indian Claims Commission determined that the Kalispel Tribe maintained exclusive use and occupancy of 2.3 million acres, including what is now the entire project area currently occupied by AFD. The historic record documents the importance of fish to Kalispel people living in the Pend Oreille Valley. Historically, bull trout and westslope cutthroat trout provided valuable subsistence for the Kalispel Tribe. The principal fishing locations for trout were at Priest, Pack, and Clark Fork Rivers; Hoodoo, Ruby, LeClerc, Tacoma, Calispell, and Cee Cee Ah Creeks, as well as other streams in the Cusick area (Smith 1985; 1986 as cited in Nenema 1997; PUD 2000: WQL 132). In one account, reference is made to the Kalispel's annual practice of constructing a fence and weir to trap large numbers of fish in the Clark Fork Delta (Suckley 1853). In another, Kalispel people living near Denton Slough are described as "subsisting entirely on fish" (Owen (1927a, 1927b). Kalispel people caught trout year-round in the Pend Oreille and Clark Fork Rivers and most of the larger tributaries below AFD. Members of the Kalispel Tribe harvested trout, suckers, char, northern pikeminnow, chub, and whitefish in rivers, streams, sloughs, creeks, and lakes throughout the area. Tribal members historically fished for salmon twice each year (July and September) at the falls on the Pend Oreille River just above the mouth of the Salmo River[31] (Smith 1985) and caught trout year-round in the Pend Oreille and Clark Fork Rivers and most of the larger tributaries below AFD.

The trout fisheries included bull trout and westslope cutthroat trout (Smith 1985; Fahey 1985 as cited in Nenema 1997 as cited in PUD 2000: WQL132). Gilbert and Evermann (1895) reported that in 1894 bull trout were abundant in the Pend Oreille River and specimens as large as twenty-six inches long and weighing five pounds or more were in the possession of individual members of the Kalispel people. The ethnographic data also identify specific tributaries where individual Kalispel Tribe would harvest "char". As the only native char in the Pend Oreille System, the fish referred to are bull trout.

With the construction of the AFD Project, the Tribe effectively became isolated from native fish populations as the dam blocks any upstream fish migration. Since dam construction, Kalispel people have become increasingly disconnected from the "ntxwe", the Pend Oreille River. With upstream fish

[31] The Salmon River confluence with the Pend Oreille River is below Boundary Dam (which is without fish passage) and is located in Canada.

migration blocked, native fish populations have declined to the point where the Kalispel Tribe can no longer subsist on their main dietary component, fish.

As fisheries manager of Reservation waters, the Tribe is particularly invested in protecting and restoring native fish. One of the Tribe's highest priorities is working with its conservation partners, including the Corps, to reestablish fish passage at AFD. Tribal members have grown increasingly disconnected from bull trout due to their near extirpation from tribal waters in and around Lake Pend Oreille. The Kalispel Tribe considers reestablishing connectivity between the Reservation and Lake Pend Oreille as the single most important conservation action needed to recover bull trout populations in the lower river. The Tribe is engaged in a significant amount of habitat restoration work in an effort to help mitigate the impacts of AFD, Box Canyon Dam, and Boundary Dam on native fish. The Corps and BPA are an important conservation partner in this effort under the Kalispel Fish Accord.

If fish passage were to be realized, native populations of fish, including bull trout, would once again migrate upstream to complete their life cycle. It is anticipated that at some point, these fish would recover to healthy enough levels where Kalispel people could once again fish for them and reestablish this important connection to their heritage.

The Kootenai Tribe

The Kootenai Tribe of Idaho has lived in the region, including the project area, for thousands of years, and also has interests in the Pend Oreille/Clark Fork System and the bull trout populations in Lake Pend Oreille, which have been affected by the inability of bull trout that originate from Lake Pend Oreille and its tributaries to migrate back upstream due to the presence of impassable dams.

Cultural Values for Tribes

Pursuant to the Federal trust doctrine, the Corps has collaborated with the federally recognized Indian tribes for this study and share the following cultural values for these tribes:

Bull trout, sturgeon, and salmon have long been a symbol and the lifeblood of the people who call the Pacific Northwest their home. These fish not only play an important role in the ecosystem of the region; they also helped shape the lives of the people who have lived here since time immemorial. The cultures, intertribal interactions, fishing technologies and the very religions of the Pacific Northwest tribes were impacted and influenced by fish. Fish have also played an important part of the economies of the region for thousands of years, from the ancient Indian trade routes to modern commercial fishing.

Fish play an integral role in tribal religion, culture, and represented a primary source of physical sustenance. They also represented a significant part of each Tribes' spiritual and cultural identify. Fish are used in religious services by many tribes and the annual return of the fish celebrated as a renewal and continuation of human and other life. Fish and the rivers they use are considered part of a tribe's sense of place: the Creator put them where the fish were and they are obliged to remain and protect them and their habitat. The annual return of these fish to their natal streams and the fishing practices of the tribes allows for the transfer of traditional values and practices from generation to generation. Without the fish that are important to each Tribe, the bull trout and salmon, the tribes believe they would cease to be Indian people.

For many tribal members fishing is or would be the preferred livelihood. Since fish are a primary food for tribes, they continue to be an essential aspect of a tribe's nutritional health. As tribal populations

grow, so does the need for more fish. The Kalispel Tribe has not had a harvestable fishery on their reservation for 60 plus years. In the absence of the essential food resource being present, Kalispel families have turned to other food resources—almost all of which are more expensive and less nutritious than native fish. Since the Tribe cannot currently feed their community wholesome native foods essential to tribal self-determination, the physical and cultural health of the Kalispel people has been harmed.

Furthermore, when Kettle Falls, a past fishing access site, was inundated by the creation of Grand Coulee Dam in the 1930's, the harvest so of the annual migration of fish, including salmon, through this site was no longer possible for the upper Columbia River Tribes.

4.14.1 Alternative 1 - No Action

Under this alternative, there would be no passage of bull trout or other native fish that are culturally important to the Kalispel Tribe. Without thermal refuge and access to spawning habitat individuals entrained below the dam will perish and loose the opportunity to reproduce. As a result, these fish populations are likely to decline even further.

4.14.2 Alternative 2 - Trap and Haul to Upstream Release Site (preferred alternative)

The construction of fish passage would improve two traditional trout fisheries located at the confluences of Cee Cee Ah Creek and Calispell Creek (coincidental with archaeological sites 45PO153 and 45PO197). These traditional fishing sites have fallen into disuse due to the near extirpation of bull trout. Restoring fish passage at AFD could provide an opportunity for the Kalispel Tribe to harvest bull trout when populations recover. Fish passage at AFD will reconnect Kalispel people with these traditional sites by reconnecting adfluvial bull trout from Lake Pend Oreille with the lower river. It is expected to lead to long-term increase in bull trout populations as they are allowed to access their spawning grounds and would no longer be trapped below the dam. This would also provide an essential food source back to the Tribe. There would be no significant adverse impacts to Tribes as a result of the proposed action. Negative impacts to the Tribe and their fisheries would be insignificant.

4.14.3 Alternative 3 – Trap with Release to Forebay Exit

Impacts would be the similar to those described for alternative two, in that movement of native fish, including culturally important bull trout, would be restored at AFD. However, the success rate of bull trout reaching their spawning grounds would be lower due to the entrainment risk associated with being released directly above the dam. As with alternatives 2, impacts would still be insignificant.

4.14.4 Alternative 4 - Full-Height Volitional Fish Ladder

Impacts would be the similar as those described for alternative two, in that movement of native fish, including culturally important bull trout, would be restored at AFD. However, the success rate of bull trout reaching spawning grounds is lower due to the entrainment risk associated with the ladder existing directly above the dam, increased energetic demands for fish to ascend the entire ladder, and the potential that sub-adult fish are not able to ascend the ladder at all. As with alternatives 2 and 3, impacts would still be insignificant.

4.14.5 Cumulative Effects of the Preferred Alternative

Cumulative impacts would be similar to those described in section 4.7, in that basin-wide fish passage could help to negate some of the negative impacts on native migratory fish by increasing access to forage

areas and cold water refuge, increasing gene flow and subsequent genetic diversity, and decreased mortality caused by the inability to escape lethal conditions. The Action Agencies have entered into a Fish Accord with the Kalispel Tribe specifically funding approximately $40 million across 10 years (through 2022) for actions to benefit fish and wildlife, including habitat projects in the project area to benefit bull trout. Upstream passage at AFD, as well other dams in the basin like Boundary Dam (downstream of AFD) and Box Canyon Dam (upstream of AFD), is needed to realize the full potential of downstream habitat restoration actions. The cumulative effects of restoring basin-wide passage for bull trout in combination with these ongoing Tribal and state efforts to improve and restore habitat for bull trout and other native species, and control non-native species would increase the likelihood of a harvestable fishery for the Tribes.

4.15 Best Management Practices and Mitigation

NEPA requires that agencies identify and include in the action all relevant and reasonable mitigation measures that could reduce negative effects of the Federal action.

Environmental mitigation during and following project construction would include appropriate BMPs to minimize increases in turbidity and water quality degradation, to minimize the potential for aquatic life impacts downstream. These approaches would include materials handling procedures to prevent the spillage of materials into the active channel, revegetation of disturbed areas, application of erosion control measures, and monitoring of those measures to ensure that both wind and water erosion is minimized, and safe handling of spills on the construction site such as fuel, lubricants, or chemicals in accordance with state laws and regulations. The open in-water work window for aquatic species is July 1 through August 31, with potential to extend into September. Conservation and best management practices (BMPs) during construction include the following:

- Some of the in-water work will be isolated either by a cofferdam or equivalent. Fish rescue will be performed by a qualified fish biologist within the isolated area prior to construction. The depth of water may limit the success of this effort.
- In-water work, including blasting and drilling for construction, will occur within an established work window of July 1-August 31, with the potential to extend to September 30, when bull trout and other trout species are least likely to be present.
- A bubble curtain will be used, if river conditions allow, during the blasting and installation of the cofferdams to minimize noise and serve as a fish barrier.
- Exclusion netting may be used, if possible, to limit fish presence around the blast zone.
- A detailed blasting plan will be developed that minimizes the impacts of elevated noise and pressure changes from blasting and drilling (see section 6.1.1, Acoustic Effects, for more details).
- Pre-construction surveys for sensitive biological resources will be conducted by qualified biologist prior to the start of construction.
- The project engineer will stake the limits of the construction footprint in the field. Temporary construction netting (high-visibility plastic fencing) will be placed around nearby vegetation to provide protection from construction activities.

- Project personnel will participate in an environmental awareness training program provided by the project biologist. Construction workers will be informed about any sensitive biological resources associated with the project and that disturbance of sensitive habitat or special-status species may be a violation of the ESA and/or Section 404 of the Clean Water Act.
- Workers will be informed of the presence of fish species and critical habitat and that unauthorized actions causing injury or death to fish could result in a civil or criminal penalties to the individual who commits such actions.
- A qualified biologist will be present for a preconstruction meeting to review BMPs with the contractor. The Corps will review, approve, and ensure implementation of the contractor's plan to monitor all construction activities for compliance with these BMPs to ensure impact to sensitive habitat or species are minimized.
- Water quality standards will be complied with per conditions in the Water Quality Certification. The mixing zone and frequency of testing will be set in the 401 certification by IDEQ. For the Pend Oreille River below AFD, turbidity will not exceed background by more than 50 NTU instantaneously or by more than 25 NTU for more than ten consecutive days. Should turbidity standards be exceeded, construction will be halted until standards can be meet. The pH criteria for this area is 6.5 to 9.0.
- The pH of the water will be monitored.
- A Storm Water Pollution Prevention Plan (SWPPP) will be provided by the contractor prior to the onset of construction activities and will be implemented as required by the conditions of the National Pollution Discharge Elimination System (NPDES) permit.
- A spill response plan and kit will be present at all times in case a spill or leak occurs, and construction personnel will be trained in its proper use.
- The storage of petroleum products and equipment, and the refueling of heavy equipment and vehicles will occur at least 100 ft from the water's edge to prevent impacting aquatic life and contaminating soil or entering the watercourses, including ditches and canals.
- If a spill occurs, immediate steps will be taken to contain and remove it, and the Corps will contact USFWS and IDEQ that same day and provide a report of the spill and clean-up procedures.
- During in-water work visual monitoring will be conducted for dead, distressed or injured fish by a project biologist. Construction may be halted until a cause is determined and necessary corrections made.

Conservation measures and BMPs during operations of the fishway and the handling of fish include the following:

1. Personnel

- All fish trap operators will have training working with ESA-listed fish species and identifying bull trout.

- Visual identification is considered a viable technique to recognize bull trout/brook trout hybrids with a 95% accuracy rate. Dorsal fin ray marking is considered the most reliable characteristic for identifying hybrids (Popowich et al. 2011). Operators will be experienced in identifying bull trout from congeneric species.

2. Fish Holding and Processing

- Initial sorting would include the separation of trout species from other species, and secondary sorting would occur to sort bull trout from other trout species. Handling may occur to sort bull trout from other trout species and inspect for injuries, but all attempts would be made to do so at a sorting table with fish submersed in water.
- The holding pool will contain enough water to allow for 0.25 ft^3 per pound of fish for the maximum amount of fish in a day (5,000 fish averaging 1 pound each) for temps below 10 °C (50°F). For temperatures above 10°C the required volume per pound of fish will increase by 5% for each 0.5 degree C above 10°C.
- Water to water transfer is the proposed method.
- Facilities at the trap may be provided for some level of sampling by other agencies. Any fish sampling by other agencies will be covered by their own ESA Section 10 permits and associated conservation measures.
- A separator screen will be installed in the presort holding pool, and possibly other holding areas, to limit predation of smaller fish by larger fish.
- All holding pools will be equipped with water level sensors and alarms. Key water level alarms will be linked to pagers or a phone tree that goes to dam operators and/or biologists. Cameras will also be present in the pools that could be accessed remotely.
- Adequate circulation and replenishment of water in holding pools and transport tanks will be provided. Chillers will be utilized for the transport pods if water temperatures in the holding facility and transport pods rise above ambient river conditions and during periods above 16°C (61° F). However, water temperatures in the fish passage facility are not anticipated to be higher than the Pend Oreille River or Lake Pond Oreille because water entering the facility is all surface outflow from Lake Pend Orielle. Solar shades may be incorporated into the facility during higher levels of design, if it is determined that elevated temperature in the flow through system could be an issue. If chilling is necessary, chilling would only occur in the transport pods and water will not be chilled more than 2˚C below ambient river temperature to avoid thermal shock upon release.

3. Transportation and Release of Fish

- Aeration shall be provided in all the transportation coolers.
- All bull trout shall be allowed to recover from the stress of transport fully before being released back into the water. Signs of recovery include maintaining neutral or negative buoyancy, upright and active swimming, and ease of breathing (no gasping). Measures to aid in recovery is to hold the fish in cool aerated water until visible stress symptoms are no longer observed, and/or moving a fish back and forth in the water to oxygenate their gills.

- Transport pods will be sized appropriately for the maximum number of bull trout expected per day (20).
- Fish shall not be detained for more than the minimum time required to transport them to the release site.

4. Reporting

- Water temperatures will be recorded and checked daily in the fish holding areas.
- Number of bull trout, and approximate size and life stage will be documented to the extent practicable with minimal handling.

4.16 Unavoidable and Adverse Effects

Unavoidable adverse effects of the proposed project include:

1. Noise disturbance and mortality to fish, and disturbance to wildlife and area residents in the vicinity due to blasting rock and the operating heavy machinery during excavation and construction activities. It is anticipated that most wildlife and fish would avoid the area while work is in progress. To reduce impacts to area residents, work would be conducted only during daylight hours in accordance with local noise ordinances.
2. Excavation and removal of approximately 20,000 cubic yards of rock.
3. Temporary increase in turbidity; however, these effects would be minimized by the use of best management practices.
4. Trapping, handling, and transport stress on fish.
5. Emissions of air pollutants and GHGs.

However, these effects will be temporary, localized and minor.

4.17 Conclusion

The Corps has determined that the preferred alternative to construct a fish passage facility at AFD would not result in significant adverse environmental impacts, either individually or cumulatively. Impacts to water quality, fish, and other aquatic resources from construction would be temporary, with a long-term benefit when the facility is operational to native fish and the Tribes that value them. No other major actions would impact water quality cumulatively during the construction of the facility that would make it rise to the level of significance. Basin-wide passage would result in a cumulative benefit to bull trout and other native fish. The location of the facility is on bedrock with sparse vegetation, so there would be no loss of wildlife habitat. Impacts to site geology would be localized and limited to the footprint of the facility and no other geology altering actions will occur within the vicinity of the project that would make it rise to the level of significance. Adverse effects to the log chute, a contributing structure to the AFD National Register District, will be limited to alteration of the entrance of the structure. Visual changes to the dam are considered minor. Mitigation measures to resolve adverse effects to the AFD historic district have been formalized in a MOA executed by the Corps and SHPO on May 1, 2018. Given the temporary nature of construction emissions and minor emissions from hauling, as compared to ongoing emissions in the region, individual and cumulative impacts to air quality would not rise to the level of significance.

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5 Recommended Plan (Agency Preferred Alternative)*

The following sections describe components, operation, maintenance, implementation requirements, cost, real estate, and other considerations of the recommended plan, which is a trap and haul facility with release of target bull trout species upstream of AFD. For information on specific design features, the complete Feasibility Design technical documents are located in Appendix A

5.1 Recommended Plan/Preferred Alternative Description

5.1.1 General

The location, flow rate, and features of the facility were developed over several years based on guidance and expertise of regional fish passage engineers, fisheries biologists, and hydraulic engineers from the Corps, Kalispel Tribe, BPA, USFWS, GEI Consultants and other agencies and organizations. The Corps and USFWS conducted a series of meetings and workshops with Federal, state, and tribal resources agencies as well as leading experts in fish passage to seek information to develop criteria that could be suitable for bull trout passage, since there is limited information on bull trout passage criteria (USACE 2011).

Through the Corps planning process, the Corps has identified a recommended plan for an upstream fish passage facility at AFD and completed a feasibility design of this plan. The planned facility includes an entrance structure designed to discharge 300 cfs with two vertical slot entrances, a gravity water supply system, a Half Ice Harbor ladder consisting of 19 pools, a pre-sort pool, a fish lock for lifting fish, a sorting area, and a truck loading area. The action includes the further design, construction, and operation of the facility, as well as best management practices to reduce impacts to bull trout. At the current level of design, the operation is anticipated to be year-round, excluding the warmest month of August when temperatures exceed lethal thresholds for bull trout and during winter periods of river or facility ice-over. The facility is designed to operate with tailwater elevations between 2030 ft and 2048 ft. The gravity water supply can operate at forebay elevations as low as 2047 ft and forebay-tailwater elevation differentials as low as 4 ft.

The entrance structure would be located on the west side of the powerhouse (See Figure 5-1). This feature has two entrance locations. One is located the furthest upstream that a fish can swim to, has strong year round flows from the turbines to attract fish to the entrance, and is oriented perpendicular to powerhouse flows. The second is located just downstream on the island facing downstream. The ladder would extend about 200 ft along the north shore of the rock island to the fish lock. A dedicated water supply system from the forebay would provide a gravity-supplied source of water to operate the fish passage facility. Once a bull trout has entered the trap and is captured, they would be sorted from non-target species for transport upstream via truck to a release location approximately five miles upstream of the dam. Non-target species (non-native and possibly some native fish) will either be returned below AFD or be routed directly to the forebay (native fish) upstream of the Dam, or euthanized by the resource agencies (see Section 5.4).

Overall, the construction of the fishway would permanently impact the island and temporarily affect water quality and noise of the Pend Oreille River at the construction site. Up to 20 bull trout could be handled and transported per day during the operation of the facility. It is difficult to predict how many bull trout could pass through the facility in a year, however the Pend Oreille Bull Trout Recovery Team estimated that a minimum of 1500 migratory adult bull trout would be necessary to consider Pend Oreille

River bull trout population recovered. It is expected that other species may enter the AFD fish trap and the facility will allow processing of all fish, up to a daily maximum of 5,000 fish (see Appendix A for detailed discussion of anticipated numbers of fish). Figure 5-1, Figure 5-2, and Figure 5-3 depict the general location of the structure, the entrance structure, and the auxiliary water supply intake.

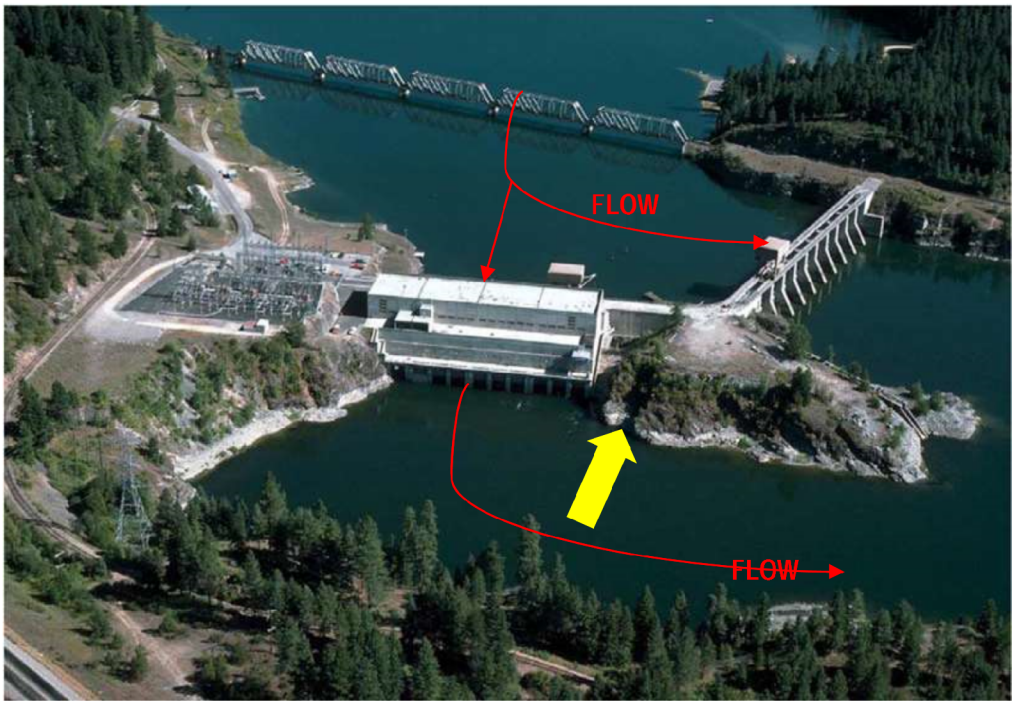

Figure 5-1. Location of the Proposed Fish Passage Facility (in yellow)

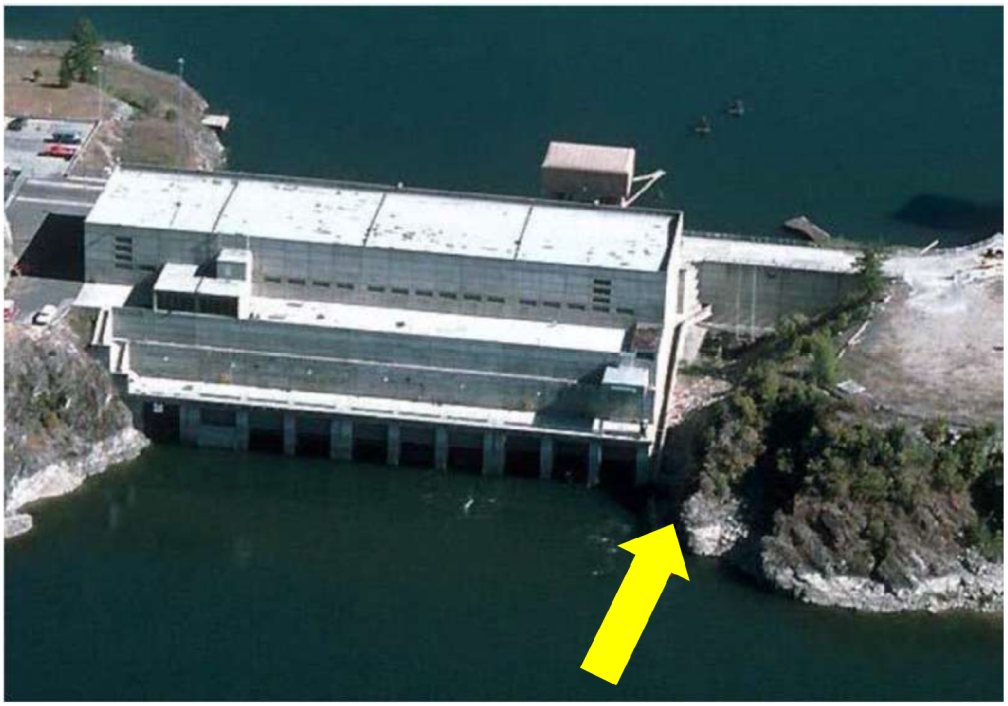

Figure 5-2. Location of the Proposed Entrance to the Facility (at the west side of the powerhouse)

Figure 5-3. Location of the Proposed Auxiliary Water Supply Intake

5.2 Design

The feasibility-level design has seven components: water supply, entrance structure and pool, fish ladder, pre-sort pool, fish lock, sorting area, truck loading area, and a release site located 5 miles upstream. The entrance structure will be on the west side of the powerhouse (east side of the rock island) attached to the island with a foundation for support. Fish would swim up the fish ladder into a pre-sort holding pool

where they would be lifted via fish lock to a sorting facility near where the existing maintenance building on the island is located. The following sections describe the various components based on the feasibility design.

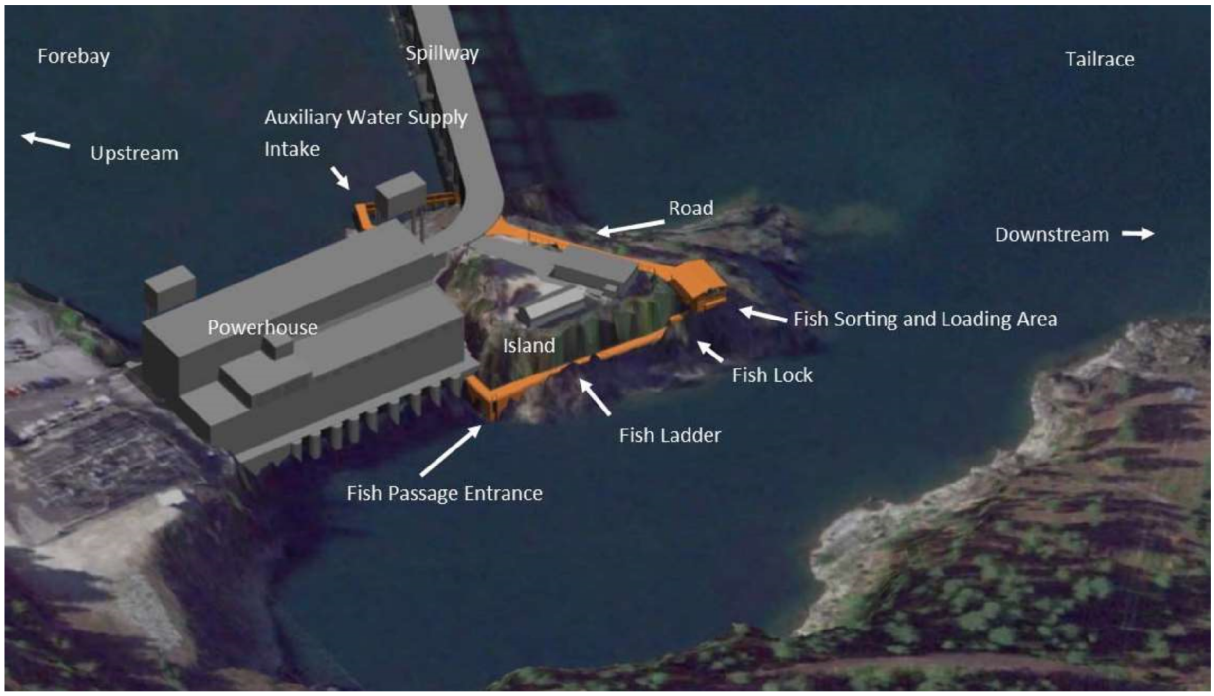

Figure 5-4. AFD Proposed Fish Passage Facility Layout (view from downstream side)

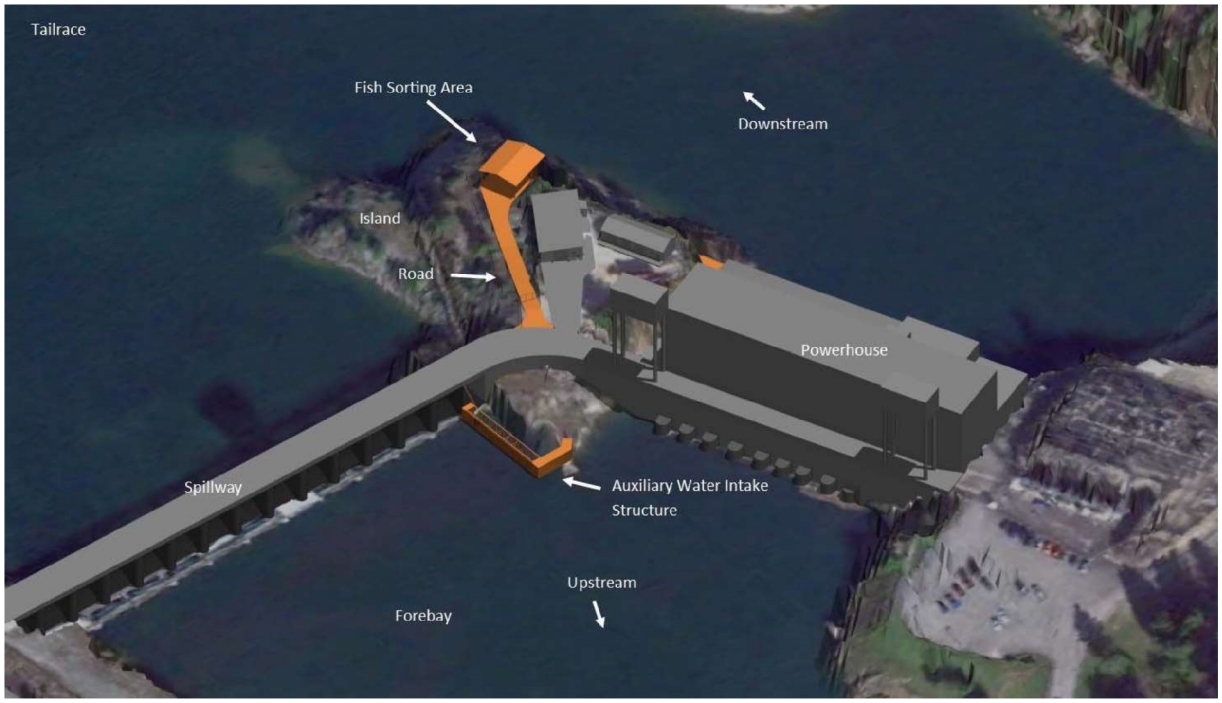

Figure 5-5. AFD Proposed Fish Passage Facility Layout (view from upstream side)

5.2.1 Auxiliary Water Supply (AWS) Tunnel

The water supply will be gravity-fed from the forebay to various locations throughout the facility. The system consists of an intake structure in the forebay, a 10-foot diameter tunnel, a headtank structure and a flow distribution system. Up to 300 cfs passes through the intake structure. The tunnel conveys water approximately 300 ft to a vertical shaft that houses the fish lock as well as a headtank. Flow out of the headtank is routed to the pre-sort holding pool, the fish ladder, and into an open water supply distribution channel through gate openings in the headtank. Figure **5-6** provides an overview of the AWS structure.

The intake structure, located between the spillway and powerhouse, consists of a trash rack to keep coarse material out of the system and a screen to keep fish out. These screens are fitted with cleaning devices. Note that there is no thermocline in the Pend Oreille River above AFD. The forebay is shallow water and the lack of volume and the velocity results in mixing of the water column.

5.2.2 AWS Intake and Screens

A new intake structure will be located in the forebay. The intake structure consists of nine screen bays, each fitted with fish screen panels approximately 10 ft wide by 10.5 ft tall. Dead plate panels are placed on top of the fish screens to provide a continuous panel to the top of the screen structure located at approximately elevation 2,065.0 ft. The top of the screen panels was set at elevation 2,045.5 ft to provide full submergence at the low forebay elevation of 2,047.0 ft. A screen cleaning system will be mounted on the intake deck. The cleaning system is anticipated to consist of a trash rake fitted with a telescoping boom that enters the water column and cleans the screens in an upward movement. A debris handling conveyor will be provided to transfer the debris from the intake deck to a location where it can be removed. Porosity control plates will be installed behind the screen panels and used to distribute flow evenly among the nine screen bays. Once the screens are balanced, no adjustment to the porosity control plates will be required. Pressure transducers are located upstream and downstream of the fish screens to monitor differential. The screen cleaning system will be cycled into operation based on the pressure differential or the timer, or will operate in continuous operation mode if required.

5.2.3 AWS Tunnel and Headtank

The AWS tunnel connects the forebay with the headtank located near the upper end of the fishway. Water passes through the tunnel gate structure, which contains an 11-foot by 11-foot isolation gate. This gate is used solely for isolation and will not be used to regulate flows. The tunnel is 10 ft in diameter. Anticipated rock quality indicates that the tunnel could be unlined; however, a lined tunnel will also be considered. Initial cleaning of rock from the tunnel will be necessary if unlined. However, due to the competency of the rock, ongoing cleaning out of rock from the headtank is not expected, particularly due to the low velocities in the tunnel (~3.8 feet per second (fps)).

The headtank shaft is near-vertical, penetrating from the existing ground surface (elevation 2,080.0 feet) down to the invert of the AWS tunnel (elevation 2,030.0 ft). The headtank includes three separate vertical slide gates. Two of the gates are used to regulate flow into the pre-sort holding pool and the fishway. The third gate is used to regulate flow into the AWS channel. The fish ladder and pre-sort holding pool gates will be manually adjusted. The AWS channel gate will be automated to maintain a flow of 300 cfs into the AWS channel. Pressure transducers are located in the AWS channel, in the pre-sort holding pool, and in the headtank. The gate position will be determined based on the head differential measured between the

headtank and the AWS channel. As the differential increases, the gate opening will be reduced. As the differential decreases due to backwater effect, the gate will be opened.

A rating curve will be developed and used as the input operating curve into the gate controller. The height of the headtank walls are set to prevent overtopping during a large flood event and corresponding increase in forebay elevation. This will prevent the fishway and entrance pool from being overtopped.

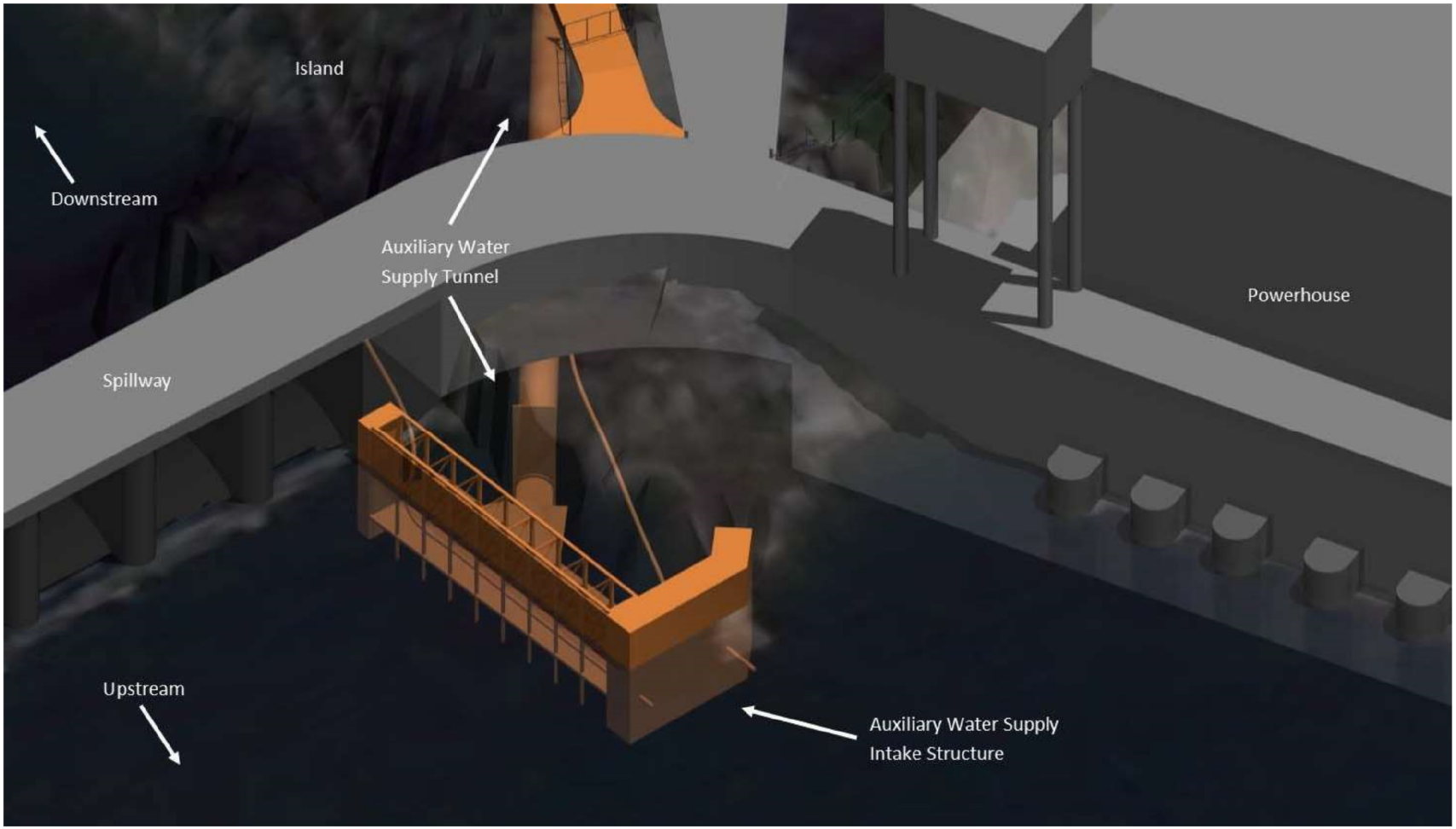

Figure 5-6. Gravity Fed Water Supply Source.

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5.2.4 Fish Entrance Structure and Pool

The fish entrance is an "L"-shaped structure and will be constructed out of prefabricated/precast components. The inside dimensions will be approximately 7 ft wide by 40 ft long on one arm and 50 ft long by 7 ft wide on the other arm. The water level will be at least 10 ft deep, and the walls will be about 35 ft tall to accommodate low and high tailwater and the 50-year flood conditions. It would include two entrances outfitted with telescoping gates to be operable as vertical slots that can be adjusted as the tailwater elevation changes. The top of walls will be at elevation 2054.6 the length of the entire fishway, which is 1 foot above the 50-year tailwater elevation. The floor elevation of the entrance pool is set to 2,021.0 ft in order to achieve a minimum submergence of 10 ft during the design low tailwater elevation of 2,031.0 ft. Entrance 1 would be located near the northeast corner of the rock island, and would be oriented parallel to powerhouse flows. Entrance 2 would be located about 50 ft to the south and offset from the powerhouse by about 10 ft. This entrance would be oriented perpendicular to powerhouse flows. Additional flexibility and adaptability to these entrances will be evaluated during the design phase to address some concerns about how fish will enter the facility. The construction materials will be a combination of steel and concrete and built off site (precast). The walls and bottom slab will be about 3 ft thick. The top of the structure will be open and fitted with a grated working surface. See Figure 5-7 below for details on the fish entrance and pool structure.

Attraction flow will enter the fishway pool through six wall diffusers located along the north wall of the pool. Each wall diffuser will be approximately 6 ft wide and 4 ft tall. Water supply to the diffusers will be from a diffusion chamber on the north side of the fishway, which is separated from the fishway pool by a concrete wall. Water is supplied to the diffusion chamber via a 10-foot diameter tunnel that originates at the water supply intake screen structure in the forebay. These fishway entrances are designed to operate at flows of up to 300 cfs through one entrance or at 150 cfs when split equally between the two entrances. The telescoping weir entrance gates will allow each ladder entrance to be operated as a vertical slot or weir or orifice. To operate as an orifice, the gate would be fully raised, exposing an orifice gate section located in the bottom gate panel. Pressure transducers will monitor the water surface elevation in the AWS channel, the entrance pool, and the tailrace. Readings from the pressure transducers will be used to set the gate positions to maintain a constant drop of 0.75 ft across each gate. As the tailwater elevation moves up or down, wire rope hoists will automatically adjust each gate crest to maintain the pre-set differential. The differential across the AWS screens will also be monitored to detect any excessive differential. The entrance pool has an approximately 350-square-foot (sf) vertical wall diffuser allowing attraction water to be introduced into the ladder entrance pool with a velocity not exceeding 1.0 fps.

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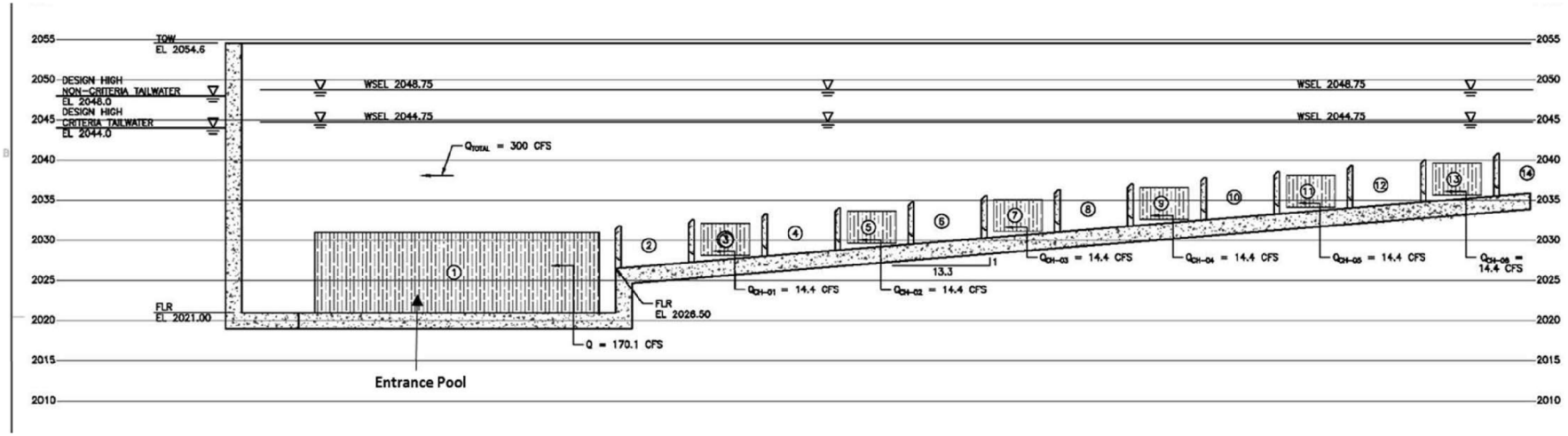

Figure 5-7. Cross Section of the Fish Entrance Structure and Lower Part of the Ladder

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5.2.5 Partial Ladder

A concrete fish ladder would be directly connected to the entrance structure and would extend approximately 200 ft west-southwest through excavation into the rock island. The slope of the structure would be approximately 13.3 horizontal to 1 vertical. The walls would extend to 1 foot above the 50-year flood level, elevation 2,054.6 ft (National Geodetic Vertical Datum [NGVD] 29). The floor of the ladder will rise from elevation 2021 to 2038. The fish ladder consists of a series of 18 pools and weirs (19 pools including the entrance pool) that ascend from the fishway entrance structure up along the rock island to the pre-sort holding pool. Each pool would be separated by a Half Ice Harbor weir and orifice baffle. Pools will be approximately 10 ft long by 6 ft wide with 4-foot long weirs having crests about 5 ft above the floor with a 12-inch square orifice. The hydraulic drop between weirs is 0.75 ft (when unsubmerged), creating a total head drop across the fishway of about 13.5 ft at the low design tailwater elevation. The ladder pool volumes are based on the requirement for acceptable energy dissipation of flow for sub-adult bull trout. See Figure 5-8, below, for an overview of the ladder.

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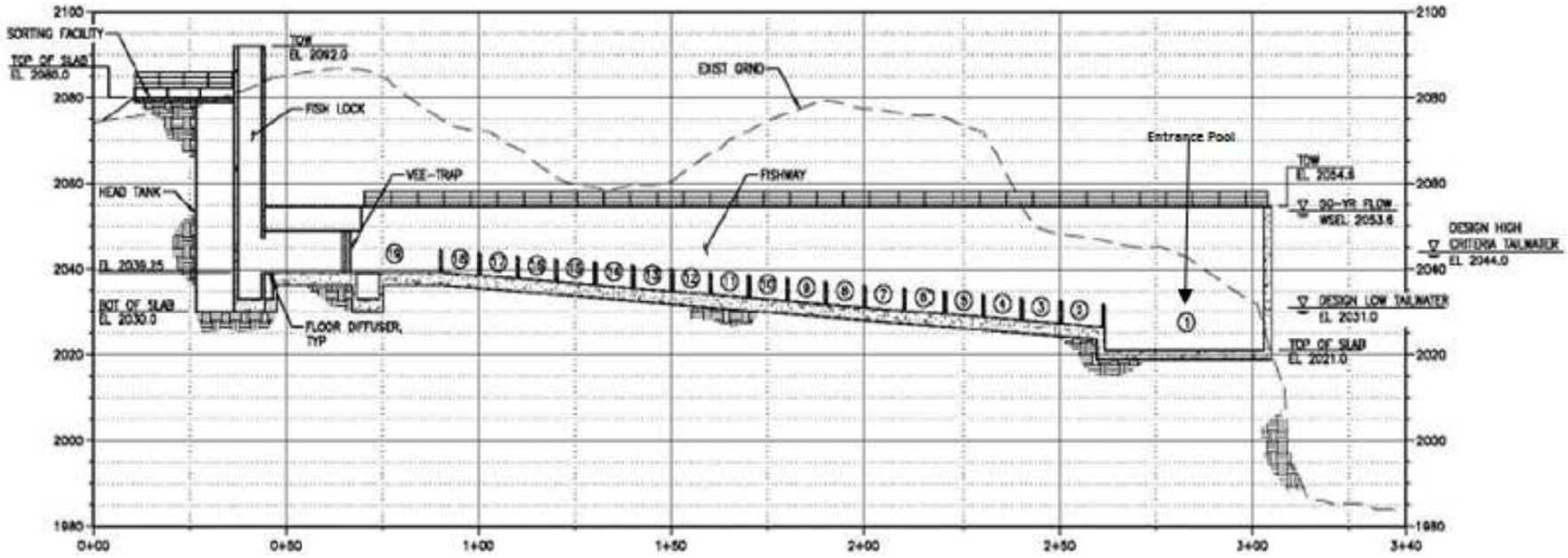

Figure 5-8. Fish Ladder Cross Section (view from upstream)

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The base ladder flow is approximately 15 cfs. At the low tailwater condition, the total fishway flow will be 15 cfs in the ladder and 285 cfs of auxiliary water introduced at the entrance structure for a total of 300 cfs. To maintain adequate transport velocities as the tailwater elevation rises and backwaters the ladder, the facility has the ability to passively re-allocate some of the auxiliary water from the entrance to locations further up the ladder through a system of weirs and diffusers. The exit of the fishway, before it becomes the pre-sort holding pool, is supplied with about 13 cfs from the headtank and 2 cfs from the adjacent pre-sort holding pool, for a combined flow of about 15 cfs. During high tailwater conditions, every other pool in the fishway would receive auxiliary water through a vertical wall diffuser to augment the velocities in the pool as the flow area increased. When the tailwater rises, water will be introduced into the fishway through an auxilliary water supply system of weirs and fishway pool vertical wall diffusers. This auxiliary water supply will maintain the transport velocity inside the ladder up to the high tailwater condition. The location of the weirs and associated flow for both the low tailwater and high tailwater operating conditions is shown on the plan sheets G006 and G007 of Appendix A.

5.2.6 Pre-sort Holding Pool, Fish Lock, and Sorting Facility

Pre-sort Holding Pool: The pre-sort holding pool will be located at the upper end of the ladder and would be separated from the last pool in the fishway by a vee-trap weir. Once in the pre-sort holding pool, fish would be unable to exit, and would be crowded into a fish lock. The fish lock will be a cast in place concrete structure located in the ladder trench. The pre-sort holding pool is sized to meet the density and flow criteria required for holding fish. This includes holding both target and non-target species. The pre-sort holding pool is 6 ft wide by 20 ft long. The pool floor will be at elevation 2,039 ft with an operating water depth of about 6 ft. The pool water supply will be gate-controlled and will be delivered into the pre-sort holding pool through a floor diffuser.

The design flow will be 2 cfs. A removable fish bar grader will be placed across the width of the pool to limit predation on smaller fish by larger fish[32]. The bar spacing will be sized (1-inch width) to allow small fish to pass through the bars while keeping larger fish from passing. A powered fish crowder will be located on top of the pool walls and will be used to crowd fish into the fish lock. The small fish will be crowded first into the lock and sorted, then the fish bar grader will be removed and the rest of the pre-sort holding pool crowded and locked, and then the larger fish will be sorted. See Figure 5-9 below for an overview of the presort holding pool.

[32] A fish bar grader separates fish of different sizes, it uses a set of parallel bars at a fixed or variable width as slots that fish swim through. A narrow width allows only smaller fish to pass through, a larger width allows fish of various sizes to pass.

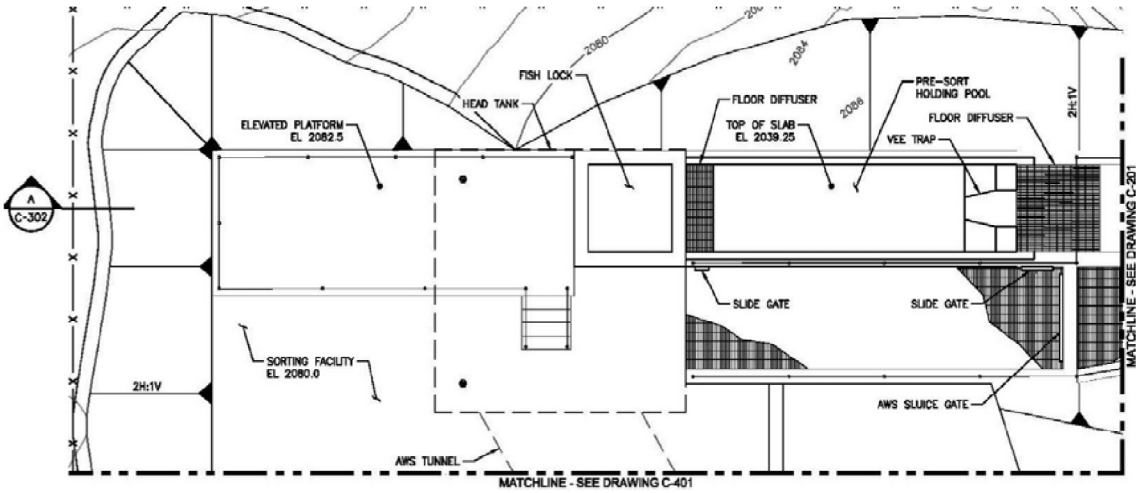

Figure 5-9. Presort Holding Pool Plan View

Fish Lock: The fish lock will be located just beyond the pre-sort holding pool. The lock will be approximately 6 ft wide by 6 ft long and will have a 6-foot-wide by 4-foot-high entrance gate. The fish lock will be designed to raise fish from the pre-sort holding pool water surface elevation of 2,045 ft vertically to approximately 2,085 ft in a maximum time of 10 minutes, using a variable pump flow rate of up to 3 cfs. A combination of water fill and brail floor will crowd fish upward. The lock water supply pump will be equipped with a variable frequency drive (VFD), allowing the lock flow rate to be adjusted and the fish metered out by adjusting the flow rate and water level. Fish will then enter into the lock overflow chute to be directed to the sorting facility. A dewatering screen will remove excess water prior to entering the distribution flume. The flume would bring fish into the sorting area. See Figure 5-10 for an overview of the fish lock.

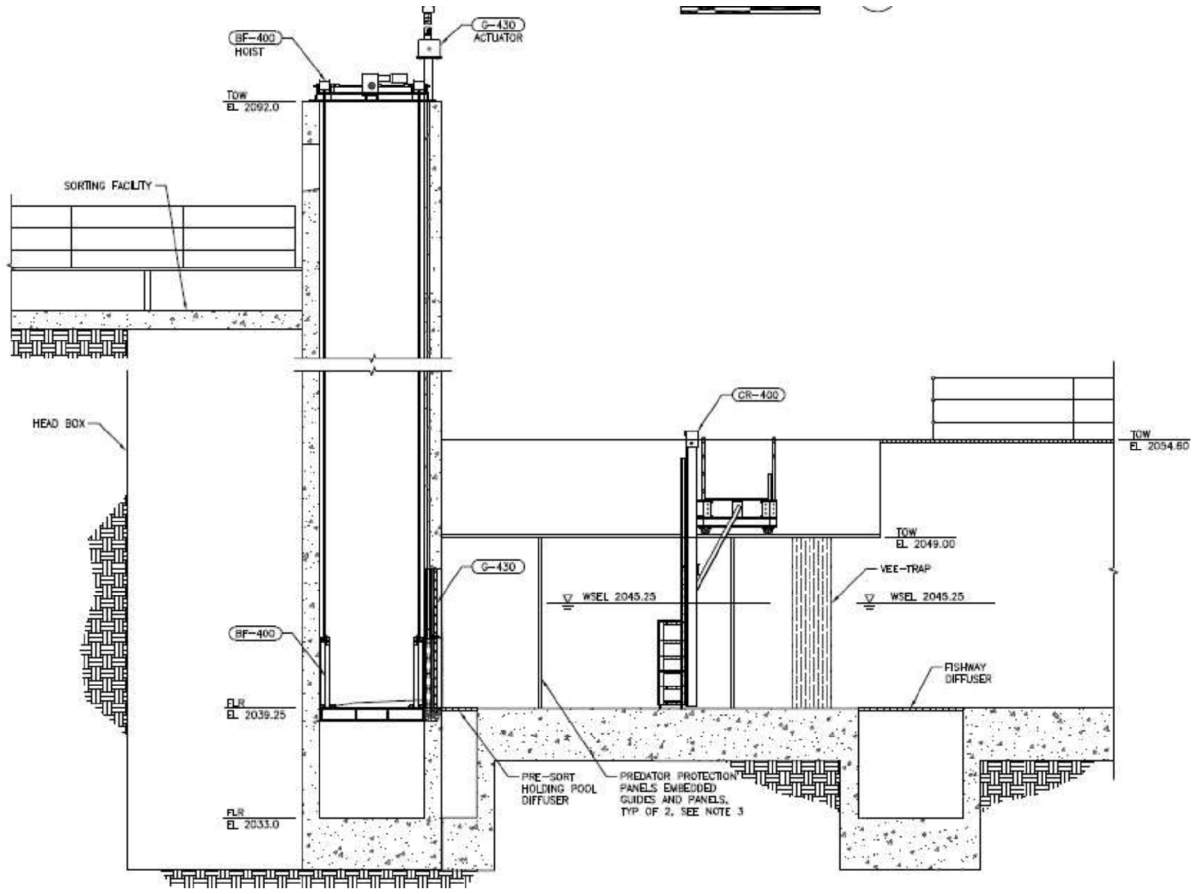

Figure 5-10. Fish Lock Cross Section

Sorting Facility: The sorting facility would be a building located near the top of the fish lock on finished grade atop the rock island to protect the sorting area from being flooded by higher tailwater elevations. The facility will contain sorting tables, a loading pool for target species, transport pipes for non-target species back to the tailwater or to the forebay, spraydown equipment, a booster pump for the fish lock that feeds into the sorting facility, a loading dock for the transport trucks, and a graded access road from the dam to the facility. With the sorting facility at a high elevation, gravity flow from the sorting table allows movement of fish to the tailrace, the forebay, and the truck transport. There may also be holding tanks for sorting proposes if fish become too numerous.

Adult and sub-adult bull trout, after having been sorted and loaded into transport tanks, will then be transported by truck upstream to the designated release site. The fish sorting platform allows direct loading via gravity into a transport tank located in the back of a 3/4-ton or 1-ton transport truck. Bull trout from the sorting pools will be moved to the transport pods on the trucks. The sorting area floor, walls, and loading pools will be cast in place concrete structures. See Figure 5-11 for a diagram of the proposed fish flow and release scheme and Figure 5-12 for a general illustration of the sorting and lifting facility.

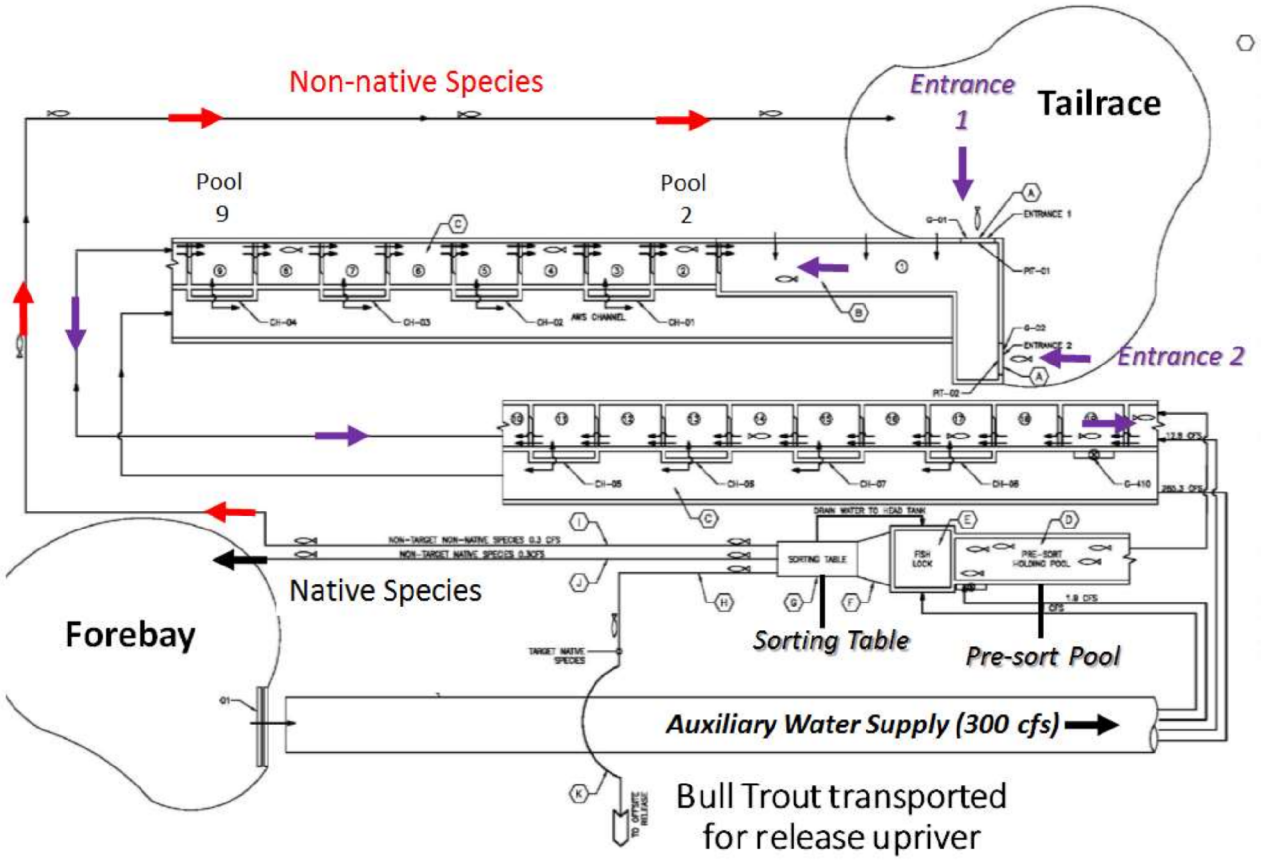

Figure 5-11. Fish Flow and Release Scheme

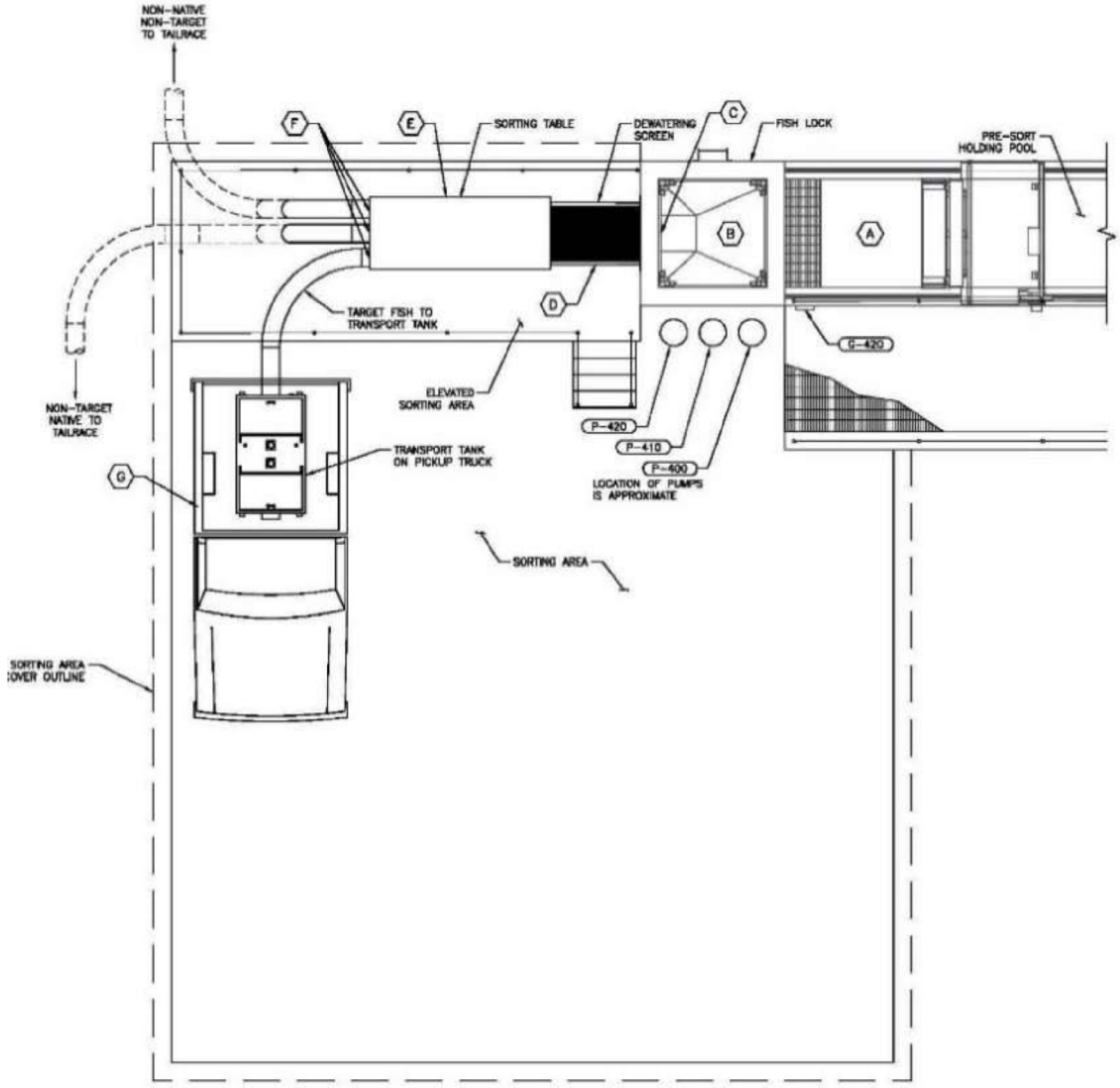

Figure 5-12. Sorting Facility Design[33]

5.2.7 Potential Changes in Design

This project is in the feasibility-level design phase. The design may be refined following the feasibility study, during the pre-construction engineering and design phase (PED). Most of these refinements will result in improvements to bull trout passage. The Corps will coordinate any changes to the facility design during the remainder of the feasibility-level design phase and during the PED phase with USFWS and other natural resource agencies.

[33] Note that more than one sorting table will likely be needed to distinguish salmonids from other fish and bull trout from other salmonids. The layout of the sorting facility will be finalized after fish sorting procedures are negotiated with the IDFG, WDFW and the Kalispel Tribe.

The sorting facility layout is still under evaluation, which is dependent on the outcome of discussions with the States of Idaho and Washington and the Kalispel Tribe on how to handle and where to place native and non-native fish. Bull trout will be sorted and transported in an efficient manner that minimizes handling time and stress. See the Fish Holding, Handling, Transport, and Release section of 5.1.3 for details on fish handling.

5.3 Construction

Construction of the facility is expected to take approximately two years. The activities include the installation of an isolation device like a cofferdam or equivalent, delivery of materials and equipment by trucks or a barge, drilling and blasting of rock, placement of piles, and the curing of concrete for the assembly and attachment of the parts. The assembly of most of the structure will take place on land; however, construction of the entrance structure and parts of the auxillary water intake may need to occur via water from a barge. The staging areas will be coordinated with AFD personnel. Limited laydown areas would be located on the east abutment within and adjacent to the USACE employee parking area. The construction management trailer would be located at the AFD powerhouse parking area. Construction equipment may include a barge, boat, crane, drills, trucks, concrete trucks, graders, compactors, and excavators.

In general, access to the Project site will be from two areas: (1) barges working in the tailrace or forebay, and (2) the right abutment through the USACE access gate, parking area, and over the powerhouse intake deck. River access will be required to construct the fishway entrance as well as the AWS intake structure. Access to the remaining project elements will be from the right abutment off U.S. Highway 2 via the dam access road.

Current spillway operation spreads spill out over the entire spillway to minimize TDG output and downstream tailrace erosion to the degree possible. The construction process may require either construction components to temporarily stop or not a complete spread out of flow along the spillway. This issue could occur for some time in mid-April through mid-July. These items could impact the construction schedule if spreading out the flow was determined to be an operation issue and eliminated.

5.3.1 Rock Drilling and Blasting

Rock excavation is required for the AWS tunnel intake, the AWS tunnel, the vertical shaft, the entrance structure and the fish ladder. Bedrock in these areas primarily consists of jointed granodiorite with varying degrees of alteration and weathering. Controlled blasting methods will be used for excavation to minimize impacts to the dam. Drilling will be required for the installation of the isolation devices (Cofferdams or equivalent). Not all of this activity will occur underwater, but the entrance structure, AWS tunnel intake, and cofferdams will require underwater blasting and/or drilling. Blast vibration monitoring, acceptance criteria and environmental mitigation methods will be developed in a later phase of design. Blast designs will consider vibration control to protect structures and mitigation techniques to minimize overpressures and fish kill zones when blasting underwater. In general, holes will be drilled in the rock face and explosives will be inserted and detonated within these holes.

Some of the rock excavated from each of these areas may be disposed of on-site in the area between the west abutment of the powerhouse and the existing fill section. There is limited access for trucks to transport and discharge rock material in this location. A material handling plan, which could include a conveyor system, will be required to effectively transport and spread the material in acceptable lifts, then

compact it. The rock removed from the excavation and tunnel is expected to be of high quality, and could be used for construction of the new permanent access road as well. On-site crushing capabilities would be required to obtain the gradation required for the roadway section and embankments. Off-site disposal of the rock is also an option.

5.3.2 Installation of Isolation Device

Cofferdams and/or dewatering systems will be required for both the AWS intake in the forebay, as well as the fishway entrance in the tailrace (see Figure 5-13). Construction of these systems would be required during the low flow periods that typically occur in late summer when the river flows drop significantly. Two approaches, which are described below, were considered for the forebay cofferdam that would provide a dewatered construction site. The cofferdam would be installed off a barge system with support from ground equipment on the dam and exposed rock surface. Once in place, the cofferdam would provide protection for the full range of anticipated annual river flow conditions.

For the fishway, the entrance structure cannot be isolated during construction because the steep slopes surrounding the location make the installation of such a device difficult and would require substantially more drilling and blasting than building the structure without an isolation device. The entrance structure will be a pre-cast section that could be floated into position, then lowered onto a pre-excavated rock foundation. In the tailrace, the fishway entrance would also be installed during this low flow period. The tailwater elevation would be low enough to allow installation of approximately 50% of the vertical height of the fishway, with a later conventional cast in place concrete placement to bring the fishway to the full wall height. Once the entrance structure is in place, the gap between the fishway entrance and the exposed rock slope would be sealed with concrete to provide a watertight seal for the fishway rock excavation and concrete placement.

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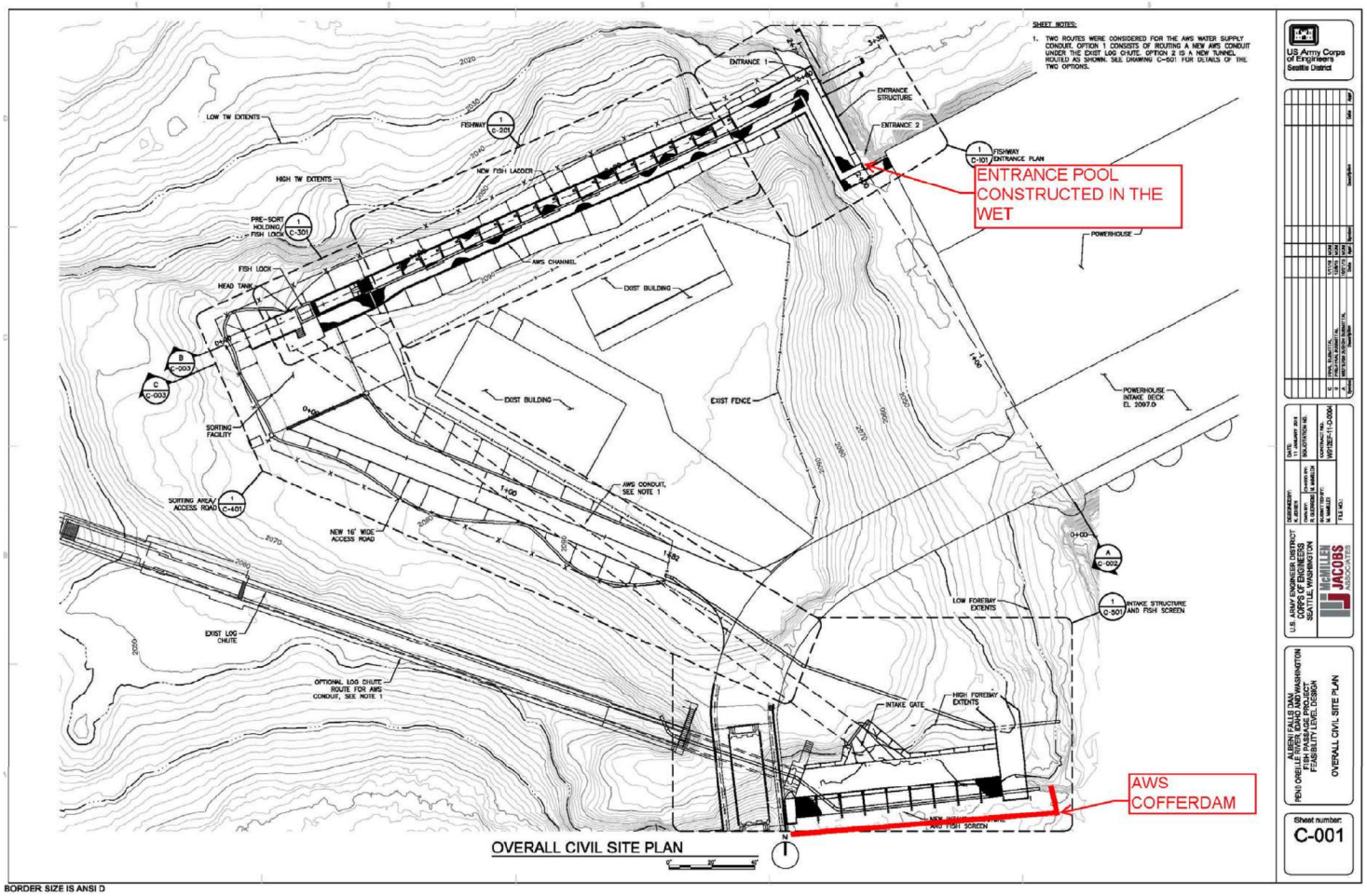

Figure 5-13. Approximate Locations of Isolation Devices (indicated in red)

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5.3.3 Building the Facility

Auxiliary Water Supply (AWS): Construction of the AWS intake structure will require the installation of a temporary cofferdam and dewatering system in the forebay. The cofferdam will extend around the perimeter of the new intake structure, allowing dewatering of the entire location for the intake screen and AWS tunnel gate structure. With the area dewatered, rock excavation and construction of the new structures can proceed in the dry. The cofferdam structures would extend from an approximate invert elevation of 2,030 ft to an approximate top elevation of 2,065 ft, which would provide about 2.5 ft of freeboard under the maximum normal forebay elevation of 2,062.5 ft. The following two options will be considered as part of the AWS intake structure design development:

Option 1 consists of a conventional cellular cofferdam founded on bedrock. With this option, the cofferdam would tie into the east abutment of the spillway and extend parallel to the spillway flow to tie in to the existing rock point near the existing concrete abutment. The intake structure would be recessed behind the cofferdam. Access to the construction area would be from the top of the non-overflow section of the dam using a crane, or from a barge moored adjacent to the cofferdam structure.

Option 2 was developed to incorporate the cofferdam structure into the proposed screen structure. Drilled shafts approximately 36 inches in diameter would be installed along the face of the proposed new screen structure. This face would be located in-line with the west abutment of the spillway structure, minimizing rock excavation. Steel piers would be installed within the drilled shafts and extend to the proposed new intake deck elevation of 2,065 ft. The piers would be configured with two slots to accommodate the future fish screens and porosity control baffles for the intake structure. Temporary bulkhead and bracing would be installed in these slots to serve as the cofferdam during construction. The intake structure would then be constructed in the dry similar to Option 1. The biggest advantage to Option 2 is that a single structure would serve as both the cofferdam and final intake structure.

Leakage through the cofferdam would be collected with sump pumps and routed to a Baker-style settling tank, then discharged back to the river. With the area dewatered, rock excavation and construction of the new structures can proceed in the dry. The precise methods will be refined during later iterations of design and the construction contract will allow for the contractor to determine means and methods within a set of criteria and constraints determined by the Corps.

Entrance Structure and Pool: Installation of a cofferdam and dewatering system for the fishway entrance will be challenging due to the steep rock abutment adjacent to the powerhouse. Installation of a conventional cofferdam is not feasible due to the depth of the water and lack of a suitable location to place the cofferdam. Because construction in-place is not feasible, a possible solution is to float a pre-cast entrance structure into position on a work barge and then lower it onto a pre-excavated rock foundation. Rock anchors would installed by divers to anchor the structure to prevent flotation. The size of the structure is the biggest challenge to this approach considering the top of the completed fishway is at elevation 2,055 ft and the slab invert elevation is 2,021ft. Instead of the entire entrance structure being pre-cast, it may be necessary to break the structure into two vertical components. A pre-cast lower section that would be floated into position and an upper section to be constructed in-place using conventional cast-in-place methods. Either approach would require a location downstream from the powerhouse where the pre-cast structure would be constructed and then launched. With the fishway entrance installed, the

structure would be sealed to be watertight so the remainder of the fishway could then be constructed in the dry.

Alternatively, the fishway entrance structure could be constructed in sections and erected off a barge. Similar to the pre-cast option, the existing rock abutment would be excavated and a tremie[34] concrete slab placed to provide a level surface to install the fishway entrance slab. The entrance floor would then be placed on the tremie slab. The wall rebar would extend up out of the floor slab. Plywood forms would be placed on the walls to contain the concrete and pre-tied rebar cages would be lowered into the forms. The walls would then be poured to an elevation above the normal tailwater elevation that occurs during the dry months of the year. The rock excavation would extend into the rock cut required for the fishway structure construction. The entrance pool would be constructed up to the rock cut, then sealed against the exposed rock walls. With the seal in place, bulkheads could be installed on the outside of the fishway entrances to allow dewatering of the entrance structure. The rock trench excavation could then continue up through the pre-sort holding pool and vertical shaft/headtank.

It is anticipated that a combination of pre-cast and cast-in-place construction techniques will be used to construct the entrance pool, with the entrance pool constructed and tied to the exposed rock cut surface, then the entire tailrace construction area can be dewatered for construction. The final design documents will provide some flexibility for contractors to select their methods of construction.

Fish Ladder, Pre-sort Holding Pool and Fish Lock: Rock excavation will be required to create a trench in which the Fish Ladder, Pre-sort Holding Pool, and Fish Lock will be constructed. This excavation will be performed in the dry, with no requirement for isolation devices. The ladder structure will be built with a combination of rock anchors on approximately 5 foot by 5 foot pattern (as necessary) and cast-in-place concrete.

Sorting Facility: Rock excavation will be required for building this structure and will be cast-in-place concrete. All work will be on dry land.

5.3.4 Construction Conservation Measures/BMPs

See section 4.15 for a list of construction conservation measures.

5.3.5 Construction Sequencing

A preliminary construction schedule was developed for the project. The construction schedule assumed a 2-year construction period centered on two low flow periods required for installation and removal of the cofferdam systems. Table 5-1, below, is a preliminary estimate of duration and sequencing of construction for the AFD fish passage facility:

[34] The tremie concrete placement method uses a pipe, through which concrete is placed below water level. The lower end of the pipe is kept immersed in fresh concrete so that the concrete rising from the bottom displaces the water without washing out the cement content.

Table 5-1. Preliminary construction schedule for the AFD Fish Passage Facility.

Feature	Activity Description	Days by Project Feature
Mobilization to Site		25
Fishway Entrance		135
	Underwater rock blasting/excavation for intake structure	
	Sink and anchor panelized pre-cast floor segments for entrance structure	
	Sink and anchor panelized pre-cast floor outboard wall segments	
	Dewater interior of entrance	
	Construct interio cast-in-place concrete walls	
	Intall entrance gate structures	
	Install metal gratings and handrails	
Fishway Ladder and AWS Channel		145
	Rock blasting/excavation for fishway ladder	
	Place cast-in-place concrete slab for fishway and AWS	
	Construct cast-in-place interior divider wall	
	Construct cast-in-place pool/baffle walls	
	Construct exterior cast-in-place walls	
	Install metal gratings and handrails	
Pre-sort Holding and Fish Lock		105
	Rock blasting/excavation for pre-sort holding pool	
	Place cast-in-place concrete slab for pre-sort pool	
	Construct cast-in-place concrete walls at pre-sort pool	
	Install vee-trap structure at pre-sort pool	
	Construct cast-in-place slab for fish lock	
	Install slide gates, floor diffusers, metal gratings and hand rails	
	Install fish lock brail lift	
Sorting Area and Access Road		45
	Excavation/Base Prep for sorting area	
	Place cast-in-place slab structure for sorting area	
	Construct elevated slab above head tank structure	
	Rock blasting/excavation for site access road	
	Install sorting facility equipment	
	Place/compact site access road base material	
	Place AC Pavement for site access road	
Vertical Shaft and AWS Tunnel		85
	Install temporary bulkhead structure	
	Drill and blast AWS horizontal tunnel	
	Drill and blast vertical shaft	
Intake Structure and Fish Screen		295
	Install cofferdam at intake structure and fish screen location	
	Dewater work area for intake structure and fish screen	
	Rock blasting/excavation for intake structure and fish screen	
	Drill pockets for installation of screen guides	
	Place cast-in-place slab for screen structure	
	Erect steel screen bay towers	
	Install dead plates and porosity plates	
	Install mechanical screen cleaner	
	Install metal grates and handrail at tower	
	Construct cast-in-place walls at end of screen structure	
	Construct cast-in-place decks at end of screen structure	
	Construct cast-in-place slab for AWS intake channel	
	Construct cast-in-place walls for AWS	
	Construct cast-in-place head wall for AWS	
Removal of Temporary Systems		40
	Removal of intake structure/fish screen cofferdam.	

5.4 Operation and Maintenance

The project is designed to operate over a range of river flows and corresponding forebay and tailwater water surface elevations. With a gravity-fed water supply the fishway will operate in an automated manner, delivering water from the forebay through a screened intake to the pre-sort holding pool, fishway, and entrance structure. The system is designed to provide automatic adjustments to the fishway entrance gate position to maintain a 0.75-foot drop across the entrance, maintain an AWS flow of 300 cfs, and initiate cleaning cycles on the intake screen cleaning system. A series of pressure transducers will monitor water levels throughout the AFD fish passage facility and trigger these automated actions. The proposed gravity-flow AWS system and fishway represent a simple, efficient approach to project operations, which has been used at fish passage facilities throughout the Pacific Northwest.

The operation of the fish passage facility will be conducted year-round for the first three years to maximize the passage of bull trout even when numbers are low and provide them the opportunity to escape lethal conditions, with the exception of periods of freeze-over conditions (likely in January) which would make the facility unable to function and during the month of August to conduct maintenance when water temperatures are often above 20°C (68 °F). The facility will operate during the months of July and September regardless of elevated temperatures, and may operate into August if bull trout continue to be present (see "Operation during High Temperatures and Annual Maintenance" below) However, there will be an alternate release site at Trestle Creek Recreation Area boat launch when temperatures are above 18°C (65 °F) to provide more immediate access to cold water refuge (see Section 5.7 for more details on the primary and alternate release sites). A more detailed operations and maintenance plan will be developed in the design phase that will address normal activities as well as potential actions during periods of environmental extremes of freezing and hot water temperatures. If, after three years, facility monitoring indicates that there are some periods of little to no bull trout occurrence, then the facility may close during those periods in subsequent years.

5.4.1 Management of the Water Level

The operation of the water level upstream and downstream of the dam will be maintained according to the current Corps' AFD water control manual, a document that meets project authorization and regulations, and 2000 BiOp requirements. The 300 cfs needed for the fish passage facility will be subtracted from the total releases by the dam.

5.4.2 Monitoring of the Facility

Cameras or monitoring devices will be installed in the presort pool (and other locations, if necessary); operating 24 hours a day, seven days a week for the first three years during facility operations. For all cameras used, data will be live fed to a system in AFD with monitors to allow AFD staff to observe if bull trout reach the presort pool. The cameras will be monitored daily. If fish are present a biologist will be notified. Staff will be required to monitor the facility for bull trout and to operate the pre-sort holding pool fish crowder, fish lock, sorting facility, and transport truck when bull trout are collected.

5.4.3 Fish Holding, Handling, Transport, and Release

The sorting operation is anticipated to occur during normal working hours. Operations staff will crowd fish into the fish lock from the pre-sort holding pool, sort fish out of the lock, and then route fish to their intended destination. The frequency of cycling from pre-sort holding pool to fish lock to sorting area to transport truck/forebay/tailrace will depend on the time of year and number of fish trapped. It is not

anticipated that sorting operations will require more than an 8-hour shift even during peak fish migration periods.

In general, the presence of bull trout or other fish in the trap will trigger the need to process captured fish. The fish will be transferred from the pre-sort holding pool to the sorting area via a fish lock. Bull trout will be processed seven days per week during the month of May, when migration is at a peak (assumed), or at other times if monitoring shows peak periods occurring outside of May. During non-peak periods, bull trout will be processed Monday through Friday, although the monitoring devices (including cameras, and possibly passive integrated transponder (PIT) tag readers and/or fish counters), will be checked daily by dam operators. During late spring and summer months bull trout would be processed on weekend days if temperatures exceed a threshold temperature (likely 16-18°C or 61-64 °F), to be determined in cooperation with USFWS. During non-peak periods when temperatures are below upper thresholds, a bull trout that enters the fish facility on Friday evening or thereafter would not be processed until the following Monday morning, with up to 64 hours of holding time in the trap. If fish numbers reach a minimum number in the pre-sort holding pool during such weekends, a biologist may be called in to process fish. There will be exclusion screens in the holding pools to provide fish opportunities to escape predation from larger fish during these longer holding periods.

Biologists handling fish at the trap will be trained to visually distinguish bull trout from brook trout, hybrids, and other salmonid species, as well as non-native from native species of fish. Visual identification of bull/brook trout hybrids has been shown to be 95% accurate. Dorsal fin ray marking is considered the most reliable characteristic for identifying hybrids (Popowich et al. 2011). Initial sorting of bull trout will separate trout species from other fish species, and secondary sorting will separate bull trout from other trout species. All non-target fish will then be separated into native versus non-native. Cutthroat troutare proposed to be released into the forebay, but all other native fish would be released to the tailrace. Non-native fish including centrarchid species, brook and brown trout, northern pike, and those visually determined to be hybrids will be released back into the tailwater unless fish managers elect to process these fish in a manner other than release back into the river. These non-natives will be handled in keeping with the Corps' policy on invasive species[35] (USACE 2009), but also in coordination with IDFG and the Kalispel Tribe. Nontarget/non ESA-listed species in general will be handled in a manner to be specifically developed in coordination with WDFW, IDFG and the Kalispel Tribe. IDFG issued a letter to Corps dated September 5, 2017 requesting that only bull trout and cutthroat trout be passed above AFD, all other native fish be returned below AFD, and all non-natives be removed from the system. In an email dated 6 February 2018 the Kalispel Tribe agreed with IDFG's recommendations on sorting, including only passing bull trout and cutthroat, and removing all non-native species. WDFW has not provide comments on the project (sorting or otherwise).

Proposed routine monitoring and evaluation includes three years of post-construction monitoring to evaluate whether the facility is working as designed to provide safe (identify injury and mortality), timely and effective passage (mark and release either bull trout or surrogate species using PIT tags). Water to water transfer is the proposed method of transfer. Handling may occur to sort bull trout from other trout

[35] Corps policy has several goals related to invasive species including: to work strategically, use partnership resources, prevent introduction and establishment, detect early, respond rapidly, control and manage, restore native species, research effective management, and manage information to track data.

species and inspect for injuries, but all attempts will be made to do so at a sorting table with fish submersed in water. Other agencies, such as IDFG and the Kalispel Tribe, may choose to sample fish, but that activity would be covered under their own ESA Section 10 permit.

Adult and sub-adult bull trout will be loaded on a truck for transport to the Bonner Park West boat launch release location approximately 5 miles upstream of the dam. The fish sorting platform allows direct loading via gravity into a transport pod located in the back of a 3/4-ton or 1-ton transport truck. Trucks will access the sorting facility from the north side of the Pend Oreille River, entering the AFD facility near the existing switchyard, crossing over the powerhouse intake deck, and approaching the sorting facility via a new access road that extends from the dam. Egress to the upstream release location will be following the same route. Aeration will occur in the transport pods and chillers may be used if necessary. Release would occur approximately 5 miles upstream at the Bonner Park West boat launch (see Section 5.7 for additional details about the release site). The Trestle Creek Recreation Area boat launch 44 miles upstream is an alternate fish release point in summer season when temperatures surpass 18 °C (65 °F). Bull trout will be released into the river via water to water transfer (either flume or sanctuary net). All bull trout will be observed for stress and adequate recovery prior to release.

5.4.4 Operation Outside of "Normal" Mode

A "normal" operation mode is anticipated to occur over 90% of the time in an average year. Operation during icing, debris, high spring runoff conditions, and annual maintenance is presented in subsequent paragraphs.

Operation during Ice and Cold Weather Operations: Conditions requiring shutdown of the facility will occur when water temperatures are 3 °C (37 °F) or below, and/or when average daily air temperature remains below freezing to the point where ice formation prevents safe operation of the structure or puts bull trout at risk (currently estimated at -6 °C (21 °F) and below). Operating within these parameters will safeguard the continued operation and mechanical integrity of the fishway, and prevent target species from becoming trapped in the fishway (including the holding pool) during ice-over conditions. As a general guideline, the time period when the facility may be shut down could extend from approximately December 15 – March 1; however, this will vary from year to year and will be dictated by the presence of fish and air and water temperatures. Typically, the extreme cold temperatures often occur in January. The Corps will operate the fishway inside this estimated timeframe if conditions allow.

Operation During Large Spring Runoff: The fishway will operate within criteria from a tailwater elevation of 2,031.0 ft to 2,044.0 ft, which corresponds to river flows of approximately 5,100 cfs and 71,000 cfs, respectively. The fishway can operate up to a maximum tailwater elevation of 2,048.0 ft, but the transport velocities within the fishway at that flow would not meet criteria, which corresponds to a river flow of approximately 100,000 cfs. Flows exceed 71,000 cfs 4% of the time throughout the year, and are less than 5,100 cfs less than 1% of the time throughout the year.

During high tailwater conditions, the objective is to continue successfully attracting and capturing upstream migrants in the fishway. When the tailwater elevations exceed 2,044.0 ft, the fishway entrances will still operate to maintain the 0.75 ft of differential across the entrance. The total AWS flow of 300 cfs would be routed through one entrance to maximize fish attraction to the fishway. Once the fish enter the fishway, they are expected to continue moving upstream in the fishway. The transport velocities will be lower than criteria, but fish movement upstream would still be expected. As the river tailwater conditions

begin to decrease the transport velocities in the fishway would increase, providing more conducive flow conditions for upstream migrants. This would ensure that the fish can be trapped and transported before the river water temperatures begin to rise at the tail end of the spring runoff in July and bull trout depart the AFD tailrace for cooler water areas.

Operation during High Temperatures and Annual Maintenance: Water temperatures in the river rise to a lethal level in August for the target species. During the month of August, when water temperatures in the river or holding area exceed 68°F (20°C), the facility may be shut down. If a bull trout is collected within the previous two weeks of reaching this threshold, the fishway operation will extend week by week until no bull trout have been collected within a two-week period. Operation of the facility would resume September 1, regardless of temperatures. If annual maintenance is needed, it would occur during the month of August during these closure periods.

The anticipated annual maintenance period is during the month of August. Water temperatures in the river rise to a lethal level in August for the target species. Fish passage is not anticipated during the entire month of August, making this the ideal time to perform maintenance on the structure.

5.4.5 O&M Conservation Measures/BMPs

See Section 4.15 for a list of O&M conservation measures.

5.5 Design Considerations

The design may be refined after the feasibility study, during the pre-construction engineering and design phase (PED). Most of these refinements would result in betterments to bull trout passage. The completed feasibility-level design is presented in Appendix A (Engineering Design).

If the recommended plan for a fish passage project is approved, additional information will be required to confirm assumptions, refine quantity estimates, and fill in data gaps during the PED phase (following completion of the feasibility study), including information needed to meet requirements in ER 1110-2-1156, *Safety of Dams – Policy and Procedures*.

5.6 Dam Safety

The Corps has considered and addressed applicable Corps Dam Safety requirements during this feasibility study to ensure modification of AFD for fish passage would not jeopardize the safety of the operating project. Chapter 21 of ER 1110-2-1156, *Safety of Dams – Policy and Procedures*, (dated March 31, 2014), outlines Corps dam safety policy for planning studies and pre-construction engineering and design. While much of Chapter 21 in the dam safety regulation pertains to new dam construction and major dam-safety modifications (i.e., projects that would result in major changes to the dam itself), the Corps addressed the following applicable requirements during this feasibility study:

- Consistent with Chapter 21 of ER 1110-2-1156, the Corps established a project delivery team (PDT) early in the feasibility study process that consists of a project manager and the technical personnel from engineering, planning, operations, public affairs, environmental and cultural resources, and others necessary to develop the project.
- This PADD/EA includes operations, maintenance, rehabilitation, repair, and replacement (OMRR&R) and dam safety requirements of the recommended plan, based on feasibility-level design analysis of the recommended plan. This study is Corps-funded and has no sponsor.
- This PADD/EA documents the risk-informed decision making process the Corps has used during the plan formulation to date. In addition, to ensure compliance with Chapter 21 of ER 1110-2-1156, the

Corps addressed the addition of fish passage to AFD in a formal risk assessment conducted in 2015. Documentation of this assessment can be found in Appendix C (2015 Periodic Assessment), which is an excerpt from the AFD Periodic Inspection No.12 Periodic Assessment No.1.

- Other subsections under Chapter 21, section 21.4.2 (Feasibility) do not apply to this feasibility study.

The Corps has addressed the following applicable requirements outlined in Northwestern Division Regulation (NWDR) 1110-1-2 (*Construction and/or Development in Spillways*, dated March 31, 2003) and in NWDR 1110-1-3 (*Modifications at Existing Corps-Owned Civil Works Projects*, dated March 31, 2003):

- The Seattle District Dam Safety Committee (including the District Dam Safety Officer) approved the concept for the recommended plan during its April 13, 2015 meeting with the understanding that they will continue to be informed about progress on the feasibility study following public, technical, and legal/policy reviews and completion of feasibility-level design of the recommended plan, before the PADD/EA is finalized. The Dam Safety Committee was briefed on the recommended plan including the feasibility-level design on February 27, 2018. The committee supported the team in moving forward with the current design.
- The Seattle District Dam Safety Program Manager reviewed the PADD/EA as part of the District Quality Control (DQC) review process conducted before public review. In addition, the Northwestern Division Dam Safety Program Manager reviewed the PADD/EA before public review.
- This study is being conducted consistent with the Project Management Business Process. The plan formulation process conducted during this study has included consideration of dam safety. As the proposed modification (fish passage) is not a major modification to the dam, the Corps has not included specific Dam Safety technical experts. As noted above, however, District and Division Dam safety staff have reviewed study documentation and the District Dam Safety Committee has approved the concept recommended plan.
- The recommended plan described in this report would not modify a spillway. As noted earlier in this report, excavation and construction activities could affect the operations of AFD in early spring when water is being spilled for flood risk management. (Spilling water unevenly through the gates, by closing the spillway bay closest to the construction, may be necessary to construct the facility.) However, once construction is completed, overall operations of the dam would remain the same as current conditions.

5.7 Real Estate Considerations

Main Fish Trap Site: The main fish trap construction area at the dam is located on property that is fee owned or is in waters that allow for Federal Government application of navigational servitude. Federal Navigational Servitude is applicable as the dam is authorized for navigation and flood control purposes and the proposed project will be located in navigable waters to address the impact caused by dam operations. Staging areas will be located on fee owned land. Access areas between Highway 2 and the dam are fee owned land and/or road easements. The existing real estate rights, the construction area, the staging areas, and the access route are depicted on Figure 5-14. No additional real estate rights are required for the main fish trap site. Fish will be trapped and taken to one of the release areas described in the following paragraphs by trucks specially equipped for that purpose.

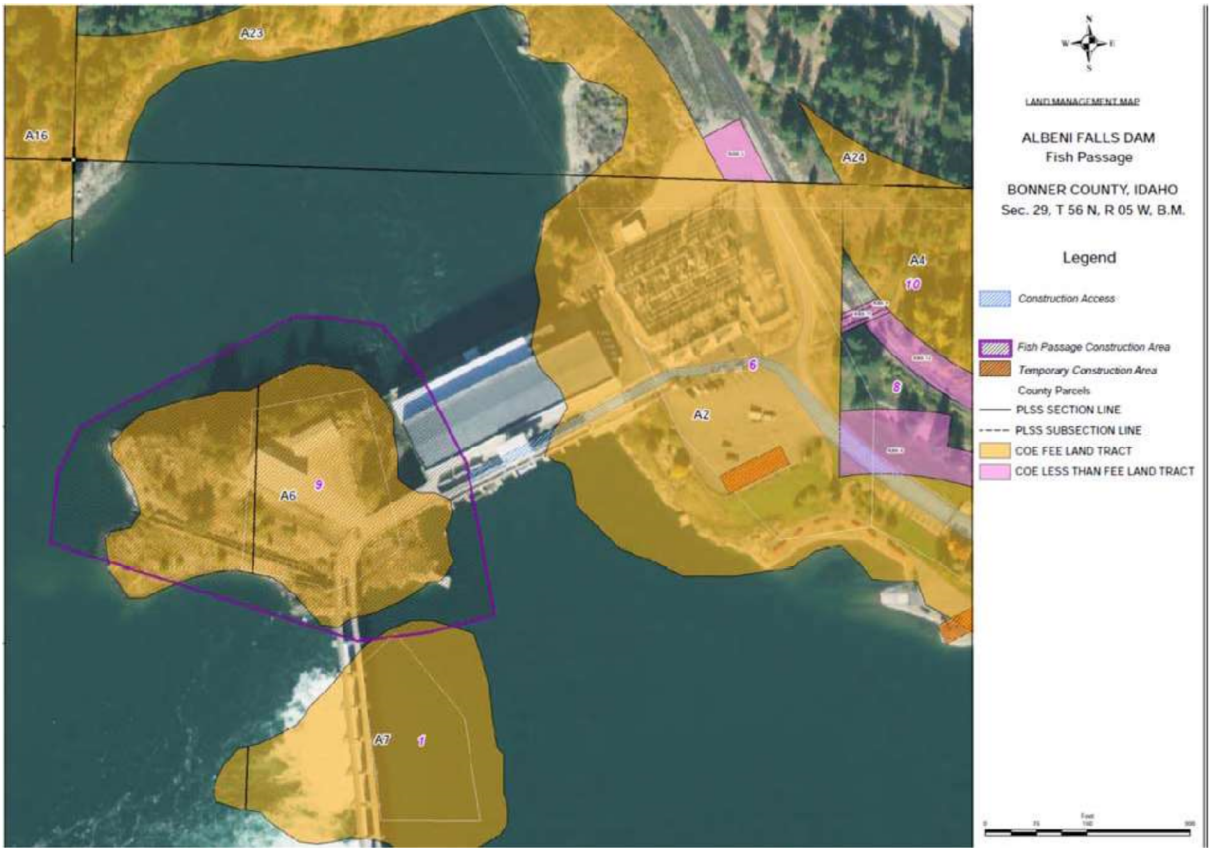

Figure 5-14. Main Fish Trap Site

Primary Fish Release Site: The primary fish release site, the Bonner Park West public boat launch is located in the Town of Priest River, Idaho, 5 miles upriver from AFD and near the mouth of the Priest River (Figure 5-15). The site is ideal due to the water quality and temperature, and its close proximity to the dam. The site is owned by Bonner County, which supports this project and the use of the boat launch, but does not feel the need to enter into a formal agreement. No real estate rights are required for this primary fish release site. No additional permanent structures are proposed for the release site as fish will be released directly from the truck to the river.

Figure 5-15. Bonner Park West Public Boat Launch

Trestle Creek Alternate Fish Release Site: The Trestle Creek Recreation Area boat launch is fee-owned and approximately 44 miles upriver (Figure 5-16). This site provides an alternate fish release point in the summer season; when water temperatures surpass 18 °C (65 °F). No additional real estate rights are required for this alternate fish release site. No additional permanent structures are proposed for the release site as fish will be released directly from the truck to the river.

Figure 5-16. Trestle Creek Recreation Area Boat Launch

Laclede Alternate Fish Release Site: The Laclede boat launch, is located in the Town of Laclede, Idaho, 13 miles upriver from AFD (Figure 5-17). This site would be used if the primary release site is unavailable or if public use of the primary site presents potential impacts for release of bull trout. The Laclede site is also owned by Bonner County, which supports this project and the use of the boat launch, but does not feel the need to enter into a formal agreement. No real estate rights are required for this alternate fish release site.

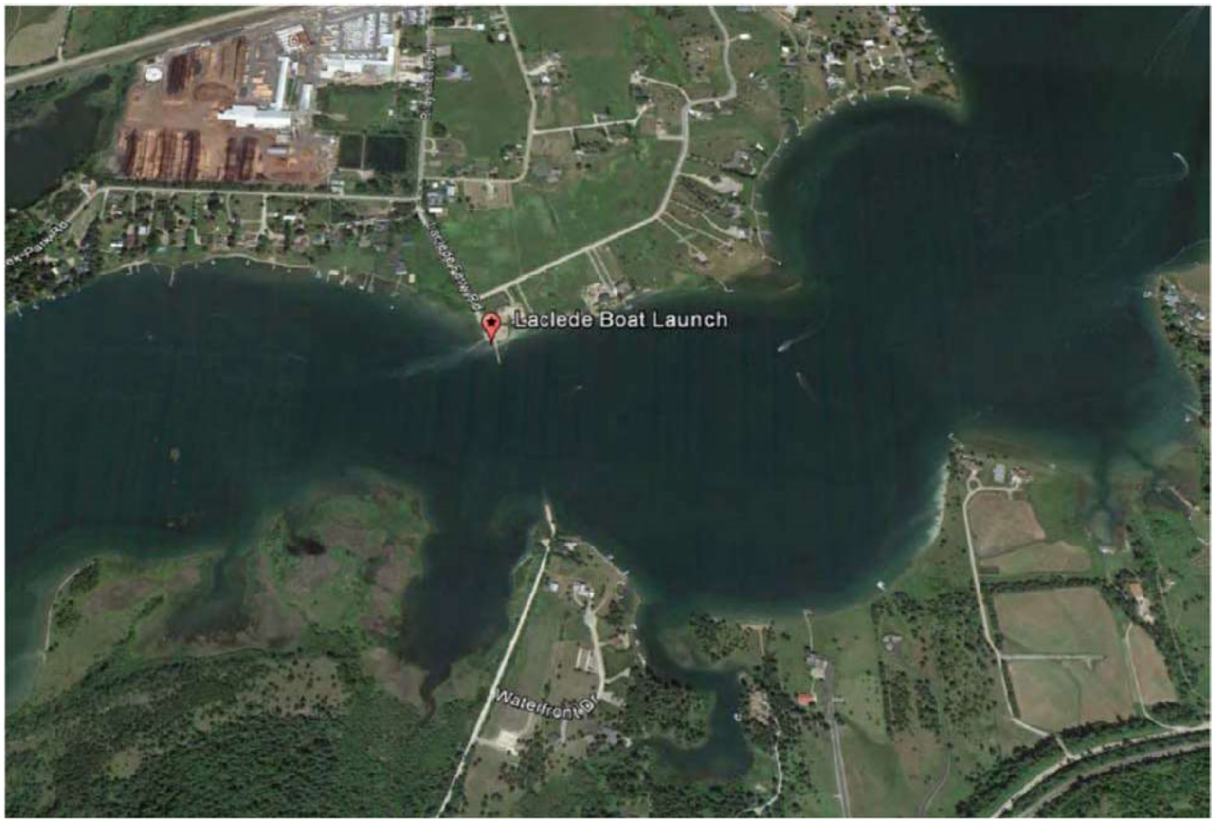

Figure 5-17. Laclede Boat Launch

5.8 Cost Estimate

Based on October 2017 price levels, the estimated project first cost is $67,505,000. Project first cost includes the cost of construction, pre-construction engineering and design, and construction management. It also includes a risk-based contingency of approximately $17,141,000, 34% of the base cost estimate. The fully funded cost estimate to the midpoint of construction is $77,283,000. Note the difference in cost from the analysis presented in Section 3.6.2. The cost estimate of the recommended plan increased during Agency Technical Review of the Draft PADD/EA based on the following considerations:

1. Care & Diversion of Water. The estimate had not adequately captured the costs of labor, equipment, or pre-discharge treatment.
2. Labor Rates & Contractor Availability. Recent experience suggests the work might not be done by a local contractor, so the estimate was changed to cover per diem and higher labor rates for non-local workers.
3. Underwater construction for AWS Intake. The estimate did not adequately capture the cost of constructing the AWS intake underwater.
4. Estimate scope. The estimate had excluded a necessary second laydown area near the log chute.
5. Material Pricing. Many general construction material prices (e.g. concrete, rock bolts, grating) were out-of-date and required updating.

These factors apply to all the action alternatives in the Final Array of Alternatives evaluated in Chapter 3, so similar rough order of magnitude cost increases would be expected for the two action alternatives that

were not selected as the recommended plan. As a result, the Corps did not re-evaluate the Final Array of Alternatives using this updated cost information as it would not be expected to change the outcome of the plan evaluation, comparison, and selection. The recommended plan cost is summarized in Table 5-2.

Table 5-2. Recommended Plan Cost Summary

	Estimated First Cost (2018 – 1Q Price level)
06 Fish and Wildlife Facilities	$47,536,000
30 Planning, Engineering and Design	$13,076,000
31 Construction Management (S&A)	$6,893,000
Total Project First Cost:	**$67,505,000**

5.8.1 Operation and Maintenance Costs

The estimated annual operation and maintenance (O&M) costs are presented in Table 5-3. The total cost consists of the sum of the labor, power and fuel, and equipment and materials including fish hauling expenses. Annual O&M is estimated at $676,200 with 50 percent contingency, or $33,811,700 over a 50-year life cycle.

Table 5-3. Annual O&M Costs

Item	Annual Qty	Unit	Unit Cost	Facility Cost	Total Annual Cost (Oct 2015 prices)	Total Annual Cost (Oct 2017 prices, update factor = 1.055)
Staff, Operations					**$342,600**	**$361,500**
Project Manager	520	hours	$106.30	$55,300		
Fishery Biologist Technicians	4,160	hours	$69.06	$287,300		
Staff, Maintenance					**$20,700**	**$21,800**
Electrical/Controls Technician	104	hours	$99.45	$10,300		
Mechanical Technician	104	hours	$99.45	$10,300		
Power and Fuel					**$3,100**	**$3,300**
Electrical Usage	25,149	kWh	$0.08	$2,000		
Transport Truck Fuel	365	gal	$3	$1,100		
Equipment and Materials					**$60,900**	**$64,300**
Clove oil or Other Anesthetic	1	LS	$2,000	$2,000		
Oxygen Tanks	1	LS	$3,000	$3,000		
Pump Parts	1	LS	$500	$500		
Lock/Equipment	1	LS	$500	$500		
Pre-sort Holding	1	LS	$500	$500		
Gates and Valves	1	LS	$500	$500		
Fish Crowder	1	LS	$500	$500		
Monitoring and Evaluation	1	LS	$5,000	$5,000		
Electrical Parts	1	LS	$2,500	$2,500		
Building Supplies	1	LS	$500	$500		
Consumables	1	LS	$2,500	$2,500		
Small Tools	1	LS	$300	$300		
Fish Trucking Costs	1	LS	$	$42,600		
Annual Cost Subtotal					**$427,300**	**$410,800**
Contingency						
				-30%	**($128,200)**	**($135,200)**
				50%	**$213,600**	**$225,400**
Total Annual Cost						
Minimum					**$299,100**	**$315,600**
Maximum					**$640,900**	**$676,200**

5.8.2 Rehabilitation, Repair and Replacement Costs

An estimate of the cost associated with the rehabilitation, repair, and replacement (RR&R) costs was developed for the Project. A standard template outlining anticipated labor, equipment, and materials cost associated with a specific RR&R activity was developed to provide a level of standardization for the cost estimates. Table 5-4 summarizes the estimate developed for each activity updated to October 2017 prices.

Table 5-4. RR&R Event Summary and Cost Estimate

RR&R Event No.	Title	Frequency (yrs)	Event Type	Cost per Event[1,2]	Cost over 50 years[1,2]
1	Telescoping Gates (2) - Seals	10	REPAIR	$21,600	$107,800
2	Telescoping Gates (2) - Operator	25	REPLACE	$67,200	$134,400
3	AWS Entrance Diffuser	20	REPAIR	$6,900	$13,900
4	Entrance Gate Stoplog Slots	15	REPLACE	$14,200	$42,700
5	Fishway/AWS Perforated Plates	10	REPAIR	$2,900	$14,400
6	Fishway/AWS Grating	10	REPAIR	$5,400	$27,000
7	Chimney Weirs	10	REPAIR	$10,300	$51,600
8	Walkway Grafting	30	REPAIR	$13,300	$13,300
9	Concrete Structure	25	REPAIR	$12,200	$24,400
10	Pressure Transducers	5	REPLACE	$8,400	$84,000
11	Fish Crowder - Mechanical Overhaul	20	REPLACE	$32,500	$64,900
12	Floor Diffuser	20	REPAIR	$8,100	$16,200
13	AWS Regulating Gate - Seals	10	REPLACE	$8,800	$44,000
14	AWS Regulating Gate - Operator	30	REPLACE	$20,300	$20,300
15	Fish Lock Pump	15	REPLACE	$20,600	$61,800
16	Fish Lock Pump - Bearings	5	REPAIR	$4,000	$39,600
17	Fish Lock Pump - Seals	5	REPAIR	$3,900	$38,800
18	Reinforced Concrete Lock	20	REPAIR	$23,100	$46,200
19	Shaft Lining	15	REPAIR	$13,800	$41,500
20	Dewatering Screen	5	REPAIR	$2,200	$22,300
21	Sorting Table	5	REPLACE	$2,200	$22,300
22	Canopy Structure	25	REPAIR	$4,400	$8,900
23	Sorting Facility Slab	20	REPAIR	$11,200	$22,500
24	Pallet Jack	10	REPAIR	$2,100	$10,300
25	Transport Truck/Tanks	10	REPAIR	$4,200	$21,000
26	Electrical Service	5	REPAIR	$12,500	$124,500
27	Tunnel Lining	20	REPAIR	$119,900	$239,800
28	Return Pipes (2)	20	REPLACE	$13,500	$27,100
29	Reinforced Concrete Gate Structure	25	REPAIR	$11,200	$22,500
30	Isolation Gate	30	REPAIR	$32,400	$32,400
31	Fish Screens	15	REPAIR	$57,000	$170,900
32	Fish Screens	25	REPLACE	$105,100	$210,200
33	Debris Cleaning System	20	REPAIR	$40,300	$80,600
34	Fish Lock and Weir Gate Wire Rope	20	REPLACE	$11,000	$22,000
Total over 50-year period of analysis					***$1,924,100***

[1]Costs presented at the October 2017 price level.
[2]Costs rounded to the nearest hundred; rounding may contribute to some discrepancy in costs presented in this table over the 50-year period of analysis.

5.8.3 Life Cycle Costs

The construction cost and operations, maintenance, rehabilitation, repair, and replacement (OMRR&R) costs were combined to evaluate costs over the 50-year planning life cycle. Table 5-5 summarizes these life cycle costs, along with the annualization of costs over the 50-year life cycle, which includes interest during construction assuming a 42-month construction duration. Costs are presented at the October 2017 price level, and the 2.75 percent (FY18) discount rate is applied for computation of interest during construction and annual costs. Total annual cost for the proposed project is $3,329,000.

Table 5-5. Life Cycle Cost Summary

Cost Criteria	Trap and Haul
First Cost (Oct 2017 prices)	$67,505,000
Construction Duration (months)	42
Interest Rate (FY18)	2.75%
Period of Analysis	50
Interest During Construction	$3,229,000
Total Implementation Cost	$70,734,000
Annual Construction Cost	$2,620,000
Total OMRR&R Cost	$35,736,000
NPV OMRR&R Cost	$19,145,000
Annual OMRR&R Cost	$709,000
Total Annual Cost	**$3,329,000**

5.9 Summary of Environmental Effects of the Recommended Plan

The following table summarizes the potential effects to the environment of the recommended plan:

Table5-6. Summary of Environmental Impacts of the Recommended Plan

Resource	No Action Alternative	Recommended Plan
Geology and Soils	No effect	Minimal effects. Rock removal would not change geology of the site, a ravine unconnected with the river would be filled with excavated rock
Hydraulics and Hydrology	No effect	300 cfs rerouted through the fish passage facility, no impacts to river hydrology Overall no effect to dam operations
Water Resources and Water Quality	No effect	Temporary increase in turbidity during construction would be mitigated by BMPs. No long term effects.
Fisheries	No effect	Mortality and disturbance from blasting and drilling. Behavioral and physiological impacts of elevated turbidity. Stress of trapping, handling, and transport from operation. Beneficial effects from passage would be new access to cold water refuge during elevated water temperatures, and increased foraging and spawning habitat.

Resource	No Action Alternative	Recommended Plan
Aquatic Non-native Species	No effect	Potential removal of individuals from the system during the sorting process.
Wildlife – Mammals and Birds	No effect	Temporary disturbance during construction, no long term effects AFD is 0.75 mile away from nearest known bald eagle nest. Construction will avoid the nesting season of February 15 through March 30.
Rare, Threatened, and Endangered Species	No effect to Canada lynx, woodland caribou, and North American wolverine. Continued adverse effect to bull trout	No effect to Canada lynx, woodland caribou, and North American wolverine. Determination of "may affect, likely to adversely affect" for bull trout based on construction impacts similar to those described for fisheries, and "may affect, but not likely to adversely affect" their critical habitat. The fish passage facility also connects critical habitat between the upper and lower Pend Oreille River and provides opportunity for restoration of bull trout populations below AFD, which were extirpated following dam construction.
Air Quality and Greenhouse Gases	No effect	Temporary increase in dust and exhaust from machinery during construction. Long term effects due to vehicle exhaust from hauling the fish to the release site.
Noise	No effect	Temporary increase during construction, especially in excavation via blasting and drilling, no long term effect.
Cultural Resources	No effect	Adverse effect to Historic District, including altering of the log chute at the entrance and replaced by the gravity water supply feature for the fish passage, which is a larger and more complex element and would introduce modern structures into the Historic District.
Utilities and Infrastructure	No effect	Fish passage would become part of the infrastructure of AFD
Transportation and Traffic	No effect	Temporary increase in traffic due to construction, no effect after construction is complete.
Aesthetics and Visual Resources	No effect	Viewshed of AFD would change with the addition of the fish passage facility.
Recreation Resources	No effect	The fish passage facility would be an additional feature to see during Park Ranger guided tours.
HTRW	Same as existing condition.	No known or suspected contamination or uncontrolled release of contamination was found.
Tribal Resources and Cultural Values	Same as existing conditions	Long-term improvements to culturally important native fish, including bull trout, due to restored passage over the dam.

5.10 Unresolved Issues

At this time the following issues are unresolved:

1. Management of non-native species that enter the facility. The Corps is proposing to return non-native species to the tailrace. If fish managers would like non-natives to be removed from the system, the Corps will provide the opportunity for them to do so at the facility. Fish managers could include, but are not limited to, IDFG, WDFW, and the Kalispel Tribe.
2. Genetic and disease testing. The Corps will not fund or perform genetic or disease testing of bull trout and any other fish species. If fish managers would like to conduct this type of testing, the Corps will provide the opportunity to do so. Fish managers could include, but are not limited to, IDFG, WDFW, and the Kalispel Tribe.

5.11 Implementation Requirements and Permits

The following items are required for implementation of the recommended plan:

1. A Clean Water Act (CWA) Section 404(b)(1) evaluation has been done (see Appendix B) . IDEQ will issue CWA water quality permit under Section 401 of the CWA but will need at least a 60 percent design plan for submittal.
2. Contractor would obtain a CWA Section 402 NPDES (storm water) permit.
3. Execution of the terms of the stipulations of the MOA that has been executed between the Corps and the Idaho SHPO.

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6 Compliance with Applicable Environmental Laws, Regulations and Executive Orders*

This chapter describes how the recommended plan (agency preferred alternative) complies with all applicable Federal environmental laws, statutes, and executive orders. The Corps shared the Draft PADD/EA with tribes, Federal agencies, state agencies, and state and local governments as part of the consultation and public review processes for the project.

6.1 National Environmental Policy Act (NEPA)

NEPA (42 U.S.C. §4321 et seq.) commits Federal agencies to considering, documenting, and publicly disclosing the environmental effects of their actions. This Environmental Assessment is intended to achieve NEPA compliance for the proposed project. As required by NEPA, this draft integrated PADD/EA describes existing environmental conditions at the project site, the proposed action and alternatives, potential environmental impacts of the proposed project, and measures to minimize environmental impacts. The document determines if the project would create any significant environmental impacts that would warrant preparing an EIS, or whether it is appropriate to prepare a Finding of No Significant Impact (FONSI).

6.2 Endangered Species Act of 1973 (ESA)

In accordance with Section 7(a)(2) of the ESA of 1973, as amended, projects that are federally funded, constructed, permitted, or licensed must take into consideration impacts to federally listed or proposed threatened or endangered species and their critical habitats. The Corps has prepared a biological assessment (BA) and submitted it to the USFWS with a determination of "may effect, likely to adversely affect" bull trout based on construction related impacts and "may affect, but not likely to adversely affect" their critical habitat. USFWS issued a Biological Opinion (BiOp) to the Corps in a letter dated January 11, 2018. It stated that the action was not likely to jeopardize the continued existence of the species nor would it result in an adverse modification of bull trout critical habitat (Appendix B).

6.3 Clean Water Act of 1972

The object of the Federal Water Pollution Control Act (33 U.S.C § 1252 et seq.), commonly referred to as Clean Water Act (CWA), is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing pollution from point and nonpoint sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. To ensure compliance with water quality standards, the Corps would address its responsibilities under CWA and obtain a 401 water quality certification (WQC) from IDEQ. The Corps submitted a package to IDEQ requesting a WQC on September 20, 2017. IDEQ determined that more details are needed to issue a WQC and the Corps agreed to withdraw its request for a WQC and wait for a 65% level of design to request one. IDEQ issued a letter to the Corps summarizing its process (Appendix B).

If applicable, the construction contractor will also obtain a National Pollutant Discharge Elimination System (NPDES) permit prior to construction. USACE prepared a 404(b)(1) evaluation to document findings regarding this project pursuant to Section 404 of the CWA, attached in Appendix D. The Corps prepared and distributed a Section 404 public notice for public comment contemporaneous with this Draft

EA. No wetlands would be affected by the project. Excavated material would not be discharged onto or directly adjacent to waters of the U.S.

6.4 Clean Air Act of 1972

The Clean Air Act (CAA) as Amended (42 U.S.C. §7401, et seq.) prohibits Federal agencies from approving any action that does not conform to an approved State or Federal implementation plan. Blasting and the removal of rock, the operation of equipment, and the operation of vehicles during construction would result in increased vehicle emissions and a slight increase in fugitive dust. These effects would be localized and temporary. There would also be emissions associated with vehicle transport of bull trout during operation of the facility. Although the action is in an attainment zone (meets EPA standards for six criteria pollutants), emissions will exceed EPA's *de minimis* threshold levels for NOx that are established for non-attainment zones. However, these releases would be temporary and the project is located in an attainment zone with good air quality so effects would be insignificant.

6.5 National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470) requires that Federal agencies evaluate the effects of their undertakings on historical, archeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking. The lead agency must examine whether feasible alternatives exist that would avoid eligible cultural resources. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects. To meet the Agency's responsibilities under NHPA, the Corps is in the process of Section 106 consultation with the Idaho SHPO, BPA, and Tribes regarding the fish passage project.

The Corps initiated Section 106 consultation with the Idaho State Historic Preservation Officer (Idaho SHPO) by letter on September 15, 2014. The Corps described the proposed project and asked the Idaho SHPO to concur with the area of potential effect (APE). The Idaho SHPO responded by email on September 24, 2014 concurring with the proposed APE. The Corps sent letters on September 15, 2014, to the Kalispel Tribe of Indians, the Kootenai Tribe of Idaho, and the Confederated Salish and Kootenai Tribes describing the project and asking if there were issues or concerns the Tribes might have and any information to identify properties that may be affected by the project which may be of a religious or cultural significance. In addition, the Corps has discussed the project with the AFD Cultural Resources Cooperating Group (CRCG) whose members include the aforementioned Tribes, the BPA, the Idaho SHPO, the Corps, the Idaho Panhandle National Forest (IPNF), and the Bureau of Land Management (BLM). Further consultation occurred with the Idaho SHPO and Tribes by letter dated August 28, 2017. The provided a project description updated noting the changes to the fish passage design, further refined the agency determination and findings and proposed mitigation measures commensurate with the determination of adverse effect.

The fish passage would introduce a modern structure of notable size and scale within the AFD historic district's boundary and the addition of modern fish passage would have incremental loss of integrity regarding the design, material, workmanship and construction of the dam from its period of historic significance, resulting in an adverse effect to the overall National Register eligible historic district. The Corps has consulted with the Idaho SHPO and other consulting parties on developing a Memorandum of Agreement (MOA) to resolve the adverse effects. The Corps and the Idaho SHPO have agreed upon

mitigation that would resolve the adverse effects caused by the proposed fish passage project, reducing the effects to less than significant. These mitigation options include processing a large collection of construction photographs at AFD to professional archival standards and making the collections available to researchers and production of a brochure/poster available at the AFD Visitor's Center emphasizing the history of the AFD historic district. As required by Section 106, the mitigation to resolve adverse effects to the AFD historic district has been memorialized in a Memorandum of Agreement (MOA), which was executed by the SHPO and Corps on May 1, 2018.

6.6 Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act (NAGPRA) (Public Law 101-601) requires federal agencies and institution that receive federal funding to return Native American cultural items such as human remains, funerary objects, sacred objects and objects of cultural patrimony. In addition, NAGRPA establishes procedures for inadvertent discovery of Native American remains and cultural items on federal land. Should human remains be found during construction of the fish passage the Corps will comply with the provisions of NAGPRA.

6.7 Northwest Electric Power Planning and Conservation Act

Under the Pacific Northwest Electric Power Planning and Conservation Act (Northwest Power Act), the Corps is to exercise its responsibilities for operating the FCRPS in a manner that provides equitable treatment for fish and wildlife with other purposes for which the Corps facilities are operated and managed, and to take into consideration in its decision making the Northwest Power and Conservation Council's (Council) Fish and Wildlife Program to the fullest extent practicable. AFD is operated and managed to conserve fish and wildlife while providing upstream fish passage would provide a migratory pathway for resident fish to reach areas above AFD. This project would reconnect critical habitat for bull trout above and below AFD and would provide access to essential habitats for other native fish which is necessary to conserve and restore fish runs in the basin.

6.8 Executive Order 13175 Consultation and Coordination with Indian Tribal Governments

Executive Order 13175 reaffirmed the Federal government's commitment to a government-to-government relationship with Indian Tribes, and directed Federal agencies to establish procedures to consult and collaborate with tribal governments when new agency regulations would have tribal implications. The Corps has a government-to-government consultation policy to facilitate the interchange between decision makers to obtain mutually acceptable decisions.

In accordance with this Executive Order, the Corps has engaged in regular and meaningful consultation and collaboration with the Kalispel Tribe of Indians (Kalispel Tribe) throughout the course of this study. The Kalispel Tribe has been a technical resource to the Corps throughout this feasibility study. The Corps has also initiated consultation with the Kootenai Tribe of Idaho.

6.8.1 Memorandum of Agreement with the Kalispel Tribe

The Corps, USBR, and BPA entered into a Memorandum of Agreement (MOA) with the Kalispel Tribe, modeled on the Columbia Basin Fish Accords. Under these agreements, the Federal agencies, tribes, and states work together as partners to provide tangible survival benefits for native fish recovery. The Kalispel MOA acknowledges a common interest between the Kalispel Tribe and the Federal agencies in AFD and

conditions for bull trout in the Pend Oreille River basin. Additional information on fish accords can be found on the Salmon Recovery website: www.salmonrecovery.gov/Partners/FishAccords.aspx.

6.9 Bald and Golden Eagle Act of 1940

The Bald and Golden Eagle Protection Act (16 U.S.C. §668-668c) applies to Corps civil works projects and requires protection of bald and golden eagles from disturbance. Bald eagles nest and overwinter on Lake Pend Oreille and the Pend Oreille River. Approximately 80 bald eagles wintered on Pend Oreille Lake in 2013-2014 season. Of 20 known nests in the area, one is near the dam, and has been successful with one or two fledges annually. This nearest nest is more than 4,000 ft away from the AFD rock island, well outside the 660-foot buffer required during the February 15 through March 30 nesting season.

6.10 Fish and Wildlife Coordination Act of 1934

The Fish and Wildlife Coordination Act (FWCA) of 1934 as amended (16 U.S.C. §661-667e) provides authority for the USFWS involvement in evaluating effects to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It requires Federal agencies that construct, license, or permit water resource development projects to consult with the USFWS, NMFS, and State resource agencies regarding the effects to fish and wildlife resources and measures to mitigate these effects. Section 2(b) requires the USFWS to produce a Coordination Act Report (CAR) that describes fish and wildlife resources in a project area, potential negative effects of a proposed project, and recommendations for a project. In communication dated April 11, 2017, the USFWS stated that they will not produce a CAR in that the effects of the project to resources will be best addressed through the ESA Section 7 consultation process (see Section6.2), and the fish management implications will be addressed through coordination and permitting with the relevant state fish and wildlife agencies.

6.11 Executive Order 12898, Environmental Justice in Minority and Low-Income Populations

Executive Order 12898 directs Federal agencies to take the appropriate steps to identify and address any disproportionately high and adverse human health or environmental effects of Federal programs, policies, and activities on minority and low-income populations. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.

The proposed action would not disproportionately affect minority or low-income populations nor have any adverse human health impacts. No interaction with other projects would result in any such disproportionate impacts. No cumulative impacts to Environmental Justice would be expected from interaction of the proposed action with other past, present, and reasonably foreseeable projects. Further, tribal governments that are also environmental justice communities in the project area have been engaged and informed about the proposed action.

6.12 Executive Order 11988 Floodplain Management

Executive Order 11988 requires Federal agencies to recognize the significant values of floodplains and to consider the public benefits that would be realized from restoring and preserving floodplains. It is the general policy of the Corps to formulate projects that, to the extent possible, avoid or minimize adverse

impacts associated with use of the base floodplain and avoid inducing development in the base floodplain unless there is no practicable alternative that meets the project purpose. Per the procedures outlined in ER 1165-2-26 (Implementation of Executive Order 11988 on Flood Plain Management), the Corps has analyzed the potential effects of the recommended plan on the overall floodplain management of the study area.

There are eight steps reflecting the decision making process required in this Executive Order. The eight steps and responses to them are summarized below.

1. Determine if the proposed action is in the base floodplain. The proposed actions are located within the base floodplain for the Pend Oreille River.
2. If the action is in the floodplain, identify and evaluate practicable alternatives to locating in the base floodplain. As the primary objective of the project is to provide fish passage at AFD, there are no practicable alternatives completely outside of the base floodplain that would achieve this objective.
3. Provide public review. The proposed project has been coordinated with the public, government agencies, and interested stakeholders. The Draft PADD/EA was released for public review in November 2017 and a public meeting was held in December 2017.
4. Identify the impacts of the proposed action and any expected losses of natural and beneficial floodplain values. Chapters 3 and 4 of this document present an analysis of alternatives. Practicable measures and alternatives were formulated and potential impacts and benefits were evaluated. The anticipated impacts associated with the recommended plan are summarized in Chapters 4 and 5 of this report. While construction of the project would result in mostly minor and temporary adverse impacts to the natural environment, the proposed action will result in a substantial long-term improvement in access to high quality habitat for cutthroat and bull trout. For each resource analyzed in Chapter 4, wherever there is a potential for adverse impacts, appropriate best management practices or other environmental considerations were identified. As there is a net benefit to biological resources, no biological mitigation is required for the recommended plan. No loss of natural or beneficial floodplain values are anticipated as a result of the fish passage facility, as it is on a rock island in the middle of AFD. The facility would not augment or displace flows in the river.
5. Minimize threats to life and property and to natural and beneficial floodplain values. Restore and preserve natural and beneficial floodplain values. Implementing the recommended plan would have no significant flooding impacts on human health, safety, and welfare. The facility would not augment or displace flows in the river.
6. Reevaluate alternatives. Chapter 4 of this document presents an analysis of alternatives. There are no practicable alternatives completely outside of the base floodplain that would achieve study objectives.
7. Issue findings and a public explanation. The public will be advised that no practicable alternative to locating the proposed action in the floodplain exists, as indicated in Item 3 above.
8. Implement the action. The proposed project does not contribute to increased development in the floodplain and does not increase flood risk. The recommended plan is consistent with the requirements of this Executive Order.

6.13 Chief of Engineers Actions for Change (24 August 2006)

On August 24, 2006 the Chief of Engineers announced 12 actions for change the USACE would undertake to incorporate lessons learned in the aftermath of hurricanes Katrina and Rita. These actions are listed below, followed by statements describing how this study takes them into consideration.

1. Employ integrated, comprehensive and systems based approach to the extent practicable.
   The report took an integrated/systems based approach by proactively seeking to avoid conflicts with future uses and upstream projects.
2. Employ risk-based concepts in planning, design, construction, operations and major maintenance.
   The alternatives development and assessment specifically sought to address and reduce risks associated with future failure and O&M concerns.
3. Continually reassess and update policy for program development, planning guidance, design, and construction standards.
   Throughout the planning process, Seattle District continually reviewed new policy for changes that would apply to this project, in addition to undergoing agency technical reviews and policy review by Northwestern Division.
4. Dynamic independent review.
   District quality control review was conducted by Seattle District staff not involved with development of this report. Agency technical review was conducted by expert personnel from outside the Seattle District.
5. Employ adaptive planning and engineering systems.
   Alternatives were eliminated that would not allow for adaptation in the future to sponsor's desired goals.
6. Focus on sustainability.
   Planning efforts were based on a 50 year period of analysis. The project aims to improve the sustainability of the target bull trout population, while not negatively impacting sustainability of the existing dam or of other fish populations that utilize the reach.
7. Review and inspect completed works.
   Operations and maintenance considerations are summarized in section 5.4 of this report. The fish passage facility will be operated throughout the year, ensuring some degree of review and inspection during the normal course of events.
8. Assess and modify organizational behavior.
   This is a national focus and not study specific.
9. Effectively communicate risk.
   Risks are communicated in a planning risk register, a cost and schedule risk analysis, and section 5.10 of this report, (Unresolved Issues).
10. Establish public involvement risk reduction strategies.
    Public involvement efforts to date are described in chapter 7 of this report.
11. Manage and enhance technical expertise and professionalism.
    This is a national focus and not study specific.

12. Invest in research.

This project will garner considerable valuable new information to inform future fish passage efforts, and in particular bull-trout passage.

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7 Public Involvement, Review and Consultation*

Public involvement activities and agency coordination are summarized in this chapter. Stakeholders, agencies, tribes, and other interested parties are integral in providing input for defining problems, opportunities, objectives, constraints, and for developing strategies that support development of the range of alternatives to be analyzed for feasibility and environmental compliance.

7.1 Public Involvement Process

In accordance with NEPA public involvement requirements (40 CFR 1506.6) and Corps Planning policy (ER 1105-2-100), opportunities are presented for the public to provide oral or written comments on potentially affected resources, environmental issues to be considered, and the agency's approach to the analysis.

The Corps presented an update on the feasibility study to the Pend Oreille Basin Commission (POBC) on September 16, 2014 and September 23, 2016 and received commission input/feedback. The Corps hosted a public open house at Priest River, ID on April 25, 2017 and provided an update on the feasibility study and received questions from the audience.

7.2 Draft PADD/EA Public Review

Corps Planning policy and NEPA require a public comment period, during which any person or organization may comment on the draft PADD/EA. For this study, the public comment period formally ran for 30 days, from November 28-December 28, 2017. The Corps hosted one public meeting during the public review period to provide information about the project and receive public comments on the Draft PADD/EA. The public meeting was December 13, 2017 in Sandpoint, Idaho. The Corps has considered all comments received during public review of the Draft PADD/EA. Responses to public comments are included and addressed in Appendix E.

7.3 Agency and Tribal Government Consultation and Coordination Process

Preparation of this Draft PADD/EA is being coordinated with appropriate Federal, state, and tribal interests. The Kootenai Tribe of Idaho and Confederated Salish and Kootenai Tribes, and the Coeur d'Alene Tribe are also interested parties and have been coordinated with as part of this process.

Federal Agencies: The Corps invited USFWS and BPA to consider a cooperating agency role in the development of the EA portions of this Draft PADD/EA. Both declined. BPA has been a technical resource to the Corps throughout the feasibility study. Although not a cooperating agency, USFWS has provided information about fish passage options for consideration during the feasibility study and participated in study workshops that have informed the study prior to the 2013 regional planning charette.

State Agencies: While not a cooperating agency on the study, IDFG and WDFW are interested parties. The Corps has informed IDFG and WDFW of study progress and considered their concerns during the study including the handling of native and non-native species. The Corps is consulting with IDEQ and Idaho SHPO as part the environmental and cultural resources compliance processes required under NEPA as described in Section 6.10 above.

Indian Tribes: The Kalispel Tribe is an interested party that has signed a MOA with the Corps, BPA and USBR acknowledging a common interest in AFD and conditions for bull trout in the Pend Oreille River basin. The Kalispel Tribe has been a technical resource to the Corps throughout the study documented in this PADD/EA.

7.4 Peer Review Process

The Corps developed the Review Plan for this study, which the Corps' Northwestern Division (NWD) approved. Peer review for this study was designed to meet all pertinent Corps policies (e.g., Engineering Circulars [EC] including EC 1165-2-214). This plan requires internal and external technical review of the PADD/EA and appendices. This study has adhered to this guidance and this document has undergone District Quality Control (DQC) review. Office of Counsel Review, Corps' Northwestern Division policy review, and Agency Technical Review (ATR).

8 Recommendation

I have considered all significant aspects of this project, including environmental, social and economic effects, and engineering feasibility. I recommend that Albeni Falls Dam be modified generally as described in this report as the Recommended Plan, subject to approval and appropriations.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program or the perspective of higher review levels within the Executive Branch.

As the District Engineer, I recommend this plan with such modifications thereof as in the discretion of the Commander, Headquarters, U.S. Army Corps of Engineers, may be advisable. Based on October 2017 price levels, the estimated project first cost of the Recommended Plan is $67,505,000. Annual operations and maintenance (O&M) is estimated to be $709,000.

Date: 17 Jun 18

MARK A. GERALDI
Colonel, Corps of Engineers
Commander and District Engineer

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From: Brian Gruber

Sent: Wed Oct 13 23:12:05 2021

To: Samantha Meysohn; Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; Miles,Tucker (BPA) - LN-7; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com; william_gale@fws.gov

Cc: Liz Mack; Hoefer, Scott E; Ulacky, Nicole M; Langeslay, Michael J CIV USARMY USACE (US); Zelinsky,Benjamin D (BPA) - E-4; Renner,Marcella P (BPA) - E-4; Bonnie Hossack - NOAA Affiliate

Subject: [EXTERNAL] RE: Review Requested - UC BAAF: 9/23 Implementation Strategies and Principles Working Team

Importance: Normal

I have one change:

In the first bullet under the Corps' presentation on potential funding options, the second sentence should either be eliminated or modified as follows: "The Corps stated that it cannot fund construction studies at Chief Joseph Dam because that would require a different authorization pathway." The sentence as presented in the draft is overbroad and suggests a consensus of the group on this point.

Thanks,

Brian

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Thursday, October 7, 2021 9:12 AM
To: Fleeger, Timothy M (Tim) CIV USARMY CENWD (USA <Timothy.M.Fleeger@usace.army.mil>; Brian Gruber <bgruber@ziontzchestnut.com>; ceder@usbr.gov; Leanne.V.Holm2@usace.army.mil; lisa.lance@sol.doi.gov; Megan.Kernan@dfw.wa.gov; benjamin.blank@dfw.wa.gov; rick@eichstaedtlaw.net; ted@tcklaw.com; Jon_Edwards@nps.gov; btmiles@bpa.gov; laura@ucut-nsn.org; Cody.desautel@colvilletribes.com; william_gale@fws.gov
Cc: Liz Mack <Lmack@kearnswest.com>; Hoefer, Scott E <SHoefer@usbr.gov>; Ulacky, Nicole M <nulacky@usbr.gov>; Langeslay, Michael J CIV USARMY USACE (US) <Mike.J.Langeslay@usace.army.mil>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; mprenner@bpa.gov; Bonnie Hossack - NOAA Affiliate <bonnie.hossack@noaa.gov>
Subject: Review Requested - UC BAAF: 9/23 Implementation Strategies and Principles Working Team

Greetings,

Thank you for your efforts on the UC BAAF Working Group – Implementation Strategies and Principles Working Team. We are writing to provide you with a high-level meeting summary from the 9/23 ISP Working Team Meeting and a friendly reminder to help with scheduling upcoming ISP Working Team Meetings.

<u>September 23rd, 2021 ISP Working Team Meeting Summary</u>

Attached please find a draft of the ISP Working Team Meeting Summary. Please note this is a high-level summary of the discussions during the meeting.

Review Requested: Please review the attached draft meeting summary and provide any feedback **by close of business on Monday, October 18th**. Please note this is an opportunity to review the document and ensure it is reflective of what was said at the meeting; we request that feedback remain at high-level and refrain from wordsmithing and additional commentary. If a statement was captured incorrectly or not incorporated in the document, please strive to provide alternative language. If we don't hear from you, we will assume that the meeting summary is okay to share more broadly.

On Tuesday, October 19th, we will send the meeting summary to the full UC BAAF Working Group so that all members can stay up-to-date with the activities of these smaller groups since these small working teams operate on behalf of the whole plenary group.

Scheduling Reminder

Please complete this Doodle Poll with your availability for 90-minute meetings in October, November, and December by **Friday, 10/8.** Let us know if you need more time to complete the poll or assistance to do so.

Feel free to contact Scott Hoefer or us with any questions or concerns. We look forward to meeting with you again soon.

Best,

Sam and Liz

Samantha Meysohn

Associate
Kearns & West

p: (360) 536-3660

w: smeysohn@kearnswest.com

Pronouns: she/her

Liz Mack

Director

Kearns & West

phone: (971) 269-0788

email: lmack@kearnswest.com

web: www.kearnswest.com

Pronouns: she/her

From: Laura Robinson

Sent: Mon Nov 08 15:01:32 2021

To: Samantha Meysohn; Langeslay, Michael J CIV USARMY CENWD (USA); Coffey, Michael A; rick@eichstaedtlaw.net; Dan_Foster@nps.gov; 'Brent Hall (BrentHall@ctuir.org)'; Nicole Ulacky; Michael Garrity (Michael.Garrity@dfw.wa.gov); Megan.Kernan@dfw.wa.gov

Cc: Liz Mack; Hoefer, Scott E; Nicole Ulacky; Zelinsky,Benjamin D (BPA) - E-4

Subject: [EXTERNAL] RE: Review Requested UC BAAF - Draft Communications Plan - External Communications Working Team

Importance: Normal

Attachments: image001.jpg

I think this looks great. Good job capturing the group's thoughts, Liz and Sam.

Thanks,

Laura

Laura Robinson

Policy Analyst

Upper Columbia United Tribes

25 W. Main, Suite 434

Spokane, WA 99201

Office 509-209-2411

Cell (b)(6)

Fax 509-209-2421

laura@ucut-nsn.org

www.ucut.org

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Monday, November 8, 2021 1:03 PM
To: Langeslay, Michael J CIV USARMY CENWD (USA) <Mike.J.Langeslay@usace.army.mil>; Coffey, Michael A <mcoffey@usbr.gov>; rick@eichstaedtlaw.net; Dan_Foster@nps.gov; 'Brent Hall (BrentHall@ctuir.org)' <BrentHall@ctuir.org>; Laura Robinson <laura@ucut-nsn.org>; Nicole Ulacky <nulacky@usbr.gov>; Michael Garrity (Michael.Garrity@dfw.wa.gov) <Michael.Garrity@dfw.wa.gov>; Megan.Kernan@dfw.wa.gov
Cc: Liz Mack <Lmack@kearnswest.com>; Hoefer, Scott E <SHoefer@usbr.gov>; Nicole Ulacky <nulacky@usbr.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Subject: RE: Review Requested UC BAAF - Draft Communications Plan - External Communications Working Team

Greetings,

Thank you for your efforts on the External Communications Working Team. We are writing with a friendly reminder to please review the Draft Communications Plan and send us any feedback and comments by end of day today.

Feel free to contact Scott Hoefer or us with any questions or concerns. We look forward to hearing from you.

Best,

Sam and Liz

From: Samantha Meysohn <smeysohn@kearnswest.com>
Sent: Monday, October 25, 2021 3:49 PM
To: Coffey, Michael A <mcoffey@usbr.gov>; rick@eichstaedtlaw.net; Dan_Foster@nps.gov; 'Brent Hall (BrentHall@ctuir.org)' <BrentHall@ctuir.org>; laura@ucut-nsn.org; Nicole Ulacky <nulacky@usbr.gov>; Michael Garrity (Michael.Garrity@dfw.wa.gov) <Michael.Garrity@dfw.wa.gov>; Megan.Kernan@dfw.wa.gov
Cc: Liz Mack <Lmack@kearnswest.com>; Hoefer, Scott E <SHoefer@usbr.gov>; Nicole Ulacky <nulacky@usbr.gov>; Langeslay, Michael J CIV USARMY USACE (USA) <Mike.J.Langeslay@usace.army.mil>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Subject: [Non-DoD Source] Review Requested UC BAAF - Draft Communications Plan - External Communications Working Team

Greetings,

Thank you for your efforts on the UC BAAF External Communications Working Team. We are writing to provide you with a draft of the Communications Plan for your review.

UC BAAF Communications Plan Draft 10-25-21

We have revised and refined the attached draft communications plan based on the discussion at the at the 10/20 External Communications Working Team Meeting.

Review Requested: Please review the Communications Plan and provide any feedback in track changes by **end of day Monday, November 8th**. We request that feedback remain at high-level and refrain from wordsmithing and additional commentary. If you would like to see a change, please strive to provide alternative language. We ask that you share the document with your agency/tribe/organization's communications/public affairs staff for their input, as well.

Please note the following as you review:

- We have added a column in the Tools and Tactics Section asking who could implement – we would like you to discuss internally with your agency/tribe/organization to see if you have resources to implement any of the items.
- Please reply all to share whether a second meeting of the External Communications Working Team may be helpful before the December 1 plenary meeting.

Feel free to contact Scott Hoefer or us with any questions or concerns. We look forward to hearing from you.

Best,

Sam and Liz

Samantha Meysohn

Associate
Kearns & West

cell: (b)(6)

email: smeysohn@kearnswest.com

Pronouns: she/her

Liz Mack

Director

Kearns & West

phone: (971) 269-0788

email: lmack@kearnswest.com

web: www.kearnswest.com

Pronouns: she/her

From: Conor Giorgi

Sent: Mon Aug 09 14:46:20 2021

To: Samantha Meysohn; william_gale@fws.gov; Brent Nichols; Casey.Baldwin@colvilletribes.com; Christopher.Donley@dfw.wa.gov; Cody.desautel@colvilletribes.com; laura@ucut-nsn.org; Michael.Garrity@dfw.wa.gov; SCamp@usbr.gov; Mike.J.Langeslay@usace.army.mil; michael.tehan@noaa.gov; mike.tehan@noaa.gov; avitale@cdatribe-nsn.gov; tbiladeau@cdatribe-nsn.gov; cassandra_hagemann@nps.gov; katherine.cheney@noaa.gov; Rudy.Peone@bia.gov; Zelinsky,Benjamin D (BPA) - E-4; justin.yeager@noaa.gov; Kock, Tobias J; Kavanagh,Maureen A (BPA) - EWP-4; Foster,Marchelle M (BPA) - DI-7; justin.yeager@noaa.gov

Cc: Liz Mack; Hoefer, Scott E; Blades, Jarod J; Waste, Stephen M

Subject: [EXTERNAL] Studies and Actions Working Team - P2IP Schedule

Importance: Normal

Attachments: Phase 2 Schedule_9Aug2021.pdf

Studies and Actions Team,

At tomorrow's meeting the UCUT's will be presenting an overview of the Phase 2 Implementation Plan (P2IP). To do so we'll be walking through the attached Gantt chart. This is a modified version from the one presented in the P2IP. We share this ahead of time so folks can view it individually as it is also being shared onscreen.

Thanks,

Conor Giorgi

P2IP Schedule and Cost Estimates

(in millions of dollars)

Phase 2 Reintroduction Activities	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
	Step 1 (Years 1 - 6)						Step 2.1 (Years 7 - 9)			Step 2.2 (Years 10 - 12)			Step 2.3 (Years 13 - 15)			Step 2.4 (Years 16 - 21)					
Downstream Behavior and Survival (yr)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Acoustic Tags Survival and Behavior Chinook	Juvenile Chinook Acoustic Study									Repeat Chinook										Repeat Chinook	
Acoustic Tags Survival and Behavior Sockeye		Juvenile Sockeye Acoustic Study								Repeat Sockeye										Repeat Sockeye	
Juvenile PIT Releases (Chinook)(tag + labor)	Juvenile Chinook PIT Releases																				
Juvenile PIT Releases (Sockeye)(tag + labor)		Juvenile Sockeye PIT Releases																			
Upstream Passage Studies (yr)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Chief Joseph Hatchery Ladder				CJD Up Passage Behavior																	
Grand Coulee (Sanpoil, Transboundary)				GCD Up Passage Behavior																	
Spokane River				SPO Up Passage Behavior																	
Interim Upstream/Downstream Design/Build (yr)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Agency Preparation to Develop Interim Facilities (permitting)	NEPA, ESA (HGMP), FERC, and other processes and permitting																				
Adult Trap and Haul - Trucks	Develop CJD Adult Trap-and-Haul																				
Operation	CJD Trap-and-Haul Operations																				
Chief Joseph Dam Upstream Passage- Design/Build					CJD Up Pass																
Operation							CJD Up Pass Operations														
Grand Coulee Downstream Passage - Design/Build							Develop GCD Down Pass														
Operation										GCD Down Pass Operations											
Grand Coulee Upstream Passage - Design/Build										Develop GCD Up Pass											
Operation													GCD Down Pass Operations								
Spokane River Dam Upstream Passage - Design/Build													Develop SPO Up Passage								
Operation																SPO Up Passage Operations					
Chief Joseph Dam Downstream Passage - Design/Build																Develop CJD Down Passage					
Operation																		CJD Down Passage Operations			
Spokane River Dam Downstream Passage - Design/Build																			Devel SPO Down Pass		
Operation																					SPO Dwn
Interim Downstream Facilities Testing (yr)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Grand Coulee																					
Fish Collection Efficiency and Behavior - Chinook										GCD Pass Test											
Fish Collection Efficiency and Behavior - Sockeye										GCD Pass Test											
Chief Joseph																					
Fish Collection Efficiency and Behavior - Chinook																			CJD Pass Test		
Fish Collection Efficiency and Behavior - Sockeye																			CJD Pass Test		
Spokane River																					
Fish Collection Efficiency and Behavior - Chinook																				SPO Pass Test	
Interim Upstream Passage Facilities Testing (yr)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Chief Joseph Dam							CJD Up Pass Test														
Grand Coulee													GCD Pass Test								
Spokane River																SPO Passage Test					
RM&E - Spawning, AR/S, PBT, Reproductive Succes	Annual RM&E																				
Interim Hatchery Facilities (yr)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Review Exisiting Facilities for Program Use																					
Expand Interim Early Rearing Facilities and Net Pens	Interim Production Development																				
Operate Interim Hatchery Facilities	Interim Production Facility Operations																				
Develop Conceptual Designs for Phase 3 Hatchery Facilities																	Phase 3 Production Planning				

= Infrastructure Design and Build
= Research and Infrastructure Evaluation
= Operation and Maintenance of Infrastructure
= Federal Authorities to be Addressed
= Contingency Year to Allow Flexibility

From: Zelinsky,Benjamin D (BPA) - E-4

Sent: Mon Aug 02 13:41:39 2021

To: Welch,Dorothy W (BPA) - E-4; Ball,Crystal A (BPA) - EW-4; Jule,Kristen R (BPA) - EWP-4; Sweet,Jason C (BPA) - PGB-5; Key,Philip S (BPA) - LN-7; Kavanagh,Maureen A (BPA) - EWP-4; Johnston,Kenneth H (BPA) - DIT-7; Cogswell,Peter (BPA) - DI-7; Foster,Marchelle M (BPA) - DI-7

Cc: Miles,Tucker (BPA) - LN-7; Armentrout,Scott G (BPA) - E-4

Subject: No Surprises Outreach From CCT

Importance: Normal

Attachments: memo_rearing ENFH juveniles at CJH for blocked area studies 072021.pdf

Chuck Brushwood and Joe Peone reached out to me today to provide a no surprises heads up (Dorie was out). FWS Service has 150,000 surplus eyed Summer Chinook eggs that they are planning to transfer to the Spokane, Coeur d'Alene, and Colville tribes to be reared and then reintroduced above Grand Coulee. The Colvilles wanted to provide us a no surprises heads up and give us a chance to share any concerns. They are requesting our feedback by this Friday. FWS also gave us a heads up at the CRS deputy meeting for the record.

On the surface, this all appears consistent with our position of not opposing where there is no federal or Bonneville nexus. However, they did highlight that they would need to rear the eyed eggs at Chief Joe Hatchery but then went to on to clarify that no Bonneville funds would be used, that they currently have adequate unused rearing space, and that they would only re-use water to ensure they aren't impacting other hatchery priorities and commitments. See the attached memo for additional details.

Please let Dorie and me know if you see any issues that would lead Bonneville to oppose and elevate by this Thursday so we can respond to them by Friday if possible.

Thanks,

Benjamin Zelinsky

Bonneville Power Administration

905 NE 11th Ave – E-4

Portland, OR 97232

503.230.4737 (office)

(b)(6) (cell)

bdzelinsky@bpa.gov

From: Zelinsky,Benjamin D (BPA) - E-4

Sent: Mon Aug 09 09:52:26 2021

To: Joe Peone (FNW); Welch,Dorothy W (BPA) - E-4; Charles Brushwood (FNW); Cummings,Adam H (CONTR) - EW-4

Subject: RE: No surprises coordination call - initial outreach

Importance: Normal

Just talked to Joe about next steps. Given the nature of our concern, he thinks Brian Gruber should be there too which makes sense. Also sounds like Chuck is out much of this week, so Joe is thinking early next week – maybe Monday makes the most sense. Adam – can you work with Joe to schedule that?

Thanks

Also – I'll officially hand the baton to Dorie now just wanted to wrap up the phone tag I was playing with Joe first.

Ben

From: Joe Peone (FNW) <Joe.Peone.FNW@colvilletribes.com>
Sent: Monday, August 9, 2021 8:51 AM
To: Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Charles Brushwood (FNW) <Charles.Brushwood@colvilletribes.com>

Cc: Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>
Subject: [EXTERNAL] RE: No surprises coordination call - initial outreach

Ben

Chuck is on vacation.

U am in all day if you want to discuss (b)(6)

From: Zelinsky,Benjamin D (BPA) - E-4 [mailto:bdzelinsky@bpa.gov]
Sent: Friday, August 6, 2021 11:34 AM
To: Charles Brushwood (FNW); Joe Peone (FNW)
Cc: Welch,Dorothy W (BPA) - E-4; Cummings,Adam H (CONTR) - EW-4
Subject: RE: No surprises coordination call - initial outreach

You guys have time for a quick call this afternoon? I have some preliminary thoughts from Bonneville to share with you.

-----Original Appointment-----
From: Charles Brushwood (FNW) <Charles.Brushwood@colvilletribes.com>
Sent: Monday, August 2, 2021 10:50 AM
To: Charles Brushwood (FNW); Zelinsky,Benjamin D (BPA) - E-4; Cummings,Adam H (CONTR) - EW-4; Joe Peone (FNW)
Subject: No surprises coordination call - initial outreach

When: Monday, August 2, 2021 1:00 PM-1:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Conference line: (888) 721-8686 pin: 9471406#

No surprises coordination call with Ben Z., Joe P., and Chuck B.

Call-in number: (888) 721-8686

Pin: 9471406#

From: Zelinsky,Benjamin D (BPA) - E-4

Sent: Mon Aug 02 13:45:26 2021

To: Charles Brushwood (FNW); Welch,Dorothy W (BPA) - E-4

Cc: Joe Peone (FNW); Casey Baldwin (FNW)

Subject: RE: No surprises coordination follow-up

Importance: Normal

Thanks Chuck.

Memo received and shared with key personnel at Bonneville. I will coordinate with folks over here with a goal of responding by this Friday. Thanks again for the no surprises outreach.

Ben

From: Charles Brushwood (FNW) <Charles.Brushwood@colvilletribes.com>
Sent: Monday, August 2, 2021 1:33 PM
To: Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>
Cc: Joe Peone (FNW) <Joe.Peone.FNW@colvilletribes.com>; Casey Baldwin (FNW) <Casey.Baldwin@colvilletribes.com>
Subject: [EXTERNAL] No surprises coordination follow-up

Hi Ben,

Thanks again for taking the time to chat with Joe and me regarding the proposed action described in the attached memo. Once you and others at Bonneville have had a chance to review the memo and confer internally, please let us know if you have any questions or concerns or if you would like to discuss this matter further.

Best,

Charles (Chuck) Brushwood

Fish & Wildlife Policy Analyst

Colville Confederated Tribes

Office: (509) 422-7749

Cell: (b)(6)

Fax: (509) 422-7443

From: Zelinsky,Benjamin D (BPA) - E-4

Sent: Fri Sep 10 10:20:25 2021

To: Laura Robinson

Cc: Conor Giorgi - Spokane Tribe of Indians (conor.giorgi@SpokaneTribe.com); 'casey.baldwin@colvilletribes.com'; tbiladeau@cdatribe-nsn.gov; Renner,Marcella P (BPA) - E-4

Subject: RE: P2IP presentation and comment period

Importance: Normal

Attachments: image003.jpg; image004.jpg

Thanks Laura – talk to you all then

From: Laura Robinson <laura@ucut-nsn.org>
Sent: Friday, September 10, 2021 9:25 AM
To: Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Cc: Conor Giorgi - Spokane Tribe of Indians (conor.giorgi@SpokaneTribe.com) <conor.giorgi@SpokaneTribe.com>; 'casey.baldwin@colvilletribes.com' <casey.baldwin@colvilletribes.com>; tbiladeau@cdatribe-nsn.gov; Renner,Marcella P (BPA) - E-4 <mprenner@bpa.gov>
Subject: [EXTERNAL] RE: P2IP presentation and comment period

Thanks all, for your patience while I was on leave. You should now see an invite in your inbox for the 22nd.

Ben, we're looking forward to the discussion. Casey, wish you could join us but we'll fill you in when you're back from vacation.

Thanks,

Laura

Laura Robinson

Policy Analyst

Upper Columbia United Tribes

25 W. Main, Suite 434

Spokane, WA 99201

Office 509-209-2411

Cell (b)(6)

Fax 509-209-2421

laura@ucut-nsn.org

www.ucut.org

From: Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Sent: Thursday, September 2, 2021 8:58 AM
To: Laura Robinson <laura@ucut-nsn.org>
Cc: Conor Giorgi - Spokane Tribe of Indians (conor.giorgi@SpokaneTribe.com) <conor.giorgi@SpokaneTribe.com>; 'casey.baldwin@colvilletribes.com' <casey.baldwin@colvilletribes.com>; tbiladeau@cdatribe-nsn.gov; Renner,Marcella P (BPA) - E-4 <mprenner@bpa.gov>
Subject: RE: P2IP presentation and comment period

Laura,

Thanks for reaching out. I appreciate the offer and would gladly take you up on it. Any chance the afternoon of the 22nd would work between 1 and 3? Otherwise we can loop Marcella in and she can help us find another time in the range you laid out.

My apologies for missing the plenary. I had a mandatory conflict.

Ben

From: Laura Robinson <laura@ucut-nsn.org>
Sent: Wednesday, September 1, 2021 4:10 PM

To: Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>
Cc: Conor Giorgi - Spokane Tribe of Indians (conor.giorgi@SpokaneTribe.com) <conor.giorgi@SpokaneTribe.com>; 'casey.baldwin@colvilletribes.com' <casey.baldwin@colvilletribes.com>; tbiladeau@cdatribe-nsn.gov
Subject: [EXTERNAL] P2IP presentation and comment period

Hi Ben,

The P2IP authors and I want to check in with you since you were unable to join for the last BAAFWG plenary meeting. While the P2IP was discussed at the S&A workgroup, the P2IP authors went into greater detail of the document in their presentation to the plenary group plus we discussed the comment period process that we've set up. Since you're BPA's point person for the BAAFWG, we want to extend an invitation to meet with you to discuss the P2IP, give you an update on the progress made so far in the comment period, and address any questions you may have. Is that something that you would be interested in? If so, let us know if any dates/times work in the weeks of the 13th, 20th, and 27th and we can get something set up.

Thanks Ben,

Laura

Laura Robinson

Policy Analyst

Upper Columbia United Tribes

25 W. Main, Suite 434

Spokane, WA 99201

Office 509-209-2411

Cell (b)(6)

Fax 509-209-2421

laura@ucut-nsn.org

www.ucut.org

The Confederated Tribes of the Colville Reservation
Colville Business Council
P.O. Box 150, Nespelem, WA 99155
(509) 634-2200
FAX: (509) 634-4116

February 26, 2020

Lorri Gray, Regional Director
Pacific Northwest Regional Office
U.S. Bureau of Reclamation
1150 North Curtis Road, Suite 100
Boise, Idaho 83706-1234

Elliot Mainzer, Administrator
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Brigadier General D. Peter Helmlinger,
Commander
Northwestern Division
U.S. Army Corps of Engineers
P.O. Box 2870
Portland, OR 97208-2870

Barry Thom, Regional Administrator
West Coast Regional Office
NOAA Fisheries
1201 Northeast Lloyd
Portland, OR 97232

Re: Upper Columbia River fish passage and reintroduction

Dear Ms. Gray, Brigadier Gen. Helmlinger, Mr. Mainzer and Mr. Thom:

The importance of salmon to the Confederated Tribes of the Colville Reservation (Tribes) cannot be overstated. Salmon fisheries play a central role in the lives of the Tribes, form a key part of our culture, history and identity, and provide tremendous economic benefits to our people. For these reasons, the Tribes have consistently requested that the co-lead agencies include fish passage and reintroduction above Chief Joseph and Grand Coulee Dams as part of the CRSO EIS preferred alternative or, at minimum, as a mitigation measure. I write to you today to reiterate the utmost priority of that request. Both the National Congress of American Indians and the Affiliated Tribes of Northwest Indians strongly support the Tribes' position and have formally memorialized their endorsement for implementation of fish passage and reintroduction at Chief Joseph and Grand Coulee Dams in two Resolutions, attached.

The Tribes appreciate the opportunity to participate as a cooperating agency in the CRSO EIS process. However, during the entirety of the process the Tribes have urged inclusion of fish passage and reintroduction in the CRSO EIS in order to restore a truly critical aspect of the Tribes' culture that the CRS obliterated – and throughout our request has been disregarded. The Tribes are profoundly disappointed and concerned by the co-lead agencies' failure to meaningfully consider our most essential interest as a cooperating agency.

An important objective of the CRSO EIS is to "allow[] innovative solutions to be considered" in order to "finally be able to break through the bureaucratic logjam that maintains the status quo" with respect to salmon and federal dams in the Columbia River

Basin. *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 184 F. Supp. 3d 861, 947 (D. Or. 2016). The clearest and best way to achieve the court's vision of the CRSO EIS as an avenue for systematic change in the upper Columbia River is to include the phased approach to anadromous fish passage and reintroduction at Chief Joseph and Grand Coulee Dams as an element of the preferred action alternative. In lieu of that, the co-lead agencies should at least thoroughly assess and consider fish passage and reintroduction as a mitigation measure for the decades-long loss of salmon in the upper Columbia. Doing so is an important step toward achieving the "innovative solutions" and "new approach" envisioned by the court when it ordered preparation of the EIS.

By failing to seriously study fish passage and reintroduction in the upper Columbia River as part of the preferred alternative or as a mitigation measure, the co-lead agencies are neglecting a key mitigation measure for a substantial portion of the mainstem Columbia River that is and will continue to be adversely affected by the CRS. In so doing, the co-lead agencies are favoring mitigation of some affected areas over others, which constituted a legally inadequate mitigation discussion in *League of Wilderness Defenders-Blue Mountains Biodiversity Project v. Forsgren*, 309 F.3d 1181, 1191 (9th Cir. 2002). A reviewing court might well reject a CRSO EIS if the co-lead agencies fail to study and implement feasible fish passage operations, relying on the belief that mitigation measures elsewhere in the watershed will "'compensate'" for unmitigated continuing harm to the upper Columbia from the blockage of currently-extirpated anadromous fish runs and the. *Neighbors of Cuddy Mt. v. U.S. Forest Serv.*, 137 F.3d 1372, 1381 (9th Cir. 1998).

To be clear, the Tribes are not asking for immediate implementation of fish passage and reintroduction. Rather, we ask that the agencies commit to studying fish passage and reintroduction in the upper Columbia River by reviewing existing analyses and independently evaluating the effectiveness of the phased approach set out in the Northwest Power and Conservation Council's 2014 Columbia River Basin Fish and Wildlife Program.

The Tribes are not alone in calling for restoration of anadromous salmon to currently blocked habitat in the Columbia River above Chief Joseph and Grand Coulee Dams. Together with the National Congress of American Indians and the Affiliated Tribes of Northwest Indians, we urge the co-lead agencies to analyze reintroducing anadromous salmon to the upper Columbia blocked area as part of the CRSO EIS and to fully commit to investigating all options for passing adult salmon above the dams. We support the phased approach set out in the Northwest Power and Conservation Council's 2014 Columbia River Basin Fish and Wildlife Program, and strongly encourage you to undertake an independent evaluation of that approach as part of the CRSO EIS preferred alternative or, at a minimum, as a mitigation measure. We have been advised that fish passage and introduction should be in a domestic process, the CRSO EIS is the correct process and yet the Tribes' stance has been consistently disregarded.

We thank you for your genuine consideration of this matter and welcome any questions you or your staff may have as you engage in a meaningful analysis of fish

passage and reintroduction at Chief Joseph and Grand Coulee Dams as a crucial part of the CRSO EIS. Please contact Neeka Somday, CTCR Legislative Assistant/Policy Analyst, at (509) 634-2213 at your earliest convenience to schedule a government to government meeting with the Colville Business Council to discuss this important matter.

Sincerely,

R Cawston

Rodney Cawston, Chairman
Colville Business Council

From: Miles,Tucker (BPA) - LN-7

Sent: Wed Sep 09 10:28:28 2020

To: 'Brian Gruber'; Anna Brady

Cc: Jeremiah Williamson; Leanne Holm (Leanne.V.Holm2@usace.army.mil); Key,Philip S (BPA) - LN-7

Subject: Accord amendment draft

Importance: Normal

Attachments: 2020.08.14_Draft Amendment to the 2018 Accord Extension_clean_CTCR edits (8.25.20)_fed edits (2020.09.08).docx

Hi Brian and Anna,

In the attached Accord amendment draft, I have accepted the majority of CTCR's proposed changes and also added several edits and comments on behalf of the agencies. Once you've had a chance to review, if there's a need for further discussion, perhaps we could schedule a call among the lawyers to try to resolve any remaining issues. Please let us know what works for you. Thanks,

Tucker

** **
Tucker Miles
Attorney-Adviser | Office of General Counsel
Bonneville Power Administration
bpa.gov | P 503-230-5968

Amendment to the Columbia Basin Fish Accord Agreement
among
Confederated Tribes of the Colville Reservation ("Colville Tribes")
and
Bonneville Power Administration ("Bonneville"),
U.S. Army Corps of Engineers ("Corps"), and Bureau of Reclamation ("Reclamation")

RECITALS

Whereas, the Colville Tribes is a sovereign nation comprised of 12 constituent tribes – Chelan, Chief Joseph Band of Nez Perce, Colville, Entiat, Lakes, Methow, Moses-Columbia, Nespelem, Okanogan, Palus, San Poil, and Wenatchi – which have inhabited, stewarded, and relied for physical, cultural and spiritual subsistence on the Columbia River and its tributaries since time immemorial;

Whereas, the Colville Tribes, Bonneville, Corps, and Reclamation are parties to the 2008 Columbia Basin Fish Accords Memorandum of Agreement (2008 Accord), including the Accord Extension signed in 2018 (collectively, together with this Amendment, "**the Accord**"), and the Accord Extension includes fish and wildlife mitigation project budgets spanning four federal fiscal years – 2019 through 2022;

Whereas, the Accord Extension term provision states: "[T]his Extension will be in force until the earlier of when the Action Agencies issue their final decisions on the [Columbia River System Operations (CRSO) Environmental Impact Statement (EIS)] and any associated consultation under the ESA for the Columbia River System, or September 30, 2022";

Whereas, in response to an October 19, 2018 presidential memorandum, the Action Agencies revised the schedule for the CRSO EIS and associated biological opinions to complete them by September 2020, one year earlier than originally planned;

Whereas, the Parties share an interest in pursuing prompt negotiation of a potential new long-term agreement ("**successor agreement**") to succeed and replace the Accord and to preserve and advance the mutual benefits of the Accord relationship that the Parties have cultivated over more than a decade;

Whereas, the Parties acknowledge that pending matters relating to Columbia River System operation, management, and mitigation, and the substance of final agency decisions for the CRSO EIS and associated ESA consultations in particular, are material to the Parties' consideration of and willingness to enter into a potential successor agreement;

Whereas, the pendency of such matters makes it impractical for the Parties to consider and discuss all information germane to the substance of a potential successor agreement on a timeframe that would allow the Parties to complete negotiation and execution of such agreement prior Sep. 30, 2020; and

Whereas, the Parties believe that maintaining continuity and stability in the Accord relationship as they pursue a successor agreement will promote more effective and productive negotiation;

***Now, therefore, the Parties agree as follows*:**

Except as expressly stated in this Amendment, all terms of the 2018 Accord Extension, including but not limited to any remaining operative provisions of the 2008 Accord, fish and wildlife project portfolios, planned budgets, and off ramps, remain in effect.

A. AMENDMENTS

1. The term provision of the 2018 Accord Extension, section IV.C.2, is amended as follows:

   Unless otherwise decided by a Party pursuant to this Section IV, *as amended*, this Extension will be in force until the earlier of ~~when the Action Agencies issue their final decisions on the CRSO EIS and any associated consultation under the ESA for the Columbia River System, or~~ September 30, 2022 *or such time that the Parties enter into a successor agreement replacing this Accord Extension.*

2. The Parties understand that upon issuance of the Action Agencies' Record of Decision (CRSO ROD), operation of the Columbia River System will be as provided in the CRSO ROD and in accordance with associated biological opinions. Therefore, Attachment C of the 2018 Accord Extension, that covered Columbia River System Operations, is superseded and stricken.
3. For the past 13 years, the Parties have agreed on the adequacy of the Action Agencies' compliance with relevant laws as to the Columbia River System. The Action Agencies assert that their actions continue to comply with their legal responsibilities under the Endangered Species Act (ESA), Northwest Power Act (NWPA), Clean Water Act (CWA), and National Environmental Policy Act (NEPA). Nonetheless, for the remaining term of the 2018 Accord Extension, as amended by Amendment Section A.1, above, the Action Agencies agree that the Colville Tribes is not obligated to affirm the adequacy of the Action Agencies' compliance with such laws under section IV.B of the Accord Extension.
4. The Parties desire to negotiate and execute a successor agreement that includes the Colville Tribes' affirmation of adequacy, ongoing forbearance, the Action Agencies' continuing funding of the Colville Tribes' fish and wildlife mitigation projects, and the

Action Agencies' commitment to certain Columbia River System operations, maintenance, configuration, and mitigation. The Parties intend to work collaboratively and expeditiously towards those shared goals. Therefore, during the Parties' good-faith negotiation of such successor agreement, the Colville Tribes will forbear from initiating, joining in, or supporting litigation against any Action Agency, NOAA, and USFWS under the NWPA, ESA, NEPA, CWA, or Administrative Procedure Act regarding the Columbia River System; *provided*, that the Parties agree that any action pertaining to the exercise or enforcement of the Colville Tribes' regulatory authority, including under the CWA, is not encompassed by the foregoing forbearance commitment.

5. Notwithstanding Section A.4, above, the Parties agree to the addition of the following off-ramp to the Accord, amending section IV.D of the Accord Extension:

> In the event that the Colville Tribes finds it necessary to initiate, join in, or support litigation precluded by Amendment Section A.4, above, to preserve its interests with respect to the legal adequacy of Columbia River System operations, maintenance, configuration, and mitigation, the Colville Tribes shall first withdraw from the Accord prior to initiating, joining in, or supporting such litigation. The Parties agree that the Colville Tribes may effect withdrawal for this purpose by: (1) providing written notice to the Action Agencies of its intent to withdraw; and (2) making reasonable efforts for the Parties to meet and confer within 15 days of such notice. If the Parties are not able to resolve their differences in this timeframe and do not extend such time for withdrawal, the Colville Tribes' withdrawal from the Accord shall be effective immediately.

All other applicable off-ramps under the Accord Extension remain available to the Parties.

6. By agreeing to this Amendment, no party waives its right to assert any claims, arguments, or defenses in the future.
7. Each party reserves the right to pursue legislation to address concerns related to Columbia River System operation, maintenance, configuration, mitigation or infrastructure funding, and other related matters.

B. NEGOTIATION OF SUCCESSOR AGREEMENT

1. The Parties share a mutual goal of expeditiously pursuing a potential long-term successor agreement. Accordingly, the Parties agree to: (1) promptly commence negotiation of a successor agreement following execution of this Amendment; (2) meet monthly or more frequently thereafter to continue negotiations; and (3) establish a goal of reaching an agreement in principle by June 30, 2021.

2.

a. The Action Agencies have an interest in developing a successor agreement that preserves and promotes collaborative relationships with the Colville Tribes and that includes commitments sufficient to support the Colville Tribes' (1) affirmation of adequacy as to the federal legal compliance with respect to Columbia River System operation, maintenance, configuration and mitigation, and (2) forbearance from initiating or joining in suits or regulatory actions challenging such compliance.

b. The Action Agencies acknowledge that the Colville Tribes' willingness to enter into a successor agreement, including affirmation of adequacy and forbearance provisions, is predicated on numerous considerations, such as review of the CRSO Final Environmental Impact Statement, associated biological opinions, and Record of Decision, as well as agreement with the Action Agencies on successor agreement terms that reasonably account for certain Colville Tribes priorities and objectives, including, but not limited to:

    i. the Colville Tribes' use of Chief Joseph Hatchery fish in the blocked area;

    ii. the Action Agencies' funding of the Colville Tribes' studies related to anadromous fish management in the blocked areas, including the phased approach described in the Northwest Power and Conservation Council's 2014 Columbia River Basin Fish and Wildlife Program;

    iii. the Action Agencies' planning and funding of the ferry ramp extension of the Inchelium-Gifford ferry as a mitigation measure of the CRSO EIS; and

    iv. the Action Agencies' funding of the resident fish mitigation measure regarding reservoir elevation changes at Lake Roosevelt.

The Parties understand that the matters enumerated in this subsection, B.2, are beyond the scope of this Amendment, but the Parties agree to good-faith discussion of these matters in their pursuit and negotiation of a successor agreement.

C. EFFECTIVE DATE OF AMENDMENT

This Amendment will take effect once all parties have signed below.

D. SIGNATURES

Colville Confederated Tribes
Fish and Wildlife Department
PO Box 150
Nespelem, WA 99155
Phone: (509) 643-2110 / Fax: (509) 643-2126

April 28, 2020

Scott G. Armentrout
Executive Vice President, Environment, Fish & Wildlife
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Re: Fish Accord Discussion on the Use of Chief Joseph Hatchery Fish in the Blocked Area Above Chief Joseph and Grand Coulee Dams

Dear Mr. Armentrout,

I am writing to follow up on our discussion during the October 2, 2019, meeting and tour at Chief Joseph Hatchery regarding the use of Chief Joseph Hatchery fish in the blocked area of the upper Columbia River above Chief Joseph and Grand Coulee Dams. This issue was discussed extensively in 2018 during negotiation of the extension of the Fish Accord between the Confederated Tribes of the Colville Reservation (CTCR or Colville), Bonneville Power Administration (BPA), and our other Accord partners. In the 2018 Fish Accord Extension and in a letter exchange dated November 13, 2018, Colville and BPA committed to discuss in good faith potential ways of moving forward on this important issue. I appreciate the conversation that we and our respective staffs had about the use of Chief Joseph Hatchery (CJH) fish during the tour last fall, and wish to build on that in the spirit of our productive and positive Accord partnership.

At the October 2, 2019, meeting you and Crystal Ball expressed a desire to focus on CTCR's specific objectives for using CJH fish in the blocked area as well as options to address the legal concerns that BPA raised in 2018, particularly the language in the 2007 authorizing legislation. We agree that sharing information about Colville's proposed use of CJH fish in the blocked area will provide essential context and help us both concentrate on the practical issues and benefits of using CJH fish above the dams.

My staff has developed an initial summary of scenarios for using fish produced at CJH in the blocked area over the next 10 to 15 years. All of Colville's proposed releases above the dams have the potential to contribute to Chinook production below Chief Joseph Dam, a central purpose of CJH. The proposed uses include releases of returning adult fish for cultural and educational purposes as well as to achieve additional in-river production, thereby increasing the number of fish returning to our area. As I mentioned during the CJH tour, trapping live fish, hauling them as little as 2 miles, and releasing them in the blocked area is a superior option to trucking carcasses 32 miles and paying for them to be disposed of in a landfill. Moreover, it is something we can do right away to begin supplementing production below the dam.

We also propose to use juvenile CJH fish for the salmon in the classroom program, which serves both educational and cultural purposes in local schools. In addition to releasing fish produced at Colville's hatchery to meet cultural and subsistence needs of the Colville people, we intend to continue pursuing the phased investigation of fish passage and reintroduction in the blocked area. In Phase 1 of that process, CJH fish were identified as the top-ranked donor stock for reintroduction, and we seek to use both returning adults and juveniles from CJH to advance our effort to explore the feasibility of and obtain information necessary to achieving Colville's objective of restoring salmon above the dams. In the attached 'Scenarios Memo,' we provide additional information on these uses of CJH adults and juveniles in the blocked area, including an estimate of the number of fish necessary for each use and the source of those fish from the CJH program. We have reviewed the Scenarios Memo with the Colville Business Council, which endorsed it as a strong foundation for discussion of a coordinated and productive way forward.

I would like to arrange a meeting as soon as possible with you, your staff and attorneys to address any questions BPA may have about Colville's proposed use of CJH fish in the blocked area as outlined in the Scenarios Memo. Our legal team will also be prepared to discuss potential options for addressing the legal concerns BPA has raised. Please contact our Accord POC, Chuck Brushwood, at (509) 422-7749 or Charles.Brushwood@colvilletribes.com to make arrangements for an initial meeting.

Thank you in advance for your consideration of this important issue. Colville appreciates the pragmatism you and your staff have brought to the issue, and we look forward to productive discussions in the near future as we continue to build on the partnership BPA and Colville have developed over more than a decade under the Fish Accord.

Sincerely yours,

Randy Friedlander
Director, Fish & Wildlife Program
Confederated Tribes of the Colville Reservation

Cc (by email): Crystal Ball
John Skidmore
Dorie Welch
Maureen Kavanagh
Philip Key
Tucker Miles
Adam Cummings

enclosure

Colville Confederated Tribes
Fish and Wildlife Department
PO Box 150
Nespelem, WA 99155
Phone: (509) 643-2110 / Fax: (509) 643-2126

Memorandum

Authors: Randy Friedlander, Casey Baldwin, and Kirk Truscott
Date: April 27, 2020
Re: Scenarios for the use of Chief Joseph Hatchery fish in the blocked area above Chief Joseph and Grand Coulee Dams

Background:
The Fish and Wildlife Department of the Confederated Tribes of the Colville Reservation (CTCR) developed several scenarios that highlight some of the needs and rationale for CTCR's use of Chief Joseph Hatchery (CJH) fish in the blocked area above Chief Joseph Dam (CJD) and Grand Coulee Dam (GCD). This 'Scenarios Memo' is intended to provide context for discussions between CTCR and BPA pursuant to the 2018 Fish Accord Extension.

Rationale for using CJH fish as the donor stock:
There are several reasons why it is logical, efficient, cost effective, and scientifically sound to use CJH fish for the reintroduction of salmon to the blocked area. First, CJH summer/fall Chinook were the highest ranked donor stock for that species in the Donor Stock and Risk Assessment Report (Hardiman et al. 2017) that was part of the Phase 1 Report prepared by the Upper Columbia United Tribes (UCUT 2019). The high rank for CJH fish was due to several factors including abundance/availability as well as genetic integrity and life history characteristics that are likely to make them successful in the blocked area. Of particular importance to CTCR is that CJH fish pose the least risk to the nearest downstream population of summer/fall Chinook in the Okanogan River if/when experimental releases result in fallback below Chief Joseph Dam or successful reproduction that results in returning adult salmon. Second, given the geographic proximity of the Okanogan River and CJH to Chief Joseph Dam and the blocked area, it will be highly efficient to access them and less expensive to trap and haul them. In addition, it will largely eliminate the challenge of avoiding them in certain collection efforts. Finally, the CJH production is under CTCR's control, and is not subject to management by other regional sovereigns through the *U.S. v Oregon* fish management agreement. This allows CTCR to have more flexibility and control over management actions.

Outline of scenarios for the proposed use of CJH fish in the blocked area:
The time frame for these scenarios varies. Some components would be implemented immediately, *i.e.*, as soon as fish are available, while others require additional planning, funding, regulatory review, and coordination. At this time, we think that implementation of all scenarios listed below could be accomplished over a 10-15 year period and may require additional time as adaptive management and other processes inform our efforts.

1) **Returning adults (dozens to several thousand).** Generally, the adult CJH fish used in the blocked area would be surplus fish that are not needed for broodstock and harvest.
   a) **Additional 'in-river' production.** Rather than hauling late-collected surplus hatchery fish to a landfill, they would be released upstream of CJD or GCD to spawn and produce fish that contribute offspring to

fisheries downstream of CJD. These fish would also meet ecological objectives (nutrient enhancement, feeding animals) and could be caught by anglers.

b) **Cultural releases.** Returning adult salmon would be released upstream of CJD and GCD for tribal ceremonies, captive fisheries, or at-large (non-captive) fisheries.

c) **Studies.** CTCR or other entities would tag, release above CJD and GCD, and monitor returning adult salmon to evaluate effectiveness of translocating adults as a management action or other research needs.

d) **Brood collection (pass through brood for other programs).** The CJH ladder would be used to collect brood for other programs to generate and rear juveniles for use in the blocked area.

e) **Testing interim passage facilities.** Testing of interim passage facilities in the tailrace of CJD would encounter CJH fish, as well as natural-origin fish and hatchery fish from other facilities.

2) **Juvenile production (hundreds to 250 thousand).**

a) **Short-term survival and behavior studies (*i.e.*, acoustic tagging).** Generally small sample size (<5,000). The source would be segregated yearling or subyearling summer Chinook.

b) **Salmon in the classroom.** Generally small sample size (<5,000). The source would be segregated yearling or subyearling summer Chinook.

c) **Long-term survival and behavior studies (*i.e.*, PIT tagging).** Generally large sample size (10,000–250,000). These fish would be used to answer uncertainties regarding smolt outmigration through the hydrosystem, smolt-to-adult survival (SAR), behavior of adult returns that were released in the blocked area, and other issues that may arise in the course of developing and implementing fish passage and reintroduction studies. If fish needed for these studies come from the existing production at CJH, they would be from the segregated subyearling portion of the program. See the notes under 'additional information' below for more details.

Additional information:

1) Every juvenile and adult released into the blocked area has the potential to contribute to additional Chinook production downstream of Chief Joseph Dam. If successful, the blocked area reintroduction effort will lead to considerably more fish.

2) Generally, the hatchery production that supports fish passage and reintroduction would be in-addition-to the mitigation obligations in areas downstream of Chief Joseph Dam. However, given current constraints on CJH due to water supply, space, and water temperature, CJH does not have the ability to generate additional smolts to support the reintroduction effort. Additionally, recognizing that it will take time to obtain all the logistical, funding, and regulatory review pieces necessary to implement new or additional production, CTCR is willing to use a portion of the CJH program's current production in the blocked area for planning purposes.

3) Utilizing segregated summer Chinook from CJH means that there will be no demographic effect to natural-origin spawners in the Okanogan.

4) Utilizing subyearling Chinook minimizes the effects on future fisheries for CTCR or other downstream fisheries because subyearlings convert to adult returns at a lower rate than yearlings.

a) Additionally, we expect that all/most of the subyearlings released in the blocked area work would be reared to the yearling stage within the blocked area, thereby increasing their survival. We are currently

investigating the feasibility of and opportunities for rearing subyearlings to the yearling stage in existing hatchery facilities in the blocked area, including one or more of the resident rainbow trout net pen sites.

5) It is important to note that the current CJH program is permitted to release up to 10% (90,000 segregated summer Chinook) beyond the full production goal. We will be working with co-managers and NOAA to understand and implement the regulatory requirements for obtaining flexibility in the release sites for existing programs (CJH and others) depending on whether the releases are:
   a) Part of the full production goals of existing programs; or
   b) Within the +10% provided for in existing programs; or
   c) In addition to existing programs (>+10% of full production goals).

6) At this time the exact number of adults or smolts that might be needed or wanted for the various uses of CJH fish in the blocked areas is not known. UCUT and others are developing an implementation plan for Phase 2 of the Fish and Wildlife Program's fish passage and reintroduction measure, but we anticipate that it will evolve and be adaptively managed through time. Therefore, the specific numbers of fish needed for use in the blocked area is expected to be developed over time, and the numbers presented in this memo should be considered estimates only. In preparing this Scenarios Memo, we also considered the following:
   a) The translocation of adult salmon through trap and haul methods will always be limited in scope due to the availability of surplus fish (run size + trapping efficiency) and the low volume capacity of trap and haul methodology.
   b) CTCR Fish & Wildlife's current recommendation is that no more than 250,000 eggs or parr from the subyearling program be used for reintroduction, which represents <9% of the overall CJH program.
   c) If the CJH program does not have a subyearling component in a given year due to broodstock, production or other shortfalls, fish from the yearling program could be used in the blocked area (<5,000).

References:

Hardiman 2017. Hardiman, J.M., Breyta, R.B., Haskell, C.A., Ostberg, C.O., Hatten, J.R., and Connolly, P.J., 2017, Risk assessment for the reintroduction of anadromous salmonids upstream of Chief Joseph and Grand Coulee Dams, northeastern Washington: U.S. Geological Survey Open-File Report 2017–1113, 87 p., https://doi.org/10.3133/ofr20171113.

UCUT 2019. Fish Passage and Reintroduction Phase 1 Report: Investigations Upstream of Chief Joseph and Grand Coulee Dams. https://ucut.org/habitat/fish-passage-and-reintroduction-phase-1-report/

D2019-12

COLVILLE CONFEDERATED TRIBES

Nespelem, Washington

TO: **COLVILLE BUSINESS COUNCIL** DATE:

COMMITTEE: Law & Justice and Natural Resources Committees

SUBJECT: Directive to send comment letter

INITIATED BY: Charissa Eichman PROGRAM: ORA

DIRECTIVE: Whereas, it is the directive of the Law and Justice and Natural Resources Committees that the attached letter be sent to Scott Armentrout at BPA. Chair designated to sign letter.

COMMITTEE MEMBERS	VOTE CAST (YES)	(NO)	COMMITTEE MEMBERS	VOTE CAST (YES)	(NO)
	X				
Elizabeth A. Allen	X				
Norma Sanchez	X				
Joseph B. Lumley	X				
Andrew Joseph Jr.	+				
Jack Ferguson	X				
Richard Moses	X				

Signed: _____
Committee Chairperson

Date Enacted: February 20th 2019

The Confederated Tribes of the Colville Reservation
P.O. Box 150, Nespelem, WA 99155
(509) 634-2200
FAX: (509) 634-4116

February 20, 2019

Scott G. Armentrout
Executive Vice President
Environment Fish and Wildlife
Bonneville Power Administration
P.O. Box 3621
Portland, OR 97208-3621

Re: BPA's comments on recommendations for the Fish and Wildlife Program

Dear Mr. Armentrout,

I am writing to convey the Confederated Tribes of the Colville Reservation's (CTCR) disappointment and concern regarding comments BPA submitted on February 8 to the Northwest Power and Conservation Council on various recommendations for amendments to the Columbia River Basin Fish and Wildlife Program (Program). CTCR's concerns relate to two topics addressed in BPA's comments – 1) Grand Coulee Dam Fall Operations (page 3 and Attachment A); and 2) Fish Passage and Reintroduction (Cover letter and Comments at page 1) – and the manner in which BPA carried out (or fell short of carrying out) its obligations under the no surprises provision of the 2018 Accord Extension.

As to Grand Coulee Fall Operations, *i.e.*, the issue of amending the Program to move the September 30 deadline for refilling Lake Roosevelt to 1283 feet to the end of October, CTCR was surprised to see the same recommendation that BPA had declined to submit to the Council after discussing it with CTCR in early December repackaged as a "comment" on recommendations submitted by the Spokane Tribe. Indeed, the memorandum submitted as Attachment A did not change in substance between the December draft discussed with CTCR and the February "comment." Even though the title of the attachment was modified slightly – from the December version of "Memorandum Supporting a Recommendation to Amendment (sic) the Council's Fish and wildlife Program…" to the February version of "Memorandum Regarding Recommendations on Grand Coulee/Lake Roosevelt Fall Operations" – the identical concluding statement in the latter document makes it clear that BPA's objective is to eliminate the September 30 refill deadline from the Program notwithstanding its communication to CTCR two months earlier that it would not be making a specific request to the Council for this change in Grand Coulee operations. *See* Attachment A a 2 ("Bonneville recommends the 2019 Program include provisions supporting an experiment to operate with greater flexibility to manage the Lake Roosevelt to a minimum elevation of 1283 feet by the end of October rather than September 30.")

As BPA is well aware, Grand Coulee operations significantly impact CTCR and the Colville Reservation, and have been discussed regularly throughout our decade-long Accord

partnership. The apparent about-face on a recommendation regarding such operations is troubling from several perspectives. First, CTCR has significant questions and concerns about the merits of the proposed change in Fall operations. Second, the eleventh-hour notice of this change provided CTCR with essentially no time to submit its views to the Council as a fish and wildlife manager during the comment period. In terms of the no surprises commitment, which at its core aims to further good faith implementation of the 2008 Fish Accord and the 2018 Extension, this experience has failed to live up to CTCR's expectations. Following the discussion and withdrawal by BPA of the recommendation in December, CTCR was not anticipating the same proposal would be submitted as a comment to another fish and wildlife manager's recommendation. The text of the "comment," which was described as a "comment that Bonneville developed in response to the Spokane Tribe's Council Program recommendation," was not provided to CTCR until the evening before it was submitted to the Council, too little time to coordinate a response and request for further discussion with BPA.[1] As a result of BPA's submission, CTCR intends to draft a comment on the issue of Grand Coulee Dam Fall operations. At the appropriate time, we will share it with BPA and the other Accord partners before submitting it to the Council.

CTCR is also concerned that BPA did not include a comment on the issue of fish passage and reintroduction above Grand Coulee and Chief Joseph dams when it shared the text of other comments it was contemplating. *See* Comments at 1-2. This comment includes a proposal that consideration of the fish passage issue be shifted from the Council's Program to a new regional forum. CTCR views this proposal as a substantive comment on the Program amendment process which should have been raised in a timely manner with CTCR given that just a few months ago, "the Parties agree[d] that all aspects and stages of this issue require the greatest sensitivity and adherence to the no surprises protocol under the Extension and the 2008 Agreement." 2018 Accord Extension Section III.H.4.a.

Please contact Randy Friedlander, Director of the Colville Fish and Wildlife Program, at (509) 634-2113 or randall.friedlander@colvilletribes.com if you have any questions about the issues raised in this letter.

Sincerely yours,

Rodney Cawston, Chairman
Colville Business Council

[1] It is unclear to CTCR how BPA's approach to this recommendation is consistent with the commitment in the "High Priority Actions" section of the 2018 Accord Extension that the parties will "Coordinat[e] and submit[] complementary recommendations for amendments to the Columbia Basin Fish and Wildlife Program." Section III.A.4.

Cc: Lorri Gray, Pacific Northwest Regional Director, Bureau of Reclamation
Brigadier General D. Peter Helmlinger, Division Commander, Northwestern Division, U.S. Army Corps of Engineers
Elliot Mainzer, Administrator, Bonneville Power Administration

From: Cummings,Adam H (CONTR) - EW-4

Sent: Tue Jul 20 14:00:29 2021

To: Welch,Dorothy W (BPA) - E-4; Ball,Crystal A (BPA) - EW-4; Lofy,Peter T (BPA) - EWU-4; Connor,Joseph W (BPA) - EWU-4; Read,Christine L (BPA) - EWB-4; Key,Philip S (BPA) - LN-7; Miles,Tucker (BPA) - LN-7; Foster,Marchelle M (BPA) - DI-7; Zelinsky,Benjamin D (BPA) - E-4; Tim Dykstra (Corps); Leanne Holm (Corps); Scott Hoefer (BOR); Jeremiah Williamson (BOR); Jarod Blades (BOR); Lisa Lance (BOR); Cody Desautel (CTCR); Neeka Somday (CBC); Chuck Brushwood (CTCR); Joe Peone (CTCR); Jeannette Finley (CTCR); Amelia Marchand (ENV); Brian Gruber (CTCR); Beth Baldwin (CTCR); Charissa Eichman (CTCR); Anna Brady (CTCR)

Cc: Cummings,Adam H (CONTR) - EW-4

Subject: Colville / AA Long-term Successor Agreement discussion 6/28 - takeaways/slides

Importance: Normal

Attachments: Colville-AA Team Membership Slides 2021,0628 update.pptx; image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image006.jpg; Colville-AA LTSA Meeting 2021,0628 - temperature slides.pptx

All,

Here are the takeaways and attachments from our 6/28 meeting. Several of these takeaways are underway and a few still need work.

Takeaways:

- · Confirm LTSA meeting for late July
- · Schedule LTSA meetings for Aug/Sept
- · BOR schedule conversation re: flows / Salmon Creek
- · Confirm Wildlife Ops Loss small-team meeting in July
- · Confirm next steps on CHJ legislation topic
- · Share UCUT Phase 2 info when available

· Schedule conversation for FMBA forum / Accord swimlanes
· Schedule agreement drafting conversation

Regards,

Adam

--
Adam Cummings
(ContR) Actalent
Project Manager | Fish and Wildlife / EW-4
Bonneville Power Administration
bpa.gov | P 503-230-7631 | C (b)(6)

From: Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>
Sent: Monday, June 28, 2021 2:42 PM
To: Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; Ball,Crystal A (BPA) - EW-4 <caball@bpa.gov>; Lofy,Peter T (BPA) - EWU-4 <ptlofy@bpa.gov>; Connor,Joseph W (BPA) - EWU-4 <jwconnor@bpa.gov>; Read,Christine L (BPA) - EWB-4 <clread@bpa.gov>; Key,Philip S (BPA) - LN-7 <pskey@bpa.gov>; Miles,Tucker (BPA) - LN-7 <btmiles@bpa.gov>; Foster,Marchelle M (BPA) - DI-7 <mmfoster@bpa.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Tim Dykstra (Corps) <Timothy.A.Dykstra@usace.army.mil>; Leanne Holm (Corps) <Leanne.V.Holm2@usace.army.mil>; Scott Hoefer (BOR) <shoefer@usbr.gov>; Jeremiah Williamson (BOR) <jeremiah.williamson@sol.doi.gov>; Jarod Blades (BOR) <jblades@usbr.gov>; Lisa Lance (BOR) <lisa.lance@sol.doi.gov>; Cody Desautel (CTCR) <cody.desautel@colvilletribes.com>; Neeka Somday (CBC) <Neeka.Somday@colvilletribes.com>; Chuck Brushwood (CTCR) <Charles.Brushwood@colvilletribes.com>; Joe Peone (CTCR) <joe.peone.fnw@colvilletribes.com>; Jeannette Finley (CTCR) <jeannette.finley@colvilletribes.com>; Amelia Marchand (ENV) <Amelia.Marchand@colvilletribes.com>; Brian Gruber (CTCR) <bgruber@ziontzchestnut.com>; Beth Baldwin (CTCR) <bbaldwin@ziontzchestnut.com>; Charissa Eichman (CTCR) <Charissa.eichman.ora@colvilletribes.com>; Anna Brady (CTCR) <abrady@ziontzchestnut.com>; James,Eve A L (BPA) - PG-5 <eajames@bpa.gov>; Sullivan,Leah S (BPA) - EWP-4 <lssullivan@bpa.gov>; Bettin,Scott W (BPA) - EWP-4 <swbettin@bpa.gov>
Cc: Tabitha Parr (CBC) <Tabitha.Parr.CBC@colvilletribes.com>; Richard Swan, Sr. (CBC) <Richard.SwanSr.CBC@colvilletribes.com>; Deanna James (CBC) <Deanna.James.CBC@colvilletribes.com>; Derek Palmanteer (CBC) <Derek.Palmanteer.CBC@colvilletribes.com>; Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>
Subject: Colville / AA Long-term Successor Agreement discussion 6/28 @ 3pm PT

Greetings,

Please see the proposed agenda below for today’s meeting.

INVITEES:

- BPA: Dorie Welch, Ben Zelinsky, Peter Lofy, Joe Connor, Philip Key, Tucker Miles, Marcy Foster, Chris Read, Adam Cummings (CONTR), Eve James, Leah Sullivan, Scott Bettin
- Corps: Tim Dykstra, Leanne Holm
- BOR: Scott Hoefer, Jeremiah Williamson, Lisa Lance, Jarod Blades
- Colville: Colville Business Council, Cody Desautel, Joe Peone, Jeannette Finley, Chuck Brushwood, Amelia Marchand, Charissa Eichman, Brian Gruber, Beth Baldwin, Anna Brady

AGENDA:

1. Introductions as needed / agenda review
2. Hydro system updates
3. Long-term successor agreement negotiation – small team report-outs (reference slides)
4. Meeting planning
    a. Tentative: aim for 7/29 10am or 11am for next LTSA meeting
5. Next steps

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Colville / Action Agency

Long-term Successor Agreement Discussion

26 June 2021

AA / Colville Negotiation Teams

- LTSA Negotiation Team
- Fish Management Blocked Areas
- F&W Projects
- Wildlife Ops Loss
- Agreement Structure / Draft

AA / Colville LTSA Negotiation Team

Entity / Group	Names
Colville	Chuck Brushwood, Joe Peone, Jeannette Finley, Cody Desautel, Amelia Marchand Legal: Brian Gruber, Anna Brady, Beth Baldwin, Charissa Eichman Council: Rodney Cawston, Jarred Erickson, others
Bonneville	Scott Armentrout, Dorie Welch, Crystal Ball, Peter Lofy, Joe Connor, Philip Key or Tucker Miles, Marcy Foster, Chris Read, Adam Cummings (CONTR)
Corps	Tim Dykstra, Leanne Holm
Bureau of Reclamation	Scott Hoefer, Lisa Lance, Jeremiah Williamson, Jarod Blade

Timeline:

- Met 1/28 (kickoff), 3/10, 5/24
- Meeting 6/28
- Working toward regular monthly cadence – tentative 7/29 for next meeting

Fish & Wildlife Projects Team(s)

Entity / Group	Names (OTHERS AS NEEDED)
Colville	Chuck Brushwood, Joe Peone, Jeannette Finley
Bonneville	Crystal Ball, Peter Lofy, Joe Connor, Adam Cummings, Chris Read, Marcy Foster or Corey Carmack
Corps	Tim Dykstra, Leanne Holm, Lori Morris (Seattle Div)
Bureau of Reclamation	Scott Hoefer, Lisa Lance, Jeremiah Williamson

Timeline:

- BPA: Kickoff 4/28; next discussion planned for 7/27 in tandem with quarterly
- Corps: 7/1 Chief Joe Hatchery tour
- BOR: Meeting(s) re: Salmon Creek / flow projects

Fish Management Blocked Areas / CHJ Fish Team

Entity / Group	Names
Colville	Chuck Brushwood, Joe Peone **To be confirmed**
Bonneville	Dorie Welch, Crystal Ball, Ben Zelinsky, Philip Key or Tucker Miles, Marcy Foster, Adam Cummings
Corps	Tim Dykstra, Leanne Holm
Bureau of Reclamation	Scott Hoefer, Lisa Lance, Jeremiah Williamson, Jarod Blade

Timeline:

- Upper Columbia Blocked Areas Anadromous Fish Working Group Meeting on 5/26
- Chief Joe Legislation Discussion with Peter Cogswell, Sonya Baskerville, and Ken Johnston on 5/26

Wildlife Mitigation Operational Losses / Impact Team

Entity / Group	Names
Colville	Cody Desautel, Joe Peone, Jeannette Finley, Rich Whitney, Kelly Singer, Chuck Brushwood, Brian Gruber, Beth Baldwin
Bonneville	Dorie Welch, Crystal Ball, Dave Kaplowe, Hannah Dondy-Kaplan, Philip Key or Tucker Miles, Marcy Foster, Adam Cummings
Corps	None at this time
Bureau of Reclamation	Scott Hoefer, Lisa Lance or Jeremiah Williamson

Timeline:

- To meet July 15 or 22, TBD

Agreement Structure / Draft Team

Entity / Group	Names
Colville	Brian Gruber, Beth Baldwin, Anna Brady, Charissa Eichman
Bonneville	Philip Key or Tucker Miles, Adam Cummings (for support as needed)
Corps	Leanne Holm
Bureau of Reclamation	Lisa Lance or Jeremiah Williamson

Timeline:

- Emails exchanged 5/10 & 5/11

Questions / Additional Discussion

From: Cummings,Adam H (CONTR) - EW-4

Sent: Mon Oct 07 17:24:19 2019

To: Miles,Tucker (BPA) - LN-7; Key,Philip S (BPA) - LN-7; Ball,Crystal A (BPA) - EW-4; Cogswell,Peter (BPA) - DI-7

Cc: Welch,Dorothy W (BPA) - E-4; George,Rodrigo (BPA) - EWP-4

Subject: Draft CTCR Comment letter re: 2020 NPCC F&W Program Draft Addendum - no surprises coordination

Importance: High

Attachments: Colville comment letter re draft addendum (10.7.19 draft).doc; image001.jpg; image002.jpg; image003.jpg; image004.jpg; image005.jpg; image006.jpg

I replied to Chuck and let him know we’d be sending ours in the AM.

--
Adam Cummings
(ContR) Aerotek
Project Manager | Fish and Wildlife / EW-4
Bonneville Power Administration
bpa.gov | P 503-230-7631 | C (b)(6)

From: Charles Brushwood (FNW) <Charles.Brushwood@colvilletribes.com>
Sent: Monday, October 7, 2019 11:55 AM
To: Welch,Dorothy W (BPA) - E-4 <dwwelch@bpa.gov>; Lesa Stark (lstark@usbr.gov) <lstark@usbr.gov>; Dykstra, Timothy A CIV USARMY CENWD (US) (Timothy.A.Dykstra@usace.army.mil) <Timothy.A.Dykstra@usace.army.mil>
Cc: Cummings,Adam H (CONTR) - EW-4 <ahcummings@bpa.gov>; Zelinsky,Benjamin D (BPA) - E-4 <bdzelinsky@bpa.gov>; Randall Friedlander (FNW) <Randall.Friedlander@colvilletribes.com>; Brian Gruber (bgruber@ziontzchestnut.com) <bgruber@ziontzchestnut.com>
Subject: [EXTERNAL] Draft CTCR Comment letter re: 2020 NPCC F&W Program Draft Addendum - no surprises coordination
Importance: High

Good morning all,

Please see the attached CTCR draft comment letter relating to the Northwest Power and Conservation Council’s public review draft 2020 F&W Program Addendum. Please let me know if you have any questions or concerns about this draft comment letter; otherwise please distribute it to appropriate staff on your end in advance of our no surprises coordination check-in call scheduled for 10:00 – 11:30 tomorrow morning.

Thank you,

Charles (Chuck) Brushwood
Fish & Wildlife Policy Analyst
Colville Confederated Tribes
Office: (509) 422-7749
Cell: (b)(6)
Fax: (509) 422-7443

The Confederated Tribes of the Colville Reservation
P.O. Box 150, Nespelem, WA 99155
(509) 634-2200
FAX: (509) 634-4116

October 18, 2019

Jennifer Anders
Chair
Northwest Power and Conservation Council
851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204
PublicComments@nwcouncil.org

By First Class Mail and Email

The Confederated Tribes of the Colville Reservation (Colville or CTCR) appreciates the opportunity to comment on the Draft 2020 Addendum to the 2014 Columbia River Basin Fish and Wildlife Program (Doc. No. 2019-6). We did not provide extensive recommendations (or comments on other recommendations) this year; however, we continue to closely follow the Northwest Power and Conservation Council's (NPCC) Program amendment process and the ongoing implementation of the 2014 Program by Bonneville Power Administration, the Army Corps of Engineers and the Bureau of Reclamation, including through implementation of Colville projects funded by our 2018 Columbia Basin Fish Accord Extension. Given the important regional processes currently underway and the extensive Program already in place, we support the NPCC's incremental approach to this round of Program amendments. With the Columbia River System Operations (CRSO) EIS process more than half-way through its four-year timeline, ongoing negotiations between the United States and Canada regarding the future of the Columbia River Treaty, and a short-term biological opinion for the Federal Columbia River Power System (FCRPS) all overlapping with the Program amendment window, preparing an addendum that complements and supplements the Program, while the 2014 Program remains in effect, is appropriately pragmatic and cognizant of these other processes and the new scientific information, analysis, and public participation involved.

Strategy Performance Indicators

A unique aspect of the draft addendum is the inclusion of a set of strategy performance indicators that "can be used to assess progress in implementing the program strategies and improve the ecological and population conditions of the focal species." Draft Addendum at 8. In general, CTCR views the indicators as useful guides and benchmarks for assessing progress of the overall effort to protect, mitigate and enhance under the Program the effects of the hydrosystem on the Basin's fish and wildlife. However, because the indicators are not intended "to be formally part of the addendum," clarity on how they will be used relative to the requirements of the Northwest Power Act, including implementation of Program measures, would assist fish and wildlife managers and the agencies going forward. Colville notes that

some of the indicators are adopted from regional processes, such as the MAFAC Columbia Basin Partnership Task Force, and as such, have already been thoroughly vetted by sovereigns and stakeholders in the region. Moreover, Colville supports the NPCC's commitment to "continue working with the state and federal fish and wildlife agencies, the region's Indian tribes, and others to refine the program's objectives and strategy performance indicators." Draft Addendum at 8. Colville intends to be part of this process especially with respect to indicators and objectives relevant to the Upper Columbia River (UCR) .

Northern Pike Suppression/Predator Management

Colville's recommendations emphasized that the "invasive predator northern pike *(Esox lucius)* poses a serious and direct threat to native salmonid populations throughout the entire Columbia River Basin" and recommended that the Program be amended to reflect four pillars of the regional effort to address this existential threat to native fish in the Basin – detection, education, prevention and control, and regulatory change. CTCR's December 13, 2018, Response to Requests for Recommendations at 2. We also noted that the high priority Colville and the federal agencies placed on this issue was reflected in the commitment of over $350,000 of baseline funding over four years for northern pike suppression in our 2018 Accord Extension. In addition, Colville has used carryover funds under the Accord to increase funding to near $400,000 for FY20 alone.

Colville notes that Part II of the draft addendum emphasizes predator management in general, and northern pike suppression in particular, as aspects of the 2014 Program that should be near-term priorities for implementation and funding. Draft Addendum at 35, 39. Colville appreciates the focus placed on this issue in the addendum – consistent with the importance reflected in the Colville Accord Extension and Colville's decision to put additional funds toward this work – and is committed to continuing to work with the Spokane Tribe, Washington Department of Fish and Wildlife (WDFW), and others on this critically important issue, including through implementation of the Accord Extension.

Colville also supports the emphasis placed on addressing pinniped and avian predation under existing legislation and management plans, as these species continue to have significant adverse effects on UCR salmon and steelhead. *See* Draft Addendum at 23, 39-40. In particular, UCR steelhead, which migrate through the foraging range of 14 different bird colonies, suffer significant losses due to Caspian tern and other avian predation, which research from 2008 through 2019 indicates "consume more smolts during that migration period than all other mortality sources combined."[1] It is vital that the region continue to actively manage this "dominant mortality factor" and other fish predators to protect the investments made in recovering salmonid populations.

Fish Passage in the Upper Columbia River

As the NPCC is aware, CTCR has been uniquely and severely affected by Grand Coulee and Chief Joseph dams, which were constructed on the Colville Reservation, inundated large

[1] *See* https://www.nwcouncil.org/news/bird-predation-salmon-and-steelhead-has-been-reduced-over-time-now-there-new-problem-birds, last accessed Oct. 7, 2019.

portions of our land, and cut off most of the Reservation from the salmon which sustained our people nutritionally, culturally, and spiritually. Thus, it should be no surprise that Colville places a high priority on work toward achieving passage and reintroduction of salmon above Chief Joseph and Grand Coulee dams. When the NPCC proposed in 2014 to include a phased investigation of fish passage and reintroduction in the blocked area of the UCR in the draft Program amendments as a more detailed articulation of a long-standing Program measure, Colville supported that amendment. *See* July 17, 2014, Comment Letter on Draft 2014 Program at 1. As we noted in our recommendations for the current amendment process, "CTCR supports full implementation of the Council's 2014 Program." This includes the measure of a three-phase feasibility study of passage and reintroduction, though we have acknowledged that Bonneville does not view it as a legally binding measure under the requirements of the Northwest Power Act. *See* 2018 Colville Fish Accord Extension at 22 n.11.

Since our comments supporting fish passage and reintroduction as a detailed measure in the 2014 Program, Colville has undertaken, in conjunction with the Spokane Tribe and other entities, several efforts to advance this goal. We have collaborated on studies under Phase 1 of Program's fish passage and reintroduction measure, contributed to a Phase 1 Report, and have jointly hosted a site visit by members of the Independent Science Advisory Board as part of their review of the Phase 1 Report. Colville continues to advocate for fish passage to be included as an alternative in the CRSO EIS process and as an integral part of ecosystem-based function in a modernized Columbia River Treaty consistent with the 2013 Regional Recommendation. Colville has also participated in the MAFAC Columbia Basin Partnership Task Force, including in the development of fish production goals in the UCR, which appear to be the basis for some of the strategy performance indicators identified in the addendum. *See* Draft Addendum at 13-14.

Most recently, in August of this year Colville released adult Chinook salmon obtained from Douglas PUD's Wells Hatchery into Lake Rufus Woods and Lake Roosevelt, marking the first time anadromous salmonids have been present in these waters since the 1950s and 1930s, respectively. These cultural and educational releases conducted under the Tribes' own authorities and using funding unrelated to the 2018 Accord Extension, was a seminal moment in Colville's effort to restore salmon to parts of its reservation that have been deprived of this life-sustaining resource for generations. It also represented an important step for improving the ecological health and economy of the UCR as a whole. We are committed to continuing this effort and achieving full life-cycle fish passage of anadromous salmon in these areas.

CTCR appreciates that the NPCC's draft addendum calls out this measure as a near-term priority, asking "Bonneville and others [to c]ontinue to make progress on the program's phased approach to evaluate the possibility of reintroducing anadromous fish above Grand Coulee and Chief Joseph dams." Draft Addendum at 37; *see also* Draft Addendum at 25 (Objective C7 – "Complete the analysis required for the phased approach to investigating the reintroduction of anadromous fish above Chief Joseph and Grand Coulee dams including juvenile and adult passage at the dams"). The addendum merely reiterates the need for implementation of an existing Program measure – one which "received substantial support in the amendment process from many governmental and non-governmental entities" – and we support it. Although CTCR made no recommendations specific to the issue of fish passage and reintroduction, we intend to

remain engaged and contribute to this vital effort consistent with the high priority that the Colville Business Council and the Colville Fish & Wildlife Program have placed on it.

Mitigation in Blocked Areas

Colville has long advocated for more equitable mitigation of the hydrosystem's impacts in the UCR. As the Colville Fish Accord Extension states: "Approaching fish and wildlife mitigation efforts fairly in the UCR Basin was an important goal of the 2008 Agreement, and the partnership between the Colville Tribes and the Action Agencies in the past decade achieved meaningful progress toward this objective." 2018 Accord Extension at 9. We appreciate the NPCC's recognition that the part of the Basin above Grand Coulee and Chief Joseph dams "has suffered the loss of anadromous fish and other fish and wildlife species directly due to hydropower development at a scale at least comparable to and in most cases greater than, other areas in the basin." Draft Addendum at 36. Further, we agree with its assessment that historically "[t]hese losses have been severely under-addressed and under-mitigated through the Northwest Power Act, especially when compared with other areas and other entities in the basin." Colville has been deeply engaged in correcting this historic injustice and under-mitigation of the hydrosystem's impacts in the UCR, including through our work with Bonneville and other Accord partners since 2008.

Colville appreciates the draft addendum's emphasis on mitigation in the UCR. However, since our participation in the amendment process has been limited and we did not make a specific recommendation on this issue, we leave it to the NPCC and the fish and wildlife managers of the UCR, working with Bonneville, the Corps and Reclamation as appropriate, to implement this near-term priority consistent with the requirements of the Northwest Power Act. Colville stands ready to work with the Spokane Tribe and WDFW as a co-equal fish and wildlife managers in the region, as well as Bonneville, whether through consultation as the draft addendum suggests, or any other viable coordination mechanism that respects CTCR's sovereignty and priorities for its reservation, the Colville people and the UCR as a whole.

Other Comments

- Page 10, Biological Objective S1 & page 14 (Wild Fish Strategy Indicators). It is confusing to reference "delisting values" for non-ESA populations. Although footnote 7 (page 44) explains why values for a non-listed species such as UCR fall Chinook were used, there is no information on how the values were determined. It may be preferable simply to reference the low, medium and high goals in the MAFAC report and as a default establish the next higher goal as the target for the biological objective.

- Page 11 (dam passage survival indicators). The dam passage survival rates are for passage at the concrete only. Is it possible to include (or establish separately) quantifiable juvenile performance standards the reservoir environment as well? This would potentially allow fish and wildlife managers and the agencies to address survival concerns specific to the reservoirs such as temperature and predation. With respect to adult survival, it is unclear why a different, lower standard applies to UCR steelhead (84.5%) relative to Snake River steelhead and UCR spring Chinook (90.1%). This should be explained.

• Page 14 (Wild Fish Strategy Indicators). Consistent with our comment above, we suggest the following revision to the last sentence before the table:

The program recognizes the provisional medium and high escapement abundances developed through the collaborative regional effort but, for ESA listed stocks, near-term focus will be on contributing to the following low natural-origin spawner escapement target:14 (S1-3). For unlisted stocks that are already exceeding the low goal, the focus will be on achieving medium and high targets.

• Pages 11-14. The strategy performance indicators were developed in the MAFAC Columbia Basin Partnership Take Force process with fish passage and reintroduction upstream of Chief Joseph and Grand Coulee dams. These goals cannot be met without access to that habitat or hatchery production for those areas. We recommend that this be explained as important context for the indicators.

• The final bullet point in Part II under the heading "How the Program is Implemented" provides as follows:

> **Plan future implementation of the Fish and Wildlife Program.** The Council will work with the state and federal fish and wildlife agencies and tribes to consider initiating a process to plan future implementation of the fish and wildlife program.

More details on this item would be helpful so wildlife agencies, tribes and others can fully understand what the NPCC is proposing.

Sincerely,

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Rodney Cawston
Chairman, Colville Business Council
Confederated Tribes of the Colville Reservation