Federal Support for the Phase 2 Implementation Plan Testing Feasibility of Salmon Reintroduction in the Upper Columbia River Basin

Programmatic Environmental Assessment

Public DRAFT

Co-lead Agencies:
Bureau of Reclamation – Columbia-Pacific Northwest Region (CPN-EA-2024-02)
U.S. Army Corps of Engineers – Northwestern Division (PEAX-202-00-G7P-1728386878)
Bonneville Power Administration (DOE/EA-2250)

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Acronyms and Abbreviations

Acronym or Abbreviation	Full Phrase
Ah	amp-hour
AR/S	adults returning per spawner
BA	biological assessment
BiOp	biological opinion
BMP	best management practice
Bonneville	Bonneville Power Administration
°C	degrees Celsius
CAA	Clean Air Act
C.F.R.	Code of Federal Regulations
CDAT	Coeur d'Alene Tribe
CEQ	Council on Environmental Quality
CJH	Chief Joseph Hatchery
CMIP	Coupled Model Intercomparison Project
CO_2e	carbon dioxide equivalent
CRM	Cultural Resources Management
CRS	Columbia River System
CTCR	Confederated Tribes of the Colville Reservation
CWA	Clean Water Act
CWT	coded wire tag
DOI	U.S. Department of the Interior
EA	Environmental assessment
ECA	Environmental compliance adequacy
Ecology	Washington State Department of Ecology
EIS	environmental impact statement
EPA	United States Environmental Protection Agency
EPM	Environmental Protection Measure
ESA	Endangered Species Act
FCRPS	Federal Columbia River Power System
FEIS	Final environmental impact statement
FERC	Federal Energy Regulatory Commission
FR	Fishery Resources
FRM	Flood Risk Management
GCM	Global Climate Model
GCPO	Grand Coulee Power Office
GHG	greenhouse gas
GHz	gigahertz

Acronym or Abbreviation	Full Phrase
HS	Health and Safety
IS	Invasive Species
ISAB	Independent Scientific Advisory Board
ITA	Indian Trust Asset
JSATS	juvenile salmon acoustic telemetry system
kV	kilovolt
LCM	life cycle model
MOU	memorandum of understanding
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Action
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPCC	Northwest Power and Conservation Council
NPDES	National Pollutant Discharge Elimination System
NTIA	National Telecommunications and Information Administration
NRHP	National Register of Historic Places
PBT	parentage-based tagging
PCBs	polychlorinated biphenyls
PEA	programmatic environmental assessment
PIT	passive integrated transponder
PM_{10}	particulate matter less than 10 micrometers in diameter
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PNNL	Pacific Northwest National laboratory
PRPA	Paleontological Resources Preservation Act
RAS	Recirculating Aquaculture System
Reclamation	Bureau of Reclamation
RMJOC	River Management Joint Operating Committee
ROD	Record of Decision
RR	Recreation Resources
RRJ	Rocky Reach Juvenile Bypass
SAR	smolt-to-adult return rate
SHPO	State Historic Preservation Officer

Acronym or Abbreviation	Full Phrase
STOI	Spokane Tribe of Indians
SWPPP	stormwater pollution prevention plan
TMDL	total maximum daily load
U.S.	United States
US	Utility Services
U.S.C.	United States Code
UCSP	Upper Columbia Salmon Passage
UCUT	Upper Columbia United Tribes
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
VR	Visual Resources
VW	Vegetation and Wetlands
WDFW	Washington Department of Fish and Wildlife
WHR	Washington Heritage Register
WQ	Water Quality

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Chapter 1. Introduction

The Bureau of Reclamation (Reclamation), Bonneville Power Administration (Bonneville), and United States (U.S.) Army Corps of Engineers (USACE), collectively the "Co-lead Agencies," prepared this Programmatic Environmental Assessment (PEA), consistent with the purpose and processes of the National Environmental Policy Act (NEPA; 42 U.S. Code [U.S.C.] 4321 *et seq.*) and pursuant to the Council on Environmental Quality's (CEQ) implementing regulations at 40 Code of Federal Regulations (CFR.) Parts 1500–1508. This draft PEA has also been prepared in a manner consistent with each agency's specific NEPA regulations, longstanding federal judicial precedents and regulatory interpretations.

This PEA describes and analyzes federal actions to support the Phase 2 Implementation Plan (P2IP): Testing Feasibility of Reintroducing Salmon in the Upper Columbia River Basin (P2IP)[1] proposal brought forward by the Confederated Tribes of the Colville Reservation (CTCR), Spokane Tribe of Indians (STOI), and Coeur d'Alene Tribe (CDAT), through and with the assistance of the Upper Columbia United Tribes (UCUT), collectively the "Project Proponents." The three types of federal actions supported by this PEA include federal funding required for P2IP activities, permitting requirements and actions, and supplying eggs and juvenile and adult salmon from existing hatcheries and non-hatchery collection actions. The P2IP includes three categories of activities:

- Juvenile and adult salmon research studies;[2]
- Development of fish holding, rearing, and acclimation facilities;
- Development and testing of interim upstream and downstream fish passage facilities.

This PEA describes the purpose and need for both the site-specific and programmatic activities, identifies activities that may require future environmental compliance processes, and informs the decisions that the Co-lead Agencies may make based on the P2IP proposal and available information.

The Project Proponents are currently implementing P2IP components that are approved or permitted by the appropriate agency or agencies. These ongoing activities are expected to continue

[1] Available at https://ucut.org/wp-content/uploads/2022/08/UCUT-Phase-2-Implementation-Plan-Version-4Aug2022.pdf.

[2] References to salmon in descriptions of P2IP activities that are funded under the September 20, 2023, Memorandum of Understanding & Mediated Settlement Agreement are limited to salmon that are neither Federally listed under Endangered Species Act (ESA) as threatened or endangered nor a Proposed Species for listing under the ESA, whether or not specifically stated.

under the existing environmental compliance unless changes are identified in this document. Ongoing activities include:

- Acquiring, collecting, and transporting non federally protected Chinook and sockeye salmon eggs, juveniles, and adults from existing hatcheries and fish collection sites and facilities to support juvenile and adult research studies;
- Rearing Chinook and sockeye salmon at existing hatcheries, net pens, and acclimation sites;
- Releasing tagged juvenile and adult Chinook and sockeye salmon;
- Operating and maintaining previously installed P2IP telemetry equipment and acoustic receivers; and
- Monitoring released Chinook and sockeye salmon.

1.1 Background

Before nonindigenous settlement, millions of salmon returned to the Columbia River Basin, sustaining Tribal communities for thousands of years and serving a vital role in a healthy ecosystem. The construction of Chief Joseph and Grand Coulee dams on the Upper Columbia River, and Little Falls, Long Lake, and Nine Mile dams on the Spokane River, halted anadromous salmon passage, creating a "blocked area." These dams severely restricted or eliminated Tribal access to salmon, and thus traditional and cultural practices related to salmon, and continue to do so. In 2013, a coalition of Columbia Basin Tribes and Canadian Indigenous Nations jointly developed a phased approach to guide salmon reintroduction efforts and develop fish passage facilities in the Upper Columbia River Basin (CBTFN 2015). A similar phased approach was formally adopted by the Northwest Power and Conservation Council (NPCC) and included as a priority in the 2014 amendments and 2020 addendum to the Columbia River Basin Fish and Wildlife Program (NPCC 2014, 2020).

In May 2019, the Project Proponents completed the Fish Passage and Reintroduction Phase 1 Report: Investigations Upstream of Chief Joseph and Grand Coulee dams (UCUT 2019). The report confirmed the achievability of Tribal goals to restore Chinook and sockeye salmon into the Upper Columbia River Basin blocked area to meet native peoples' cultural and spiritual values and increase ceremonial, subsistence, sport, and commercial fish harvest opportunities for all communities along the Columbia River in the United States and Canada where possible. The Project Proponents considered these goals in relation to the current dam operations, existing riverine and reservoir habitat conditions, donor stock availability, risks to resident fish species, and the effectiveness of available fish passage technologies. Results of modeled management scenarios from Phase 1 estimated that reintroduction of salmon to the blocked area could result in the production of approximately 76,000 adult sockeye salmon and 44,000 adult summer/fall Chinook salmon annually, given the current habitat conditions, available stocks of fish, and construction of effective fish passage systems at existing dams (UCUT 2019).

The NPCC's Independent Scientific Advisory Board (ISAB) reviewed the Phase 1 report following publication. The ISAB found it reasonable that the reintroduction of salmon to the blocked area

could be successful but noted considerable uncertainty around dam passage and reservoir survival, the resulting number of adult salmon that would return, and the type of management required to sustain them. ISAB recommended developing a strategic implementation plan with an adaptive management process to address uncertainties (ISAB 2019).

The P2IP describes the research needed to resolve uncertainties identified in the Phase 1 report and noted by ISAB and to develop and test strategies to guide the long-term reintroduction planning. The P2IP identifies a stepwise approach to monitoring and evaluation that provides for adjustments to the research approaches over the next 20 years, as follows:

- Step 1 focuses on collecting baseline information and developing support programs and facilities.
- Step 2 focuses on the incremental design, building, and testing of interim fish passage facilities at five individual dams in the study area: the Chief Joseph Dam (USACE), Grand Coulee Dam (Reclamation), and the three Spokane River dams operated by Avista Corporation (UCUT 2022).

The P2IP is intended to inform the development of the Project Proponents' long-term plan for reintroducing salmon in the Upper Columbia River Basin that would ultimately serve the following goals:

- Restore Tribal traditional and cultural practices related to salmon in the region.
- Restore access to salmon for Tribal and non-Tribal communities in the blocked area.
- Return salmon to their historic habitats in the Upper Columbia River to increase the abundance and distribution of salmon in the Columbia River Basin.
- Restore ecosystem function in blocked area habitats as it relates to the cycling of marine-derived nutrients that anadromous salmon provide.

1.2 Purpose and Need

The Co-lead Agencies developed this PEA to evaluate the prospective environmental effects of federal actions associated with the P2IP, in accordance with applicable laws, regulations, and authorities. Reclamation is a U.S. Department of the Interior agency that oversees water resource management and power generation related to the operation of diversion, delivery, and storage projects throughout the western United States. Reclamation's actions are governed by the Reclamation Act of 1902; the 1939 Reclamation Project Act (43 U.S.C. § 485 *et seq.*); individual project authorizing statutes, particularly those for Grand Coulee Dam; and other statutes. Bonneville is a power marketing administration within the U.S. Department of Energy. Bonneville's actions are governed by several statutes, including the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act; 16 U.S.C. §§ 839 *et seq.*), the Bonneville Project Act (16 U.S.C. § 832 *et seq.*), and the Federal Columbia River Transmission System Act (16 U.S.C. § 838 *et seq.*). USACE is designated as a Direct Reporting Unit by the Secretary of the Army with three primary mission areas: Engineer Regiment, military construction, and civil works. As part of its civil

works mission, in the Columbia River Basin USACE is responsible for systemwide flood risk management (FRM) and the operation of individual projects, including Chief Joseph Dam, for power production, fish and wildlife conservation, navigation, water supply, and recreation consistent with the 1944 Flood Control Act, 33 U.S.C. § 701 *et seq.*, and individual project authorizing statutes, including the Rivers and Harbors Acts of 1946 and 1948[3].

The P2IP entails testing the feasibility of restoring salmon in the Upper Columbia River Basin upstream of Chief Joseph, Grand Coulee, and Spokane River dams. In September 2023, CTCR, STOI, CDAT, and the federal government signed a Memorandum of Understanding and Mediated Settlement Agreement (P2IP Agreement) to resolve pending litigation and pursue a proactive, collaborative, and science-based approach to implementing the P2IP. The P2IP Agreement outlines funding and implementation commitments through the year 2043, including the following:

- Bonneville will provide certain funding for implementation of the P2IP studies for reintroducing specific non-federally protected salmonid stocks above Chief Joseph and Grand Coulee dams in the Upper Columbia River Basin consistent with the Administrator's settlement authority described under 16 U.S.C. § 832a(f).
- Consistent with the P2IP Agreement, Reclamation, USACE, U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) will work with Project Proponents and Bonneville to identify additional funding needs for implementation of P2IP and seek additional funding as necessary and appropriate to ensure full funding of P2IP activities during the 20-year implementation period.
- Project Proponents may use existing hatchery facilities for activities related to P2IP implementation.
- The USFWS may provide surplus fertilized eggs and juvenile and adult salmon of non-listed stock from federal hatchery facilities to support the study and testing of reintroduction.

The P2IP Agreement also establishes a mutual understanding that the Parties do not intend for P2IP implementation to require any material changes in operation and maintenance of any Columbia River System (CRS) dams or reservoirs and if material operations and maintenance changes were proposed, they could be subject to the completion of requisite compliance.

[3] The River and Harbor Act of 1946 authorized the construction, repair, and preservation of certain public works on rivers and harbors for hydropower generation, navigation, irrigation, and other purposes. Chief Joseph Dam was initially authorized as Foster Creek Dam and Powerhouse under this Act dated July 24, 1946 (Pub. L. No. 79-525, 79th Congress, 2nd Session), and in accordance with the survey report dated April 9, 1946, submitted by the Chief of Engineers in House Document 693 (79th Congress, 2nd Session July 3, 1946). Foster Creek Dam was renamed Chief Joseph Dam by the River and Harbor Act of 1948 (Pub. L. No. 80-858). Recreation is authorized through the Federal Water Project Recreation Act of July 9, 1965 (Pub. L. No. 89-72) and under the Flood Control Act of 1944 (Pub. L. No. 78-534). Fish and Wildlife Conservation is authorized by the Fish and Wildlife Coordination Act of 1958 (Pub. L. No. 85-624) and the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Pub. L. No. 96-501).

In meeting the need for action, the federal government seeks to achieve the following purposes:

- Support efforts to study and test the feasibility of reintroducing specific non-federally protected salmonid stocks above Chief Joseph Dam, Grand Coulee Dam, and Avista Corporation's Spokane River dams in the Upper Columbia River Basin consistent with the P2IP Agreement.
- Continue to provide adequate, efficient, economical, and reliable power supply.
- Continue to deliver reliable water supplies, manage flood risk, provide reliable navigation, and support recreation opportunities.
- Minimize environmental impacts.

1.3 Relationship to Other Federal National Environmental Policy Act Efforts, and Other Federal Studies, Documents, and Reports

The following projects and programs occur within the Columbia River Basin and are interrelated with, but independent from, this PEA.

- Final Environmental Impact Statement on Columbia River System Operations (CRSO), July 2020, evaluated the potential environmental impacts of the operations and maintenance of the 14 federal multi-purpose dams and related facilities within the Columbia River Basin. The CRSO Record of Decision (ROD) was issued in September 2020.
- The Systemwide Programmatic Agreement for the Management of Historic Properties Affected by Multipurpose Operations of Fourteen Projects of the Federal Columbia River Power System (FCRPS) for Compliance with Section 106 of the National Historic Preservation Act (NHPA) was signed and implemented in 2009.
- Final Environmental Impact Statement on Chief Joseph Hatchery Programs, March 2010, Bonneville Power Administration. This EIS examines Bonneville's decision to fund the CTCR to construct, operate, and maintain Chief Joseph Hatchery to mitigate for effects on Upper Columbia River summer/fall Chinook salmon and Upper Columbia River spring Chinook salmon affected by the development and operation of the FCRPS.
- Bonneville's Fish and Wildlife Program. Bonneville provides funding to multiple local, state, Tribal, and federal entities as part of its Fish and Wildlife Program to implement offsite mitigation actions consulted upon in various biological opinions for ESA-listed species. The Bonneville Fish and Wildlife Program also funds efforts to protect, mitigate, and enhance fish and wildlife, including non-listed species, affected by the development and operation of the FCRPS, which includes the CRS under the Northwest Power Act. These efforts are consistent with the recommendations developed through the NPCC's Fish and Wildlife Program. These projects will continue to undergo site-specific environmental compliance analysis prior to implementation. This analysis includes review under applicable laws and regulations, such as NEPA.

- Final Environmental Assessment to Analyze Impacts of NOAA's National Marine Fisheries Service Determination that the Confederated Tribes of the Colville Reservation Tribal Resource Management Plan Meets the Endangered Species Act Tribal § 4(d) Rule, issued February 2017. The EA analyzed NMFS' decision to approve the CTCR's Tribal Resource Management Plan.
- Reclamation completed four categorical exclusion checklists between 2021 and 2024 to distribute funds to the Project Proponents for P2IP activities and authorize placement of P2IP research equipment at Grand Coulee Dam and lands managed by Reclamation.
- USACE completed a categorical exclusion checklist in 2022 and issued a real estate out-grant under Department of the Army Permit No. DACW674220014900, which grants U.S. Geological Survey the right to place monitoring equipment in various areas at Chief Joseph Dam Project in connection with a smolt outmigration study (February 1, 2022, and ending January 31, 2026).

1.4 Public Involvement

Public involvement ensures disclosure of the effects of major federal actions and alternatives, as well as the opportunity for members of the public to provide input on agency decision-making. Public involvement requirements under the NEPA are codified in 40 CFR 1501.9. The public scoping process meets the Co-lead Agencies' public involvement obligations under Section 106 of the National Historic Preservation Action (NHPA) per 36 CFR 800.2(d)(3).

On February 9, 2024, the Co-lead Agencies initiated public scoping for the P2IP studies by sending a notice to interested parties requesting public scoping comments and announcing public meetings for the PEA to evaluate federal support of the P2IP. Additionally, a notice was published in the *Spokesman Review* newspaper on February 9, 2024. Public meetings were held on February 27, 2024, in Grand Coulee, Washington, and on February 28, 2024, in Airway Heights, Washington. Reclamation also maintains a P2IP project website[4] and a virtual public meeting room[5] to share P2IP information with interested parties and stakeholders. The scoping period was scheduled for 30 days between February 9, 2024, and March 11, 2024. In response to a public request for a comment period extension, the Co-lead Agencies extended the period an additional week, to March 18, 2024. The description and outcomes of the scoping process are summarized in the Scoping Report (Reclamation 2024e), which was published to the Reclamation P2IP project website and the virtual public meeting room in October 2024.

[4] The Reclamation project website can be accessed at https://www.usbr.gov/pn/programs/p2ip/index.html.
[5] The virtual public meeting room can be accessed at https://www.virtualpublicmeeting.com/p2ip-salmon-reintroduction-programmatic-ea.

Chapter 2. P2IP Study Location and Alternatives

This chapter includes the P2IP study location, description, and the range of alternatives considered by the Co-lead Agencies. The alternatives presented in this chapter were developed based on the federal government's purpose and need and P2IP study plan, as described in **Chapter 1**, and the issues raised during internal and external scoping. The alternatives discussed in detail in this document include the No Action Alternative and the Proposed Action.

2.1 Study Area

The geographic scope of P2IP study activities covers the historical range of anadromy[6] in the Upper Columbia River Basin within the United States, defined as the Columbia River upstream of Beebe Bridge (about 12 miles downstream of Wells Dam) and all major tributaries upstream of Chief Joseph Dam in the United States (see **Figure 2-1**, P2IP Study Area). The juvenile and adult salmon studies would also use already permitted programs at existing facilities (for example, hatcheries, fishways at downstream dams, passive integrated transponder [PIT] antennas, and telemetry systems [acoustic or radio tag receivers]) and other authorized methods within the Columbia River Basin to the Pacific Ocean.

2.2 No Action Alternative

The No Action Alternative represents the continuation of ongoing P2IP activities, which are partially funded by the Co-lead Agencies. Where required, the Co-lead Agencies have already completed environmental compliance for the various study activities associated with the P2IP, including issuing required permits. The No Action Alternative provides the basis for comparison with the action alternatives. The ongoing P2IP activities include collecting and transporting eggs and juvenile and adult salmon from existing hatcheries; fish rearing at existing hatcheries, net pens and acclimation sites; tagging and releasing juvenile and adult salmon; operating and maintaining previously installed P2IP receivers; and monitoring released salmon (see **Table 2-1** and **Table A-1**).

Under the No Action Alternative, the federal actions to support the P2IP as described in the Proposed Action would not occur.

[6] Anadromous fish are those that spawn in fresh water, migrate to the ocean to forage and mature, and return to the fresh water to spawn, and begin the cycle again. Historically, the Upper Columbia River Basin supported a vast range of anadromous fish species, including Chinook, coho, sockeye, and pink salmon, pacific lamprey, and steelhead. Accessibility to the habitats in the Upper Columbia River Basin to these anadromous fish was eliminated by dam construction over the last century.

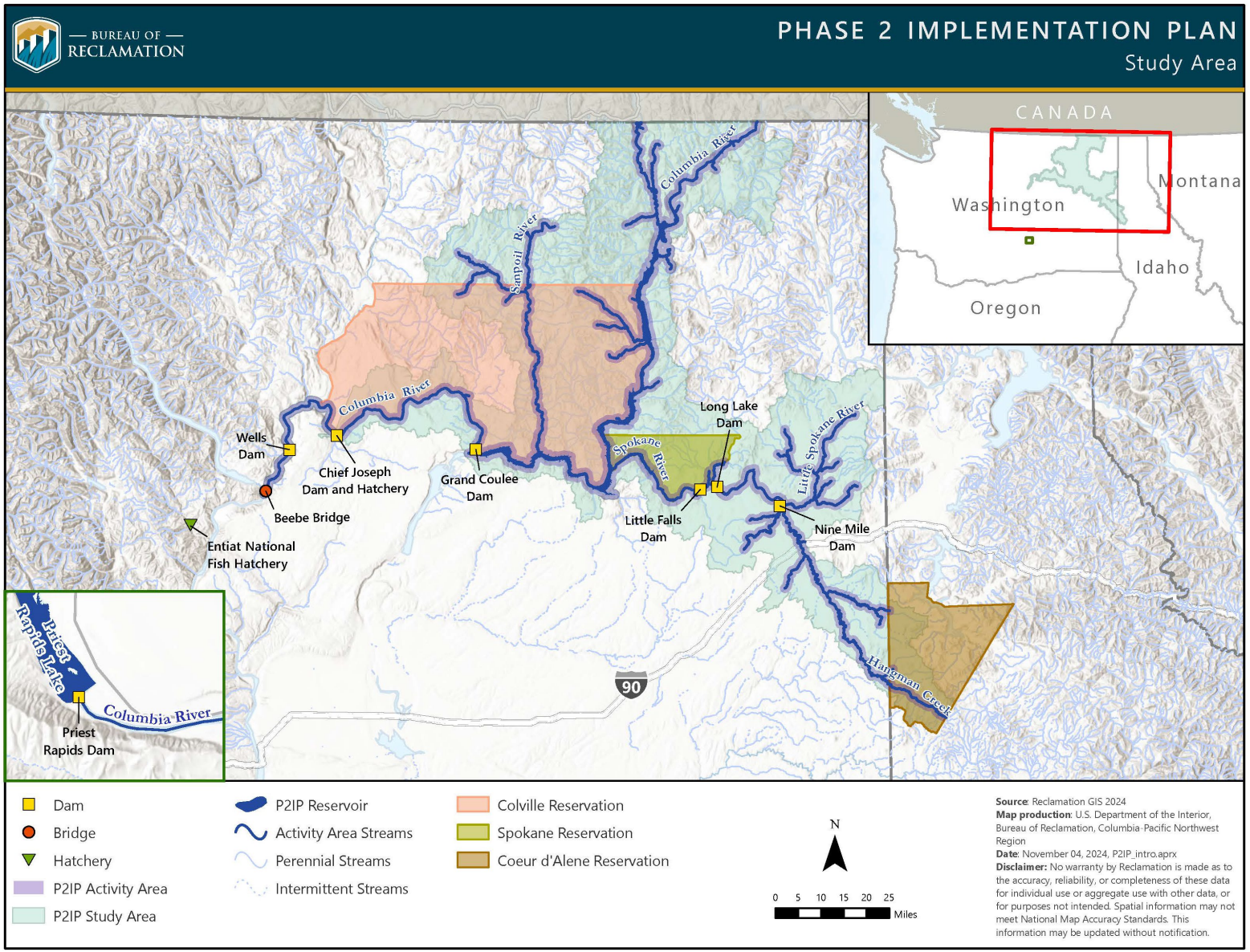

Figure 2-1. P2IP Study Area

2.3 Proposed Action

The Proposed Action would provide federal funding and authorizations to support a 20-year study to test the feasibility of reintroducing salmon in the blocked area through juvenile and adult salmon research studies; the development and operation of fish holding, rearing, and acclimation facilities; and the development, testing, and operation of interim fish passage systems (see **Table 2-1**).

Federal actions may include but are not limited to the following:

- Providing federal funding to support P2IP activities throughout the Study Area.
- Reviewing, approving, and issuing permits for actions including, but not limited to, data collection, installation of equipment, or construction of facilities (for example, interim passage and/or rearing facilities) on federally managed lands and facilities.
- Providing eggs, juveniles, and adult salmon from existing hatcheries and non-hatchery collection actions.
- Participating in the planning, design, development, implementation, feasibility assessments, and operation of interim passage facilities and guidance structures.

Table 2-1. Comparison of Alternatives

	No Action	Proposed Action
Telemetry Receivers		
P2IP Telemetry Receivers	68	107+
*Existing Resident Fish Receivers**	0	94
Multi-dimensional Fish Tracking Receiver Array	0	Up to 200
Salmon collection facilities/locations		
Existing Hatcheries & Acclimation Facilities	3	12
Other Collection Methods (Seining, Fyke Netting, Hook-and-Line, Weirs, and Screw Traps)	3	5+
Rearing & Acclimation Facilities		
Utilization of Existing Hatcheries	6	9
*Land-based Acclimation Facilities^*	1	4
Net Pen Sites	3 (8 pens)	5 (12 pens)
Tributary Streamside Incubation Boxes	0	3+
Data Collection to Inform Design of Land-based Acclimation Facilities	0	3+
Salmon Release		
Release sites	22+	36+

	No Action	Proposed Action
Interim Passage		
Trap and Transport	Yes	Yes
Data Collection to Inform Design of Upstream and Downstream Passage Facilities	0	10 sites
Upstream Interim Passage (Construction, Testing, Operation) ^	0	5
Downstream Interim Passage (Construction, Testing, Operation) ^	0	5
Salmon		
*Juvenile Chinook salmon release***	Up to 180,000	Up to 250,000 +
*Juvenile sockeye salmon release***	0	Up to 250,000++
*Adult Chinook salmon annual release****	Up to 2,000	Up to 15,000+
*Adult sockeye salmon annual release****	Up to 500	Up to 15,000++

*Buoys may be used to install P2IP telemetry equipment
**Number would be dependent on salmon availability annually
***Number would be dependent on salmon availability and research stock returns annually
^Site-specific future environmental compliance process
+ The Proposed Action may have up to 70,000 additional juvenile and 13,000 adult Chinook salmon released in the blocked area.
++ The Proposed Action may have up to 250,000 additional juvenile and 14,500 adult sockeye salmon released in the blocked area.

2.3.1 PEA Approach

This PEA considers a suite of similar activities that share a common purpose of testing the feasibility of reintroduction of salmon in the Upper Columbia River Basin over the next 20 years. The PEA fully evaluates actions including, but not limited to, distribution of federal funding, operation and maintenance of P2IP equipment and facilities, and site-specific P2IP activities, where the details are currently available. P2IP activities that require site-specific engineering design would be evaluated in future environmental compliance documentation. Addressing these activities in a programmatic manner establishes the broad-based analysis of environmental characteristics and impacts, constraints, requirements, and processes for activities located on federally managed lands or at federal facilities, or that use federal funds. **Table 2-2** includes brief descriptions of the P2IP activities by category and identifies whether the activity has been fully evaluated in this PEA or would need additional environmental compliance evaluation.

2.3.2 Annual Environmental Compliance Review Process

The Project Proponents would prepare an annual work plan identifying activities planned to be implemented the following calendar year. The work plan would be submitted in the late summer/early fall annually to allow sufficient time for the Co-lead Agencies to review it and for completion of any environmental compliance review process or real estate permitting requirements, as needed. Submission of descriptions for the P2IP activities identified in **Table 2-2** that require additional environmental compliance processes following siting and design would be coordinated between the Project Proponents and Co-lead Agencies.

Table 2-2. P2IP Activities and Environmental Compliance Processes

P2IP Activities	PEA	Future Environmental Compliance
Research Activities		
Acquisition/Collection of Eggs, Juveniles, and Adult Salmon	X	
Salmon Marking (Tagging)	X	
Salmon Release	X	
Spawning and Carcass Surveys	X	
Telemetry Receiver Installation/Operations and Maintenance	X	
Rearing Activities		
Salmon Incubation, Early Rearing, and Acclimation	X	
Data Collection for Proposed Acclimation Facility Design	X	
Tributary Streamside Incubation Boxes	X	
Acclimation Facility Construction		X
Interim Passage		
*Adult Trap and Transport from existing facilities**	X	
Data Collection for Proposed Interim Passage Design	X	
Construction and Testing of Interim Upstream and Downstream Passage		X

*Trapping of adult salmon at existing facilities (i.e., dams, hatcheries, etc.) would be completed consistent with the existing authorizations of those facilities. P2IP would not increase the number of fish collected. The P2IP activity is specific to the transport of salmon into the blocked area.

The Co-lead Agencies, as part of their responsibilities, would thoroughly evaluate the annual work plan submitted by the Project Proponents. This evaluation would determine whether environmental compliance requirements have already been met for the P2IP activities, and what additional steps would be needed for the specific activities proposed that year. This process would involve identifying activities that have completed environmental compliance and those that require additional review before implementation, such as a NEPA analysis, NHPA Section 106 consultation, Tribal coordination and/or consultation, ESA consultation, or permitting. The Co-lead Agencies would review the work plan and identify the lead federal agency for each proposal and implementation activity. The lead agency would review the submitted activity to determine whether additional environmental compliance processes or permitting are required and initiate them as necessary.

2.3.3 P2IP Activities

The federal actions would support the P2IP to test key biological assumptions from the Phase 1 report that are considered to critically influence the success of the reintroduction effort. The three categories of P2IP activities—research studies, salmon rearing facilities, and interim fish passage—are summarized below. Detailed descriptions of the P2IP activities are presented in **Appendices A, B**, and **C** of this document.

Research Studies

Juvenile survival and behavior studies would be performed for subyearling and yearling summer/fall Chinook and sockeye salmon using PIT tags, juvenile salmon acoustic telemetry systems (JSATS) or acoustic tags, and coded wire tags (CWT). Up to 250,000 juveniles of each species could be released

annually to accommodate the tagging studies for the 20-year study duration. The goal would be to mark all released juvenile Chinook with CWT and to mark a subset of juveniles with PIT and JSATS tags. Juvenile sockeye tagging would not include CWT but would include marking all or a subset of releases with PIT and/or acoustic tags. Sample sizes of tagging groups would vary depending on the tag type and study objectives.

Results from these studies would be used to evaluate behavior and migratory and dam passage survival, estimate smolt-to-adult return rates (SARs), and provide return-migrating salmon for subsequent adult behavior and survival studies. Estimates from juvenile survival studies would be used to update life cycle model (LCM) inputs and adaptively manage research studies. Information from JSATS-tagged fish would inform decision-making on the need, design, and subsequent effectiveness testing (for example, collection efficiency) of downstream passage facilities at each of the five individual dams in the Study Area. PIT antennas and/or telemetry receivers would be installed, operated, and maintained throughout the Study Area, including at the dams. Researchers would collect, compile, manage, and interpret fish data. **Appendix A** of this document provides a detailed description of the P2IP research activities.

Juvenile Survival Studies

- Juvenile behavior, movement, and survival would be evaluated through PIT and acoustic tag-based research studies.
- The studies would use existing deployed receivers and new receiver deployments, as described in **Appendix A**, to collect data from tagged fish (see Figure A-2).
- Researchers would collect, compile, manage, and interpret fish data from these studies.
- These studies are expected to continue through the year 2043 and are designed to be performed repeatedly, but the acoustic studies may not occur annually.
- The PIT tag-based studies would examine assumptions made in the LCM about survival of juvenile summer/fall Chinook and sockeye salmon as they migrate through the CRS to the Pacific Ocean and back to the Upper Columbia River Basin as adults. Juvenile fish releases are expected to occur annually for the PIT tag studies.
- The acoustic-based studies would examine assumptions made in the LCM about survival of juvenile summer/fall Chinook and sockeye salmon, behavior, dam passage routing, and travel time through Study Area reaches. The JSATS-based studies would provide critical information about near-dam behavior and route-specific dam passage and survival at each of the five dams in the Study Area. These multi-year studies are expected to be repeated at strategic intervals through 2043.

Adult Salmon Research Studies

Adult survival and behavioral studies would be performed for naive[7] and local-origin[8] Chinook and sockeye salmon. A trap-and-transport program would be used to transport adult fish from Priest

[7] Naïve fish are defined as fish that originate (i.e., are hatched, reared, and released) from below Chief Joseph Dam. These adult fish are naïve to the blocked area.

[8] Local-origin fish are defined as a hatchery fish that were reared and released upstream of Chief Joseph Dam as a juvenile or natural origin progeny of adult salmon spawning in the blocked area.

Rapids Dam, Wells Hatchery and Dam, and below Chief Joseph Dam, and from hatcheries with available salmon to various release locations within the blocked area (see **Figure 2-1**). The number of adult salmon would vary annually depending on availability.

All adults transported would have a tissue sample collected for genetic analysis and parentage-based tagging (PBT) before being moved. A subset of fish could be marked with a PIT tag and either an acoustic or radio telemetry transmitter, so the fish could be actively tracked by researchers throughout the Study Area. The PBT information would be submitted and stored in a publicly accessible centralized genetics database (FishGen) currently used within the Columbia River Basin. Genetics results would be used to calculate the number of adults returning per spawner transported previously, a value termed AR/S. AR/S is a crucial performance metric that the Project Proponents would use when making decisions. Other elements of the proposed research are summarized below.

- Salmon research studies would examine factors that influence adult return rates to the blocked area and inform planning and development of interim adult passage facilities at all five dams. The adult research, combined with complementary juvenile studies, would provide much of the information necessary to evaluate the study program and identify areas where more detailed studies are needed.
- Adult sockeye and summer/fall Chinook salmon would be collected at collection facilities downstream of Chief Joseph Dam and marked with acoustic or radio tags. A subset of adults would be tagged and monitored using existing acoustic tag receivers deployed for concurrent resident fish monitoring programs already in operation.
- Additional acoustic and/or radio telemetry receivers would be installed near the dam tailraces and within blocked area tributaries to assess near-dam behavior and spawning escapement. Additional receiver sites may be necessary based on information obtained from the initial deployment, range testing, and fish distribution.
- Tagged adult salmon would be transported via truck or moved via an interim passage facility, then released in various locations including dam tailraces and forebays, mid-reservoir reaches, tributaries, and the transboundary reach. (Collaboration with Canadian researchers may be necessary to fully understand and assess survival and behavior in the transboundary reach of the Columbia River and the Kettle River, which flows south from Canada into the Columbia River near Kettle Falls, Washington.)
- Researchers would collect, compile, manage, and interpret data.
- Spawning would be documented with traditional spawning ground surveys on foot, deepwater redd surveys using underwater video, or aerial drones.

Adult salmon research studies would be repeated at least through 2043.

Fish Rearing and Acclimation Facilities

The Proposed Action would require a source of both summer/fall Chinook and sockeye for research studies. In Phase 1, Chief Joseph Hatchery summer/fall Chinook and Okanogan sockeye salmon stocks were ranked highest for use in the reintroduction program and are the preferred stocks for use in P2IP efforts. Several other summer/fall Chinook salmon sources (such as Entiat

National Fish Hatchery and Wells Fish Hatchery) were also identified as potential donor stocks. **Appendix B** of this document provides a detailed description of the P2IP fish-rearing activities, and the interim fish-rearing and acclimation facilities are summarized below.

- Project Proponents would collect summer/fall Chinook and sockeye salmon from a combination of regional hatcheries identified in **Table A-1** of **Appendix A** to be reared and released in the blocked area (see **Figure A-2**).
- Artificial production of Chinook and sockeye salmon needed for the Proposed Action would rely on either existing local land-based hatchery facilities or updated versions of these facilities, and new acclimation facilities. Additionally, the Project Proponents would work with the owner/operators of anadromous fish hatcheries downstream of Chief Joseph Dam to determine whether surplus fish production or rearing space is available. Opportunities to develop new acclimation facilities in the Spokane and Sanpoil watersheds are described in **Appendix B**.
- Egg incubation and early rearing would be done using existing hatchery facilities or through expansion of these facilities, and potential development of acclimation facilities (see **Table A-1**).
- Siting, design, and construction plans would need to be developed for new facilities. Related activities could include geotechnical studies, surveying, and well drilling to characterize site conditions and inform designs (see **Appendix B**, **Figures B-7** through **B-9**).
- Incubation and early-rearing facility designs and plans would be submitted to the applicable co-lead agency or agencies for design review and site-specific environmental compliance.
- Yearling production would require that subyearlings be transferred from hatcheries to new or existing net pens in reservoirs and to newly developed acclimation sites.
- Existing P2IP net pen locations, including Sherman Creek (Kettle Falls) (see **Figure A-2**), Two Rivers, Keller Ferry (see **Figure A-7**), and Rufus Woods Lake (Pacific Aquaculture) (see **Figure A-6**), would continue to be used for juvenile salmon acclimation.
- New net pens are proposed in the Sanpoil Arm of Lake Roosevelt (see **Figure B-2**). Net pens would be similar in shape and dimension to those currently used by the Lake Roosevelt Artificial Production program for triploid rainbow trout and existing P2IP net pens in the blocked area (that is, approximately 20 feet square and 16 feet deep).
- New and upgraded acclimation sites would be in the Sanpoil and Spokane River watersheds. Siting of the acclimation facilities would be based on property availability and acquisition, studies, existing infrastructure, and site conditions.
- Subyearling production may not require acclimation sites, as these fish would be released directly from hatcheries to various locations within the blocked area. Subyearlings may be released in the spring (March–May) or in the fall (September–November).

Interim Fish Passage

Interim passage actions would focus on the study, design, installation, testing, and operation of fish passage systems. Data collection may include geotechnical studies and surveys, along with existing operational data to characterize site conditions and hydrologic modeling to aid in the design process.

These actions could occur at each of the five individual dams over the 20-year implementation period.

The existing trap and transport program for naïve and local-origin adults would be expanded to include additional locations and number of fish under the Proposed Action. Fish may be collected from existing hatcheries and collection facilities in the Columbia River downstream of Chief Joseph Dam, then transported and released upstream in the blocked area. Adult release sites include Rufus Woods Lake, Lake Roosevelt, the Columbia River transboundary reach, Hangman Creek, Sanpoil River, Spokane River, Little Spokane River, and other spawning and rearing areas (see **Appendix A**, **Figure A-2**).

Fish passage designs would be developed based on research studies, existing infrastructure, and site conditions. There is currently insufficient information to provide a site-specific or implementation-level review of individual fish passage facility designs in this PEA. Project Proponents would employ fish passage experts to work with staff from Reclamation, USACE, Avista Corporation, Bonneville, NMFS, USFWS, and Washington Department of Fish and Wildlife (WDFW) to develop fish passage alternatives. Fish passage designs and construction plans would be submitted to the relevant owner/operator/agency for design review following owner-specific procedures and environmental compliance, future environmental compliance processes, and any other regulatory needs. **Appendix C** of this document provides a description of the interim fish passage activities of the P2IP.

The sequence of fish passage design, installation, operation, and testing efforts may be as follows, with potential adjustments based on study results:

1. Chief Joseph Dam upstream passage
2. Grand Coulee Dam downstream passage
3. Grand Coulee Dam upstream passage
4. Spokane River dams upstream passage
5. Chief Joseph Dam downstream passage
6. Spokane River dams downstream passage

2.4 P2IP Environmental Protection Measures

Incorporation of environmental protection measures (EPMs) is integral to the Proposed Action and would minimize environmental effects of study activities. A comprehensive list of EPMs is presented in **Appendix D**. EPMs would be applied to individual P2IP activities, as applicable, during the annual activity review and implementation planning processes. Implementation of the EPMs is part of the Proposed Action and have been incorporated into the analyses presented in **Chapter 3**.

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Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

This chapter describes existing physical, biological, social, and cultural resources that could be affected by the No Action Alternative and the Proposed Action, described in **Chapter 2**. It also identifies potential environmental consequences—beneficial or adverse—to those resources that could result from implementing the two alternatives. The affected environment sections describe the existing conditions upon which the alternatives could have an effect. The environmental consequences sections describe the potential direct, indirect, and cumulative impacts of those alternatives, if implemented, on the resources evaluated.

Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and occur later in time or are farther removed in distance but are still reasonably foreseeable. Potential impacts are described in terms of duration, intensity, and context. The 2024 implementing regulations for NEPA (40 CFR 1508.1(i)) define cumulative effects as "…effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from actions with individually minor but collectively significant effects taking place over a period of time."

The Co-lead Agencies—Reclamation, USACE, and Bonneville—have considered cumulative effects from past, present, and reasonably foreseeable future actions (per 40 CFR 1508.1) associated with the P2IP activities below; impacts for applicable resources are discussed and organized by their relevant resource indicators. **Table E-1** in **Appendix E**, Reasonably Foreseeable Future Actions, lists the reasonably foreseeable future federal and nonfederal actions considered in the analysis. Impacts from past and present actions are considered part of existing conditions, as described in the affected environment sections for each resource.

For this analysis, impact duration time frames are defined as follows:

- Temporary: These are impacts that would only occur during P2IP installation activities (such as installation of new telemetry receivers) or during active implementation for a particular P2IP activity (such as salmon release).
- Short-term: These are impacts that would occur for less than 3 years after initial activity implementation.
- Long-term: These are impacts that would occur for 3 years or longer after initial activity implementation.

For this analysis, the magnitude of effects is defined as follows:

- No: There would be no impact on the resource or indicator being evaluated, or the resource is not present in the analysis area.
- Little: The resource or resource indicator impact is unnoticeable (that is, unmeasurable) at the analysis scale.
- Minor: The resource or resource indicator would experience a noticeable effect, but the impact magnitude would be small (with or without mitigation) in comparison with the scale of the analysis. These effects would be detectable but localized and/or temporary.
- Moderate: There would be a measurable impact on the resource or resource indicator that does not rise to the level of a major impact because it is short term in duration and isolated to a portion of the analysis area.
- Major: There would be a long-term impact on the resource or indicator that is substantial, highly noticeable, and widespread throughout the analysis area.

3.2 Climate Change Considerations and Sensitivity

Reclamation developed new climate-informed decision-making guidance to incorporate climate change information in decision-making processes. The P2IP is being used as a pilot project to help further refine this guidance. This guidance has been applied to the P2IP environmental compliance process for two purposes: (1) to account for and mitigate climate change impacts, and (2) to further develop the guidance through its application to the project. The guidance establishes a six-step process to appropriately identify, analyze, and account for historical and future impacts on climate. The steps include:

1. Gather decision information
2. Identify climate sensitivities
3. Perform historical climate analysis
4. Account for climate change in the historical record
5. Perform projected future climate change analysis
6. Account for projected future climate change

Local climate change conditions for the Study Area will be evaluated using a data set developed by the River Management Joint Operating Committee (RMJOC). The RMJOC is made up of river operators from Reclamation, the USACE, and Bonneville that collectively operate the CRS. In 2013, the RMJOC requested a new set of naturalized streamflow data sets derived from the Coupled Model Intercomparison Project Phase 5 (CMIP-5) Global Climate Model Projections (WGCM 2008). This is the most current complete and peer-reviewed data set and was an update to a previous study that used the CMIP-3 data set. This study found that temperatures have already warmed about 1.5 degrees Fahrenheit in the region since the 1970s, while future annual precipitation trends are

more uncertain. Additionally, as temperatures increase, average winter snowpacks are anticipated to decline, despite the potential for increased precipitation during winter months. By the 2030s, higher average fall and winter flows, earlier peak spring runoff, and long periods of low summer flows are very likely.

Step 1 of the process involved identifying the three federal actions supported by the PEA, which included federal funding required for P2IP activities, permitting requirements and actions, and the provision of eggs and juvenile and adult salmon from existing hatcheries.

Step 2 of the process included an assessment of the sensitivity of activities within the federal actions to changes in climate and whether a climate change assessment would be needed where sensitivities were identified. It was determined that many of the activities may be sensitive to changes in climate variables such as air temperature, precipitation, and hydrology, and that certain activities, such as tagging and releasing fish, would require additional climate change assessment work.

Step 3 of the process involved an analysis of historical climate indicators, including air temperature and precipitation, flows in the Columbia River Basin, and water temperature. It was found that average annual temperatures at Grand Coulee Dam and the Spokane Airport increased by 0.8 and 2.0 degrees Fahrenheit, respectively, from 1993 to 2023, while precipitation trends were not statistically significant. Additionally, flows in winter and spring months increased, while flows in the summer months decreased between 1929 and 1998, possibly attributable to earlier snowmelt in the basin (Bonneville 2020; Chang et al. 2023). Water temperature trends differ; this is likely due to the regulation of flows; however, it is suggested that small contributing, unregulated tributaries may be experiencing an increase in water temperatures Reclamation 2024j).

Step 4 of the process determined appropriate analysis periods for historical comparison, resulting in the period of 1976 to 2005 for comparison to future temperature, precipitation, and streamflow from the RMJOC-II data set. For more recent changes, the period of 1993 to 2023 can also be referred to.

Step 5 of the process included an analysis of the RMJOC-II data set for an understanding of potential climate change effects that should be considered in follow-on studies. Specifically, the potential for earlier snowmelt and runoff, and increased temperatures in unregulated streams and tributaries should be considered in follow-on studies, particularly if fish have the potential to use the unregulated tributaries.

Finally, Step 6 of the process incorporated this information into findings to apply to P2IP PEA activities. It was found that the activities undertaken by the P2IP studies can be sensitive to increases in air and stream temperature. The largest risk to the activities is the potential for stream temperatures to exceed mortality thresholds for the species that are being reintroduced into the blocked area. Therefore, it was determined that future air and stream temperature estimates should be considered in the design of these new features and the related analyses using qualitative analysis of the identified trends. For example, designs should consider air and stream temperature when siting collection facilities and add features that could contribute to cooling, like shading. Additionally, designs should account for the potential for reduced summer flows by possibly designing to the lowest potential flow so that the facility may still operate under these conditions.

Two scenarios with a time series of temperature and precipitation, incorporating a daily average time series of four hydrologic scenarios, were developed for the quantitative analysis of flows (Chang et al. 2023).

Considering the potential for change identified by this analysis would ensure the activities undertaken by the P2IP will be robust and continue to perform despite the likely changes.

3.3 Resource Topics Analyzed

Table 3-1 identifies the presence or absence of resources or resource uses in the Study Area and the rationale for those that do not warrant detailed analysis in the PEA. The potential for the alternatives to affect resources or resource uses is also documented in **Table 3-1**. Resources or resource uses that may have more than minor impacts from the Proposed Action or that are required to be addressed in environmental compliance documentation by the Co-lead Agencies are further analyzed in the PEA, as noted in **Table 3-1**. For resources not affected by current activities but having the potential to be affected by future P2IP activities described in **Table 2-1**, sections in this chapter include the rationale for dismissing the resource from analysis of direct and indirect effects along with a description of the nature and type of impacts from future P2IP activities. Future P2IP activities would be further analyzed through future environmental compliance processes.

Table 3-1. Determination and Rationale Caption Table for Detailed Analysis by Resource Topic

Resource Topic	Determination and Rationale for Detailed Analysis
Climate and Air Quality	See detailed analysis in **Section 3.3**, Air Quality and Climate.
Water Quality	See detailed analysis in **Section 3.4**, Water Quality.
Water Resources	Under the No Action Alternative, water resources would continue to be affected by operation and maintenance of the 14 federal facilities that comprise the CRS, as analyzed by the Co-lead Agencies in the CRSO EIS and associated documentation. Operations and maintenance activities would continue in the Columbia River Basin, including adaptive management of these operations to respond to seasonal conditions. Additionally, CRS operational plans may be updated in response to other changes in the basin (for example, to address updates to the Columbia River Treaty and other activities such as maintenance needs). Similarly, water resources of the Spokane River would continue to be affected by operation and maintenance of public and private hydropower generation facilities within and outside the Study Area, such as Avista Corporation's Spokane River Project (Federal Energy Regulatory Commission [FERC] License No. P-2545) and Little Falls Dam, as well as the City of Spokane's Upriver Dam (FERC License No. P-3074). Under the Proposed Action, new and not previously analyzed potential impacts on water resources include increased groundwater and surface water use to support juvenile and adult salmon rearing at existing hatcheries and facilities, release of juvenile and tagged fish, and interim passage systems such as trap and transport operations. However, the impacts on resources reliant on this water supply to accomplish the Proposed Action would be little relative to overall water supplies within the Upper Columbia River Basin in the long term.

Resource Topic	Determination and Rationale for Detailed Analysis
	Remaining P2IP activities, including egg collection and transport, juvenile rearing and adult salmon holding in net pens and land-based acclimation facilities, and the operation and maintenance of P2IP telemetry and acoustics on released salmon would not be expected to impact the availability or abundance of water resources; this is because the Proposed Action does not include changes to water uses or availability. Due to the lack of measurable impacts on water resources, a detailed analysis of proposed activities is not warranted for this resource.
Upper Columbia River Dam Operations	Under the No Action Alternative, implementation of the current P2IP activities would continue under existing operations and maintenance of Chief Joseph Dam and Grand Coulee Dam, two of the 14 federal facilities that comprise the CRS, as analyzed under the CRSO EIS (2020). The No Action Alternative would have no effect on federal dam operations and maintenance because all ongoing research activities would be within the operational limitations of existing in-season management plans for these facilities. Under the Proposed Action, the P2IP proposal would not result in material changes to CRS operations and maintenance activities. The proposed P2IP activities would be implemented within the current and future operational limitations of existing in-season management plans for Grand Coulee and Chief Joseph dams and their associated facilities; therefore, a detailed analysis of proposed activities is not warranted. Any additional site-specific proposals at the Chief Joseph and Grand Coulee dams would be assessed through future environmental compliance processes by the Project Proponents and Co-lead Agencies.
Spokane River Dam Operations	Under the No Action Alternative, implementation of the current P2IP activities would continue under existing operations and maintenance of the Spokane River dams in the Study Area (Little Falls, Long Lake, and Nine Mile dams). These dams are owned by the Avista Corporation and, except for the Little Falls Dam, are operated under a federal license issued by the FERC in 2009 (License No. 2545). The No Action Alternative does not propose new P2IP activities. Still, current activities would continue to be implemented within the operational management plans for the Avista facilities. The Proposed Action does not include operational changes to the Avista facilities within the Study Area. P2IP activities are anticipated to be implemented within the current operational bounds described within FERC licensing or current operations of Little Falls Dam. Implementing the Proposed Action would not affect the Avista dam operations and maintenance; therefore, a detailed analysis of proposed activities is not warranted. In coordination with Avista, any additional site-specific proposals at the Spokane River dams would be addressed through future environmental compliance processes.

Resource Topic	Determination and Rationale for Detailed Analysis
Geology and Soils	Under the No Action Alternative, there would be no new impacts on geology or soils or changes to existing conditions because current activities and processes would be expected to continue. Under the Proposed Action, there would be limited impacts on geology and soils because there would be limited ground-disturbing activities. However, minor beneficial impacts on soil with the addition of marine-derived nutrients from adult salmon release in the blocked area would be expected in the long term. Salmon transport marine nutrients to freshwater and forest ecosystems when they migrate from the ocean, spawn, and die. The carcasses then provide nutrients (such as carbon, nitrogen, and phosphorus) that benefit both freshwater and riparian communities (Willson et al. 1998; Cederholm et al. 1999). Releasing of adult salmon in the blocked area would reintroduce this important nutrient source truncated by the dams in the Upper Columbia River Basin. Non-ground-disturbing activities would include acquiring, transporting, and releasing salmon; marking fish; monitoring salmon movements; using existing facilities and in-water equipment; adult salmon trapping and transport; and surveying carcasses. Ground-disturbing activities could include the installation of land-based research equipment and data collection to inform the engineering design of acclimation facilities and interim passage. Geotechnical testing and studies would occur in defined areas at each land-based acclimation site and dam. Impacts on geology or soil resources would be minor and temporary in nature with the implementation of EPMs **VW-1** and **WQ-1** (**Appendix D**), which require revegetation of disturbed areas to pre-work conditions following completion of ground-disturbing activities and use of erosion-control devices such as silt fencing to control erosion from disturbed areas, respectively. Additionally, the Project Proponents and contractors would apply the appropriate standards to geotechnical investigations as required by the land management agency when collecting geotechnical data on federally managed lands. A detailed analysis of impacts on geology and soils from the Proposed Action in this PEA is not warranted.
Biological Resources	See detailed analysis in **Section 3.9**, Biological Resources.
Transportation	Under the No Action Alternative, no effects on the transportation system in the P2IP analysis area would occur when compared with the existing conditions; this is because current activities would continue, and no changes to the transportation system, land access, service level, or uses would occur. Implementation of the Proposed Action does not propose changes to the transportation system, land access, service level, or uses at this time. Though study activities may increase road use during short periods of time and at low frequency for trap and transport activities and general study-related travel each year, the overall effect on transportation would be minor through the temporary, short-term, and long-term time frames. Should further site-specific proposals indicate a proposed alteration, modification to the transportation system would be addressed through future environmental compliance processes. Therefore, a detailed analysis of impacts on transportation is not warranted.

Resource Topic	Determination and Rationale for Detailed Analysis
Recreation	Under the No Action Alternative, continuing current P2IP activities would not change existing recreation opportunities and uses within the analysis area. Under the Proposed Action, P2IP activities, including egg collection and adult salmon transport, juvenile salmon rearing at existing hatcheries, ground-disturbing data collection to inform the design of acclimation and interim passage facilities, and monitoring activities, would have no to little effects on recreational opportunities in the analysis area through the long-term time frame; this is because these activities would occur in areas with relatively low recreation use. During the 20 years of the P2IP studies, boat- and land-based salmon releases, installation, operations, and maintenance of telemetry receivers and net pens, as well as monitoring activities, could displace or disrupt recreation users in the vicinity of these actions. Recreationist displacement or disruption would be little and limited to the temporary time frame by the presence of salmon release hatchery trucks at the boat launch; new net pen facility installation; and telemetry receiver installation, operations, and maintenance activities. Net pen facilities located on the reservoirs may eliminate the recreational use of the reservoir immediately surrounding the facilities in the long-term time frame. However, the net pens may attract fish to the area and provide additional fish in the blocked area in the short and long term, which would benefit anglers who fish in the area. Study activities increase the potential for anglers to catch outplanted adult salmon in the blocked area. This may positively impact anglers since there is the potential to catch salmon in the long term. Impacts of salmon release activities at existing boat launches would be expected to have little impact on recreationists in the blocked areas since hatchery truck salmon releases take very little time (typically 15 minutes), and recreational users can easily access other recreation sites in the reservoir and river areas in the blocked area. If anglers catch a P2IP tagged salmon, anglers should follow WDFW notification recommendations in the current Washington Sport Fishing Rules (WDFW 2024a). These impacts would be minor, and the Co-lead Agencies would continue coordinating with the Project Proponents and WDFW to inform anglers of P2IP research efforts and tagged fish reporting. Overall, the positive and negative impacts on recreation under the Proposed Action are expected to be minor through the long-term time frame. Therefore, a detailed analysis of recreation is not warranted.
Socioeconomics and Environmental Justice	See detailed analysis in **Section 3.12**, Socioeconomics and Environmental Justice.
Cultural Resources	See detailed analysis in **Section 3.13**, Cultural Resources.
Visual Resources	See detailed analysis in **Section 3.15**, Visual Resources.

Resource Topic	Determination and Rationale for Detailed Analysis
Land Use and Realty	Under the No Action Alternative, there would be no change in land use designations, landownership, or current land use authorizations in the P2IP Activity Area. To further the P2IP research studies, the Proposed Action would involve the installation of telemetry receivers and associated equipment, rearing facilities (net pens), and completion of data collection for siting and design of proposed acclimation facilities and interim fish passage facilities on federally managed lands and waters requiring new land use authorization from the land management agency with jurisdiction. Land use authorizations may include rights-of-entry, consent documents, permits, licenses, and/or easements. Under the Proposed Action, no change to land use designations would be expected from the acquisition of eggs, juvenile salmon, and adult salmon; rearing; salmon marking and release; or interim passage (adult trap and transport) activities. The Proposed Action proposes no change to land use designations within the P2IP Activity Area through the long-term time frame. Land use authorization requests would be evaluated and issued as required by the federal agency with jurisdiction during the 20-year research effort to study the reintroduction of salmon in the Upper Columbia River Basin. Therefore, a detailed analysis of land use and realty is not warranted.
Floodplains and Wetlands	Under the No Action Alternative, current P2IP activities would continue, but there would be no new P2IP activities that would create additional effects on wetlands and floodplains beyond what have occurred from past and ongoing P2IP activities. The effects of those past and ongoing P2IP actions on wetlands and floodplains were assessed and disclosed in previous environmental compliance documents, as appropriate. Under the Proposed Action, only minor effects on wetlands and floodplains would be likely from the types of actions proposed in the temporary to short-term time frame. No material changes to CRS operations are proposed. Actions such as the collection, handling, rearing, transport, marking, and release of eggs, juveniles, or adult salmon are expected to have no ground-disturbing or flow-affecting activities and would, therefore, have no effect on wetlands or floodplains. Some P2IP actions, however, could require ground disturbance and may require water use that could impact wetlands and floodplains. Such actions include installation of telemetry receivers, PIT tag arrays, and streamside incubation boxes. Siting of telemetry receivers and incubation boxes, and the data collection for future land-based acclimation and interim passage facilities would not take place within large wetlands, as these conditions are unsuitable for these facilities. However, their locations would likely be near streams and rivers and would, therefore, likely be within floodplains. The facilities' footprints in these floodplains, however, would be very small in relation to the floodplains they affect, with most surfaces retained as pervious (unpaved) and thereby still functional for groundwater recharge (a key function of floodplains). The streamside incubation boxes would require a small amount of flows diverted from their adjacent streams or rivers, but the diversions would be of short distances, and water use would not be consumptive; thus, there

Resource Topic	Determination and Rationale for Detailed Analysis
	would be little to no effect on the local hydrology affecting the floodplains or nearby small wetlands. **EPM VW-1** and **VW-2** (**Appendix F**) and applicable permitting requirements would be implemented to avoid and minimize impacts to protect floodplain and wetland function as much as possible. The Project Proponents and Co-lead Agencies would verify mapped wetlands prior to activities and avoid ground-disturbing activities within verified wetlands and floodplains to the maximum extent practicable. In the temporary to short-term time frame, the overall impacts on wetlands and floodplains from P2IP actions are anticipated to be minor with implementation of EPMs; thus, a detailed analysis in this PEA of proposed activities is not warranted and would be conducted in future environmental compliance reviews, as appropriate.
Utilities	The proposed activities would not interfere with existing water and wastewater pipelines, natural gas pipelines, or fiber-optic cables; therefore, no impacts on utility systems through the long-term time frame would be expected under either the No Action Alternative or Proposed Action. As such, this resource topic is not discussed further, and detailed analysis is not warranted.

3.4 Climate and Air Quality

Air quality is determined by the concentration of air pollutants in the atmosphere. In accordance with the Clean Air Act, as amended, the U.S. Environmental Protection Agency (EPA) regulates air quality to protect public health and welfare, including protection against decreased visibility and environmental damage. The EPA sets National Ambient Air Quality Standards (NAAQS) for the following six criteria pollutants considered harmful to human health and welfare: ground-level ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, two categories of particulate matter (particulate matter less than 10 micrometers in diameter [PM_{10}] and particulate matter less than 2.5 micrometers in diameter [$PM_{2.5}$]), and lead. Air pollutant concentrations are assessed against the NAAQS to evaluate the air quality conditions in a geographic region.

Climate change refers to the long-term change in average weather patterns, as determined by changes in its properties such as average temperature or precipitation patterns (IPCC 2021). Global temperatures have increased by approximately 1.8 degrees Fahrenheit (1.1 degrees Celsius) above preindustrial levels (IPCC 2023). The Study Area is east of the Cascade Mountains in central and eastern Washington, with generally cold, wet winters and warm, dry summers. Temperatures in Washington have risen by approximately 2.0 degrees Fahrenheit (1.2 degrees Celsius) since the beginning of the twentieth century (Crimmins et al. 2023).

Human activities, principally through greenhouse gas (GHG) emissions, have unequivocally caused global warming (IPCC 2023). GHGs trap absorbed radiation and result in warming of the atmosphere. The principal GHGs that enter the atmosphere due to human activities, including fossil fuel power generation, include carbon dioxide, methane, nitrous oxide, and other trace gases.

3.4.1 Resource Indicators

The following resource indicators are used to determine the level of impact to air quality and climate change from the No Action and Proposed Action alternatives:

- Change in tons of criteria air pollutants (carbon monoxide, nitrogen oxides, PM_{10}, $PM_{2.5}$, and sulfur oxides)[9] and volatile organic compound emissions from P2IP activities
- Change in metric tons of GHG emissions from P2IP activities

3.4.2 Criteria Air Pollutant Emissions

Affected Environment

The Clean Air Act requires each state to identify areas that have ambient air quality in violation of the NAAQS using monitoring data collected through state monitoring networks. Any area that violates the NAAQS for any of the six criteria pollutants is designated as a nonattainment area. The analysis area, which includes the airsheds that encompass the geographic scope of the P2IP Activity Area, are in attainment for all the criteria air pollutants, except for Spokane, which is a carbon monoxide nonattainment area (EPA 2024b). The Washington State Implementation Plan describes how the state plans to achieve, maintain, and enforce standards for areas that do not comply with the NAAQS.

Total annual emissions from gasoline-powered highway vehicles and diesel-powered off-highway vehicles and equipment for the air quality analysis area are shown in **Table 3-2**, below.[10]

Table 3-2. 2020 National Emission Inventory Data on Mobile Sources
(tons per year)

	Carbon monoxide	Nitrogen oxides	PM_{10}	$PM_{2.5}$	Sulfur oxides	Volatile organic compounds
Tons per year	48,200	7,150	500	300	20	4,160
Percentage of annual emissions in analysis area	15%	27%	1%	1%	1%	1%

Source: EPA 2020

No Action Alternative

Under the No Action Alternative, criteria air pollutant emissions from transportation and maintenance activities of current P2IP activities, which consist of fish transport, fish rearing, and monitoring, as well as operating and maintaining previously installed P2IP receivers and net pen

[9] Sulfur dioxide and nitrogen dioxide standards are designed to protect against exposure to the entire group of sulfur oxides and nitrogen oxides (EPA 2017a; EPA 2024c). Ground-level ozone is created through chemical reactions between precursor gases such as volatile organic compounds and nitrogen oxides (EPA 2024d). Lead emissions are assumed to be little and not discussed further a result of EPA's regulatory efforts including the removal of lead from motor vehicle gasoline which has resulted in a 98 percent decrease between 1980 and 2014 (EPA 2024e).

[10] County-level annual emissions from gasoline-powered highway vehicles and diesel-powered off-highway vehicles and equipment for Benewah County in Idaho and Chelan, Douglas, Ferry, Grant, Lincoln, Okanogan, Pend Oreille, Spokane, and Stevens Counties in Washington are shown in Table 3-5 of the Air Quality and Climate Change Memorandum (2024).

facilities, would continue. Annual emissions, as presented in **Table 3-3**, are estimated based on annual P2IP activities to date, including approximately 40,000 annual miles traveled by passenger vehicles, 5,075 annual miles traveled by hatchery trucks,[11] and 1,560 gallons of gas used annually by four-stroke engine motorboats. Under this alternative, annual emissions from current P2IP activities would continue to be minor, accounting for less than two-tenths of 1 percent of annual emissions from gasoline-powered highway vehicles and diesel-powered off-highway vehicles and equipment from the Study Area counties. Motorboat travel would continue to be the biggest contributor to nitrogen oxides, sulfur oxides, PM_{10}, and $PM_{2.5}$ emissions. Passenger cars would continue to be the biggest contributor to carbon monoxide and volatile organic compound emissions. Impacts from emissions would be temporary and minor; emissions could result in additional short-term, minor impacts from secondary creation of pollutants in the atmosphere.

Table 3-3. Criteria Air Pollutant Emissions from On-Road Vehicles, Trucks, and Boats under the No Action Alternative (tons per year)

Vehicle	Carbon monoxide	Nitrogen oxides	PM_{10}	$PM_{2.5}$	Sulfur oxides	Volatile organic compounds
Passenger car/truck	0.313	0.018	0.004	0.001	0.0001	0.031
Motorboat	0.052	0.501	0.009	0.009	0.0191	0.025
Light commercial (hatchery) truck	0.014	0.025	0.003	0.001	0.0001	0.003
Total	**0.379**	**0.544**	**0.016**	**0.011**	**0.0193**	**0.059**
% of Analysis Area Criteria Pollutant Emissions	**0.001%**	**0.008%**	**0.003%**	**0.004%**	**0.097%**	**0.001%**

Source: EPA 2023a

Proposed Action

Under the Proposed Action, P2IP activities consisting of research studies, updates to existing and creating new acclimation and rearing facilities, and interim passage of fish would result in increased criteria air pollutant emissions. Emission sources would include gasoline-fueled, on-road vehicles, trucks, and motorboats used for transportation of staff, equipment, and fish, as well as installation and maintenance of net pens. Additional sources of emissions would include non-road heavy equipment such as pumps, generators, geotechnical drill rigs, and excavators used during data collection for siting and design of interim passage facilities at each dam.

Estimated emissions are based on a total maximum distance of approximately 100,000 annual miles traveled by passenger vehicles, 66,250 annual miles traveled by hatchery trucks,[12] and 3,120 gallons of gas used annually by four-stroke engine motorboats. Annual emissions are presented in **Table 3-4**. While annual emissions from P2IP activities under the Proposed Action would increase

[11] Based on moving 500 adult and 160,000 juvenile salmon per net pen with a total of 8 net pens, truck capacity of 80 adult and 15,000 juvenile salmon, and 300-mile average round trip.
[12] Based on moving 15,000 adult and 500,000 juvenile salmon per year, truck capacity of 80 adult and 15,000 juvenile salmon, and 300-mile average round trip.

Table 3-4. Criteria Air Pollutant Emissions for On-Road Vehicles, Trucks, and Boats under the Proposed Action (tons per year)

Vehicle	Carbon monoxide	Nitrogen oxides	PM_{10}	$PM_{2.5}$	Sulfur oxides	Volatile organic compounds
Passenger car/truck	0.783	0.044	0.009	0.003	0.0003	0.077
Motorboat	0.105	1.001	0.018	0.018	0.0382	0.050
Light commercial (hatchery) truck	0.183	0.329	0.037	0.015	0.0015	0.037
Total	**1.071**	**1.374**	**0.064**	**0.036**	**0.0400**	**0.164**
% of Analysis Area Criteria Pollutant Emissions	**0.002%**	**0.019%**	**0.013%**	**0.012%**	**0.200%**	**0.004%**

Source: EPA 2023a

compared with the No Action Alternative, the emissions would account for a small fraction (still less than 1 percent) of gasoline-powered highway vehicle and diesel-powered off-highway vehicle and equipment emissions in the Study Area counties.

Like under the No Action Alternative, impacts from emissions would be temporary and minor; emissions could result in additional short-term, minor impacts from secondary creation of pollutants in the atmosphere. Due to the mobile nature of emission sources, the estimated annual emissions and resulting impacts would be spread across the Study Area, which would result in minor, local impacts. As a result, the Proposed Action is not anticipated to result in nonattainment status for any portion of the analysis area.

Cumulative Effects

Future P2IP activities, which include improvement of existing acclimation and rearing facilities and construction of new acclimation facilities or interim upstream and downstream passage, would contribute criteria air pollutant emissions from construction and transportation activities. Emission sources would include gasoline-fueled, on-road commuter vehicles and trucks used for transportation and hauling, and non-road, diesel-fueled, heavy construction equipment such as excavators, graders, loaders, backhoes, and bulldozers. Air quality impacts would be assessed in a future environmental compliance process.

Other non-P2IP-related reasonably foreseeable actions that contribute to cumulative impacts on air quality include those that involve concurrent nearby construction activities. These include, but are not limited to, projects such as the Colville Confederated Tribes National Telecommunications and Information Administration (NTIA) 2.5 GHZ Wireless, Middle Mile and Fiber to the Home Project; Town of Coulee Dam Feeders 1, 3, and 4 Upgrade and Replacement; and Grand Coulee Dam and vicinity projects that involve geotechnical field work or involve sinkhole, ramp, pipeline, and parking lot repairs. Transportation and construction equipment used during implementation of these projects would result in criteria air pollutant emissions that, if emitted concurrently and near the P2IP Activity Area, would contribute to localized cumulative air quality impacts. Due to the mobile nature of emission sources from the Proposed Action, the potential for impacts to occur

concurrently and near other past, present, and reasonably foreseeable actions would be small, resulting in little cumulative impacts on air quality.

3.4.3 Greenhouse Gas Emissions

Affected Environment

According to EPA's 2020 National Emissions Inventory, county-level annual emissions from gasoline-powered highway vehicles and diesel-powered off-highway vehicles and equipment for Benewah County in Idaho and Chelan, Douglas, Ferry, Grant, Lincoln, Okanogan, Pend Oreille, Spokane, and Stevens Counties totaled 3,127,953 metric tons of carbon dioxide equivalent (CO_2e).[13] This represented 0.05 percent of the U.S.'s 2021 annual emission of 6,325 million metric tons of CO_2e and 3.57 percent of Washington's annual emission of 87.6 million metric tons of CO_2e (EPA 2020; EPA 2023b).

The EPA administers the Greenhouse Gas Reporting Program (40 CFR 98) which requires reporting of GHG data and other relevant information from large GHG emission sources. Large GHG emission sources include facilities in a variety of categories with emissions that exceed 25,000 metric tons of CO_2e per year.

No Action Alternative

Under the No Action Alternative, current P2IP activities, which consist of fish rearing, capture, and monitoring, as well as operating and maintaining previously installed P2IP receivers, facilities, and research sites, would continue. While emissions would be temporary, GHGs have long atmospheric lifetimes and can accumulate over time to contribute to long-term climate change impacts (IPCC 2013). The annual GHG emissions presented in **Table 3-5** are based on 40,000 annual miles traveled by passenger vehicles, 5,075 annual miles traveled by hatchery trucks,[14] and 1,560 gallons of gas used annually by four-stroke engine motorboats. Under the No Action Alternative, annual emissions from current P2IP activities (52.85369 metric tons of CO_2e) would continue to be minor, accounting for 0.002 percent of annual gasoline-powered highway vehicles and diesel-powered off-highway vehicle and equipment emissions in the Study Area counties. Motorboat travel would be the biggest contributor to annual GHG emissions from current P2IP activities.

The No Action Alternative's estimated GHG emissions of approximately 53 metric tons of CO_2e per year would be below the EPA's Greenhouse Gas Reporting Program threshold of 25,000 metric tons per year. Over the 20-year life of the P2IP, GHG emissions would result in $14,000 (2020 inflation-adjusted dollars) at 5 percent discount rate, $50,000 (2020 inflation-adjusted dollars) at 3 percent discount rate, and $75,000 (2020 inflation-adjusted dollars) at 2.5 percent discount rate in potential future damage from climate effects based on the social cost of carbon.

[13] Converted to 100-year global warming potential from the Intergovernmental Panel on Climate Change sixth assessment report: Carbon dioxide = 1, Methane = 29.8, and Nitrous oxide = 273 (IPCC 2021)

[14] Based on moving 500 adult and 160,000 juvenile salmon per year, truck capacity of 80 adult and 15,000 juvenile salmon, and 300-mile average round trip.

Table 3-5. GHG Emissions for On-Road Vehicles, Trucks, and Boats under the No Action Alternative (metric tons per year)

Vehicle	Carbon dioxide	Methane	Nitrous oxide	CO_2e^*
Passenger car/truck	13.81526	0.18144	0.00001	19.22426
Motorboat	28.42573	0.00043	0.00125	28.78103
Light commercial (hatchery) truck	4.83832	0.00015	0.00002	4.84840
Total	**47.07931**	**0.18202**	**0.00128**	**52.85369**

Source: EPA 2023a

* Using 100-year global warming potential based on the Intergovernmental Panel on Climate Change sixth assessment report: carbon dioxide = 1, methane = 29.8, and nitrous oxide = 273 (IPCC 2021)

Proposed Action

Under the Proposed Action, temporary emission of GHGs from P2IP activities, which consist of research studies, updates to existing and creating new acclimation and rearing facilities, and interim passage of fish, would accumulate over time to contribute to long-term climate change impacts. Estimated emissions are based on total maximum of 100,000 annual miles traveled by passenger vehicles, 66,250 annual miles traveled by hatchery trucks,[15] and 3,120 gallons of gas used annually by four-stroke engine motorboats. The annual emissions are presented in **Table 3-6**. While annual emissions from P2IP activities under the Proposed Action would result in over three times the GHG emissions produced under the No Action Alternative, the emissions would account for a minor fraction (0.005 percent) of gasoline-powered highway vehicle and diesel-powered off-highway vehicle and equipment emissions in the Study Area counties.

Table 3-6. GHG Emissions for On-Road Vehicles, Trucks, and Boats under the Proposed Action (metric tons per year)

Vehicle	Carbon dioxide	Methane	Nitrous oxide	CO_2e^*
Passenger car/truck	34.5311	0.4536	0.00002	48.0607
Motorboat	56.8514	0.0009	0.00251	57.5621
Light commercial (hatchery) truck	63.1604	0.0020	0.00027	63.2920
Total	**154.5500**	**0.4565**	**0.00280**	**168.9148**

Source: EPA 2023a

* Using 100-year global warming potential based on the Intergovernmental Panel on Climate Change sixth assessment report: carbon dioxide = 1, methane = 29.8, and nitrous oxide = 273 (IPCC 2021)

Hatchery truck travel would be the biggest contributor to annual carbon dioxide emissions and total CO_2e, passenger cars and trucks would be the biggest contributor of annual methane emissions, and motorboats would be the biggest contributor of annual nitrous oxide emissions from P2IP activities. The Proposed Action's estimated GHG emissions of approximately 169 metric tons of CO_2e per year would be below the EPA's Greenhouse Gas Reporting Program threshold of 25,000 metric tons per year. Over the 20-year life of the P2IP, GHG emissions would result in $43,000 (2020

[15] Based on moving 15,000 adult and 500,000 juvenile salmon per year, truck capacity of 80 adult and 15,000 juvenile salmon, and 300-mile average round trip.

inflation-adjusted dollars) at 5 percent discount rate, $160,000 (2020 inflation-adjusted dollars) at 3 percent discount rate, and $239,000 (2020 inflation-adjusted dollars) at 2.5 percent discount rate in potential future damage from climate effects based on the social cost of carbon.

Cumulative Effects

Future P2IP activities, which include improvement of existing acclimation and rearing facilities and construction of new acclimation facilities and interim upstream and downstream passage, would contribute GHG emissions from construction and transportation activities. Emission sources would include gasoline-fueled on-road commuter vehicles and trucks used for fish transportation, and non-road diesel-fueled heavy construction equipment such as excavators, graders, loaders, backhoes, and bulldozers. Impacts would be assessed through future environmental compliance.

Climate change is cumulative in nature. GHGs can last a few years to hundreds of years, mix well in the atmosphere, and accumulate over time to contribute to global climate change. Other non-P2IP reasonably foreseeable actions that contribute to cumulative impacts are those such as transportation and construction activities that emit GHGs. These include, but are not limited to, projects such as the Colville Confederated Tribes NTIA 2.5 GHZ Wireless, Middle Mile and Fiber to the Home Project; Town of Coulee Dam Feeders 1, 3, and 4 Upgrade and Replacement; and Grand Coulee Dam and vicinity projects that involve geotechnical field work or sinkhole, ramp, pipeline, and parking lot repairs. The Proposed Action would add to cumulative climate change impacts by contributing to atmospheric GHGs that accumulate over time and contribute to global climate change.

3.5 Water Quality

3.5.1 Resource Indicators

A qualitative assessment is used to evaluate changes to physical, chemical, and biological properties of water quality due to the No Action and Proposed Action alternatives.

3.5.2 Changes to Physical, Chemical, and Biological Properties of Water Quality

Affected Environment

The analysis area contains eight hatcheries and acclimation facilities and four existing net pens with current or potential P2IP use (see **Appendix B, Figure B-1**). Hatcheries, acclimation facilities, and net pens use water for incubation, rearing, and acclimation of juvenile fish, and adult holding[16]. Water from hatcheries and ponds is discharged to waterbodies after use, settling, and treatment to remove fish waste and unconsumed food. Hatchery programs are required to comply with all federal, state, and Tribal water quality standards. Hatcheries must also comply with any required National Pollutant Discharge Elimination System (NPDES) permits for effluent discharges. For any water quality-based NPDES permits issued on the Confederated Tribes of the Colville Reservation (CTCR), the EPA's regional administrator must use the CTCR water quality standards for point

[16] Existing hatchery facilities may be used to temporarily house adult salmon prior to transport and release in the blocked area.

sources[17] on the CTCR (40 CFR 131.35). For any NPDES permits issued within STOI's jurisdiction, the EPA is required to use STOI's EPA approved water quality standards.

The NPDES permits for hatcheries set effluent limits for the types and amounts of pollutants that can be discharged from facilities (EPA 2022). NPDES permits set various effluent limitations for maximum daily limits and/or average monthly limits for different kinds of facilities, which are classified by the number of days that facilities discharge, how much weight (in pounds) of aquatic animals are produced each year, if the facility conducts research on aquatic animals, and if the discharged water is treated with a fish anesthetic (EPA 2022). Effluent limits also depend on the type of effluent, such as discharges from upland facilities and offline-settling basins, and pond system discharges during harvest or fish release (EPA 2022). For example, under the general NPDES permit that covers Ford Hatchery, Chief Joseph Hatchery, Colville Tribal Hatchery, and Spokane Tribal Hatchery, the effluent limitation set for Concentrated Aquatic Animal Production facilities is a maximum daily limit of 100 milligrams/Liter total suspended solids and 1.0 milliliter/Liter settleable solids where waters are discharged directly to waters of the United States (EPA 2022). This permit contains effluent limits for all facilities for total suspended solids and settleable solids, and limits for total residual chlorine for facilities that use chlorine or chloramine-T (EPA 2022). These limits are set to ensure protection of water quality and human health (EPA 2022).

Discharges must be monitored at each outfall that is identified. All facilities must monitor flow, total suspended solids, settleable solids, and total residual chlorine when using chlorine or chloramine-T. Also, facilities that discharge to waters that are impaired for temperature and dissolved oxygen (DO) must monitor for temperature and parameters related to downstream far-field oxygen use, respectively (EPA 2022).

Water quality is monitored at all hatchery facilities, so problems may be detected and remedied. Hatchery waste products include, but are not limited to, uneaten food, fish fecal matter, soluble metabolites (for example, ammonia), algae, parasitic microorganisms, drugs, and other chemicals. Thus, fish hatchery effluents[18] may deliver nutrients, solids, and potential pollutants to the receiving environment. These effluent releases can result in increases in temperature, pH, suspended solids, ammonia, organic nitrogen, total phosphorus, and chemical oxygen demand (Ecology 1989). Water quality downstream of net pens can be affected by the introduction of waste products, such as ammonia, urea, and the products of microbial breakdown of solid wastes (Homziak 1992). However, there are typically minor impacts on water quality due to the installation of site-specific EPMs and rapid dilution of nutrients.

Physical properties of water considered in this analysis consist of temperature, pH, and sediment load. Temperature influences major ecosystem processes and has effects on aquatic life (EPA 2021). The pH is the concentration of hydrogen ions and is used to determine the acidity of water; thus, it plays a critical role in chemical processes in natural waters. Sediment load contributes to turbidity or total suspended solids, which are ways to measure water clarity. High sediment load leads to cloudy

[17] Point sources refer to point source pollution, which is any single identifiable source of pollution from which pollutants are discharged.

[18] Wastewaters (liquid waste or sewage) that flow directly into surface waters, either treated or untreated.

or muddy waters, which can negatively affect aquatic health and impact other water quality parameters, such as reducing DO due to decreased light penetration (EPA 2021).

Chemical properties of water considered in this analysis consist of DO and Polychlorinated Biphenyls (PCBs). DO is the amount of oxygen in water available to aquatic organisms and is necessary to support fish spawning, growth and activity (EPA 2021). DO levels that are either too low or too high, as well as large DO fluctuations over short periods, can be detrimental to fish health. PCBs are a group of human-made organic chemicals manufactured from 1929 until manufacturing was banned in 1979. The group has a range of toxicity. PCBs do not readily break down in the environment and can remain for long periods cycling between air, water, and soil. They can be carried long distances (EPA 2024g).

Biological properties of water considered in this analysis consist of phosphorus and nitrogen. Nutrients play a critical role in healthy functioning of aquatic ecosystems, but in excess they create one of the most common water pollution problems affecting waterbodies (EPA 2021). Phosphorus and nitrogen are important for supporting the growth of aquatic plants and algae that provide food for aquatic organisms (EPA 2021).

The water quality analysis area contains stream segments that are on Washington State's 303(d) list[19] as administered by the State under the Clean Water Act. The analysis area contains 58 streams with associated water quality parameters[20] on the 303(d) list; however, this analysis focuses on the 15 stream segments within 0.25 miles of any hatcheries, acclimation facilities, or net pen facilities (**Table 3-7**).

Table 3-7. 303(d) Waterbodies in the Analysis Area within 0.25 Miles of P2IP Artificial Production Facility

Waterbody	Pollutant	Artificial production facility within 0.25 Miles
Chamokane Creek/Tshimikain Creek	None[21]	Ford Hatchery (NPDES Permit: WAG130009) Spokane Tribal Hatchery (NPDES Permit: WAG130019)
Columbia River (Lake Entiat)	PCBs	Wells Hatchery (NPDES Permit: WAG135009) Proposed: Chelan Falls Hatchery
Columbia River (Franklin D. Roosevelt Lake)	None	Sherman Creek/Kettle Falls

[19] The 303(d) list refers to Clean Water Act Section 303(d). Section 303(d) of the Clean Water Act and the supporting regulations (40 CFR 130.7) require states, territories, and authorized Tribes to develop lists of waters impaired or threatened by pollutants and to develop Total Maximum Daily Loads (TMDLs), i.e., establish the maximum amount of a pollutant allowed in a waterbody, for these waters.

[20] Water quality parameters are factors that are measured to determine the quality of water. Parameters include physical parameters, such as temperature and salinity; chemical parameters, such as pH and acidity; and biological parameters such as bacteria and nutrients.

[21] No pollutants of concern that are analyzed within this PEA (that is, temperature, pH, sediment, phosphorus, DO, PCBs, and nutrients) are within 0.25 miles of Ford Hatchery. Chamokane Creek is listed for bacteria – fecal coliform within 0.25 miles of Ford Hatchery; however, effluent from the Ford Hatchery is not expected to be a significant source of fecal coliform loading.

Waterbody	Pollutant	Artificial production facility within 0.25 Miles
Columbia River (Lake Pateros)	PCBs	Chief Joseph Fish Hatchery Columbia River (NPDES Permit: WAG130025) Colville Tribal Hatchery (NPDES Permit: WAG130016)
Columbia River (Lake Rufus Woods)	None	Pacific Aquaculture Net Pens
Hangman Creek	DO pH	Proposed: sqweyu' (Hangman Creek)
Little Spokane River	DO pH	Proposed: sqweyu' (Hangman Creek)
Little Spokane River	Temperature	Proposed: Glen Tana
Sanpoil River	None	Proposed: Sanpoil River at Louie Creek
Spokane River	None	Little Falls Acclimation Facility Two Rivers Net Pens

Sources: Reclamation GIS 2024; EPA 2024h

No Action Alternative

Under the No Action Alternative, ongoing P2IP activities would continue to occur, including research studies and hatchery and net pen operations. Additional P2IP-related activities would be less likely to occur, and existing management of these facilities to reduce impacts on water quality within the analysis area would continue. Waterbodies would remain 303(d) listed in the Study Area for impairment (**Table 3-8**) and would be less likely to be affected by additional P2IP-related activities due to no assurance of funding for these activities. Other hatchery programs would continue to maintain operations.

The pollutant loads associated with Pacific Aquaculture's commercial net pens have been permitted by the EPA through an NPDES permit with conditions and wasteload allocations that protect the water quality of receiving waters. NPDES permits for net pens are site-specific and generally require monitoring to assess pollutant levels to verify compliance with NPDES permit conditions. EPMs would continue to be implemented to reduce the likelihood of impacts on water quality. EPMs include management practices such as efficient feed management, removal and disposal of animal mortalities, and regular maintenance of facilities, which reduce the concentration of total suspended solids (EPA 2024a).

Proposed Action

Research Studies

Under the Proposed Action, research study leads would conduct research studies such as salmon release; salmon tagging; and acquiring or collecting eggs, juvenile, or adult salmon. Salmon release could have long-term impacts by altering the population of salmon; however, given the numbers of additional fish that are proposed over the 20-year time frame, there would be little negative or positive impacts on water quality because it is unlikely that a large enough concentration of salmon carcasses from released adults would be present in any given location to cause measurable changes or adverse effects on water quality (Reclamation 2024g).

Acclimation and Rearing Facilities

Effluent discharge by land-based acclimation facilities would be expected to continue to contribute similar levels of pollutants to receiving waters as under the No Action Alternative. For existing hatcheries, an increase in artificial production intensity and the footprint of fish in the same hatchery space would result in long-term impacts on water quality because there would be an increase in the proposed number of fish. However, these impacts would be minor because any increase in fish and their impacts on water quality would be covered and addressed in the NPDES permits (Reclamation 2024g). As NPDES permits are renewed, land-based acclimation facilities would be required to comply with effluent limits that reflect current technologies and watershed conditions.

Proposed Acclimation Facilities Data Collection

Ground-disturbing activities, such as geotechnical boreholes, trenches, and groundwater monitoring wells, associated with data collection for siting land-based acclimation facilities would have the potential to directly impact the physical properties of water quality. Ground-disturbing activities would increase exposed soil, which increases the potential for release of sediment into adjacent waterbodies through erosion. Releasing additional sediment into adjacent waterbodies could affect the waterbody's beneficial use, such as water supply, recreation, and wildlife habitat.

If required, the Project Proponents' contractors would develop and implement a stormwater pollution prevention plan (SWPPP; see **Appendix F; WQ-3**) to ensure that EPMs for erosion control are implemented. In addition to the SWPPP, the Project Proponents would implement EPMs to control erosion and runoff from disturbance areas and reduce the likelihood of impacts on water quality. EPMs would include silt fence or similar devices and covering exposed soil with straw mulch or similar measures (see **Appendix F**; **WQ-1, WQ-2**). The Construction Stormwater General Permit would be required if construction activities disturb more than 1 acre; however, these activities would likely occur under 1 acre. Disturbed areas would be reclaimed after data collection was completed. Because these ground-disturbing activities would be localized and temporary, effects on water quality would be minor.

Ground-disturbing activities associated with data collection for siting land-based acclimation facilities and interim passage would also have the potential to affect the chemical properties of water since there would be a potential for spills through equipment operations. Spills could release petroleum products and other chemicals into adjacent waterbodies. Spills could affect the waterbody's beneficial use, such as water supply, recreation, and wildlife habitat. If required, the Project Proponents' contractors would develop and implement a SWPPP to manage materials delivery, storage, and containment (see **Appendix F**; **WQ-3**). The Project Proponents' contractors would implement additional EPMs to reduce the potential for release of pollutants from construction activities and potential spills, such as using spill containment and spill kits, and refueling and petroleum product storage would occur in specified areas outside the ordinary high-water mark of streams/rivers in the Study Area (see **Appendix F**; **WQ-4**, **WQ-5**, **WQ-6**, **WQ-7**, and **WQ-8**). Because these ground-disturbing activities would be localized and temporary, effects on water quality would be minor.

Ground-disturbing activities associated with data collection for land-based acclimation facilities would impact the biological properties of water because these activities would increase erosion and

the input of nutrients in soil to waterways (EPA 2024f). However, impacts would be minor because the Project Proponents' contractors would implement the same EPMs described above for erosion control (see **Appendix F**; **WQ-1**, **WQ-2**, and **WQ-3**).

Net Pens

Under the Proposed Action, expansion of existing net pen sites and the addition of a new net pen site, in addition to continued operation of existing net pens, would result in little effects on water quality due to the application of EPMs, such as efficient feeding, regular maintenance, and regular and frequent carcass removal (EPA 2024a), and the rapid dilution of nutrients (Dalsgaard 2006; Reclamation 2024g).

Interim Passage

The trap and transport of salmon through interim passage downstream could impact the biological properties of water due to the introduction of marine nutrients previously unavailable to the blocked area. However, given the numbers of additional fish that are proposed over the 20-year time frame, there would be no negative or positive impacts on water quality because it is unlikely that a large enough concentration of carcasses would be present in any given location to cause measurable changes or adverse effects on water quality (Reclamation 2024g).

Cumulative Effects

Reasonably foreseeable future actions that have the potential to impact water quality construction activities associated with the CTCR's NTIA 2.5 GHz Wireless, Middle Mile and Fiber to the Home Project; Town of Coulee Dam Feeders 1, 3, and 4 Upgrade and Replacement; the Chief Joseph Dam Powerhouse Sump Pumps and Controls; and Construction Engineering Group Parking Lot Sinkhole project.

Ground-disturbing activities associated with construction of land-based acclimation facilities and upstream and downstream fish passage under future P2IP activities would potentially have little temporary impacts on the physical properties of water quality. Ground-disturbing activities would increase exposed soil, which increases the potential for release of sediment into adjacent waterbodies through erosion. Releasing additional sediment into adjacent waterbodies could affect the waterbody's beneficial use, such as water supply, recreation, and wildlife habitat.

If required, the Project Proponents' contractors would develop and implement a SWPPP (see **Appendix F; WQ-3**) to ensure EPMs for erosion control are implemented. In addition to the SWPPP, the Project Proponents would implement EPMs to control erosion and runoff from disturbance areas and reduce the likelihood of impacts on water quality. EPMs would include silt fence or similar devices and covering exposed soil with straw mulch or similar measures (see **Appendix F; WQ-1, WQ-2**). By using concrete in construction activities associated with land-based acclimation facilities, the Project Proponents' contractors would have the potential to impact pH since concrete has a high pH (EPA 2012). This could lead to additional stress on adjacent 303(d) streams listed for pH, such as the Little Spokane River. The Project Proponents' contractors would implement the SWPPP, which would contain measures such as using concrete washout areas, to reduce impacts on water quality from concrete associated with construction activities (see **Appendix**

F; WQ-3). Construction activities would not release effluent or pollutants that would impact temperature.

Construction would also potentially have little temporary impact on the chemical properties of water, since there would be a potential for spills through equipment operations. Spills could release petroleum products and other chemicals into adjacent waterbodies. Spills could affect the waterbody's beneficial uses, such as water supply, recreation, and wildlife habitat. If required, the Project Proponents' contractors would develop and implement a SWPPP to manage materials delivery, storage, and containment (see **Appendix F; WQ-3**). To reduce the potential for release of pollutants from construction activities and potential spills, the Project Proponents' contractors would implement additional EPMs, such as using spill containment and spill kits; also, refueling and petroleum product storage would occur in specified areas outside the ordinary high-water mark of streams and rivers in the Study Area (see **Appendix F; WQ-4, WQ-5, WQ-6, WQ-7, WQ-8**).

Ground-disturbing and construction activities would impact the biological properties of water because these activities would increase erosion and input of nutrients in soil to waterways (EPA 2024f). However, there would be little impacts because the Project Proponents' contractors would implement the same EPMs described above for erosion control (see **Appendix F**; **WQ-1**, **WQ-2**, and **WQ-3**).

Operations of the proposed land-based acclimation facilities, including Sanpoil at Louie Creek, Glen Tana, and sqweyu', would be analyzed through future environmental compliance. Operations of the land-based acclimation facilities would have the same kinds of minor, temporary impacts on the physical, chemical, and biological properties of water quality as existing hatcheries. Glen Tana would be constructed adjacent to the Little Spokane River, which is on the 303(d) list for DO, and sqweyu' would be constructed along Hangman Creek, which is on the 303(d) list for DO, temperature, and pH. Land-based acclimation facilities' operations could put additional stress on the Little Spokane River and Hangman Creek for these water quality parameters with effluent discharges, as described in the No Action Alternative. Both facilities would be required to obtain an NPDES permit, through which the facilities would be required to operate. Thresholds for effluent are set under the NPDES permit and would be site-specific based on the location and pollutants of concern.

Construction activities associated with these projects would involve ground disturbance and the potential to release pollutants, including, but not limited to, sediment and petroleum products, into waterbodies in the analysis area. The Construction Stormwater General Permit would be required if construction activities disturb more than 1 acre; however, these activities would likely occur under 1 acre. When combined with past, present, and reasonably foreseeable future actions within the analysis area, the No Action Alternative and Proposed Action would both have a minor contribution to cumulative impacts on water quality; this is because ground-disturbing data collection activities under the Proposed Action could result in a temporary, minor increase in the potential to release sediment into waterbodies in the analysis area, which could result in an increase in cumulative impacts on the physical, chemical, and biological properties of water quality (Reclamation 2024g). However, there would be little impact because the Project Proponents' contractors would implement the same EPMs described above for erosion control (see **Appendix F**; **WQ-1**, **WQ-2**, and **WQ-3**).

Finally, water temperature in the Columbia River has increased by 0.72 degrees Fahrenheit per decade since 1940 (Isaak et al. 2012). Climate change projections in the Upper Columbia River Basin indicate that warmer air temperatures would lead to earlier snowmelt and more precipitation falling as rain (RMJOC-II 2020). This would result in earlier peak flows and lower summer flows (Bonneville 2020; Chang 2023). Operations of land-based acclimation facilities would occur from late fall through the early spring; therefore, they would likely not contribute to warming water conditions during the times of year that are critical for cold-water species or when conditions are monitored for 303(d) compliance. Additionally, the acclimation sites, such as sqweyu', Glen Tana, and Louie Creek, are proposed to be operated using groundwater. As such, effluent from these facilities would be cooler than surface water temperatures if they are ever operated during the summer base flow periods.

3.6 Biological Resources

This section discusses effects from the proposed P2IP activities on biological resources, including aquatic species. Under the Proposed Action, impacts on terrestrial plants and wildlife would be minor and localized. Placement of new land-based installations of receivers and the anchor for the Sanpoil Arm net pens would only involve human and vehicle presence during installation. The receivers and anchor would be small job boxes with solar panels (for the receivers) and either an I-bolt or ecology block (for the anchor). No ground disturbance would be required for these installations and EPM (**VW-3**) would prohibit job boxes placed in known populations of Ute ladies'-tresses (a terrestrial plant species listed by the USFWS as Threatened) along the Columbia River.

Geotechnical and groundwater testing to inform design and future construction of new facilities would have minor impacts on terrestrial plants and wildlife because test wells and trenches would be temporary and localized (see **Appendix B and C**). EPMs (**VW-1**, **VW-2**, and **FR-13**) such as minimizing surface disturbance and mitigating temporarily disturbed areas would limit the extent and intensity of some impacts. Reclamation, Bonneville, or USACE standards for geotechnical investigations would be followed for all project components where geotechnical investigation is necessary (**FR-13**). Wildlife could avoid the installation and testing sites during activity.; Project activities would not result in permanent habitat alterations. A short-term loss of vegetation would occur on less than 0.5 acres at each of the land-based acclimation geotechnical investigation sites including the stream terrace of Hangman Creek at sqweyu', Louie Creek stream terrace, and the Upper Sanpoil site where equipment operations remove or injure vegetation (Appendix B). Vegetation would recover from those activities after three years.

Remaining P2IP activities, including operation and maintenance of P2IP telemetry and acoustics on released salmon; egg collection and transport; juvenile and adult salmon rearing at existing hatcheries, net pens, and facilities; release of juvenile and tagged fish; and the trapping and transportation of adult salmon, would have no adverse impacts on terrestrial plants and wildlife. Some wildlife may benefit from feeding on adult salmon carcasses found in the waters after spawning, or smolts released from facilities (Bonneville 2010). Overall, there would be little to no direct and indirect effects on terrestrial species from P2IP-related activities. Therefore, terrestrial plants and wildlife are not discussed further in this section.

3.6.1 Resource Indicators

The following resource indicators are used to evaluate the potential impacts to biological resources from the No Action and Proposed Action alternatives:

- Potential for translocated fish interaction with resident fish, indicated by the increased number of fish released into the blocked area
- Injury and mortality to resident fish, including non-target fish mortality, indicated by number of new fish traps and increased operation of existing traps
- Competition for food and habitat
    - Predator-prey changes

3.6.2 Affected Environment

The affected environment includes Lake Roosevelt, Rufus Woods Lake, and Wells Reservoir (a.k.a. Lake Pateros)(see **Appendix A, Figure A-2**). Within Lake Roosevelt, the largest tributary is the Spokane River, which begins at the outlet of Lake Coeur d'Alene, Idaho, and enters the Columbia River about 44 miles upstream of Grand Coulee Dam. The Spokane River has three major tributaries: the Little Spokane River, Hangman (a.k.a. Latah) Creek, and Chamokane Creek in the lower part of the basin.

All native anadromous salmon and Pacific lamprey have been extirpated from the Columbia River above Chief Joseph Dam, except for small experimental and ceremonial releases that do not function as a self-sustaining population. Lake Roosevelt (including the Columbia River upstream to the United States-Canada border) hosts 15 native and 12 nonnative fish species (USACE, Reclamation, Bonneville 2020). Primary harvest fisheries include hatchery rainbow trout, kokanee salmon, and walleye. The lake supports popular fisheries and fishing tournaments for rainbow trout, walleye, and bass. Other game fish include yellow perch, lake and mountain whitefish, black crappie, bullhead, sunfish, and catfish. Nongame species such as suckers, redside shiners, dace, and sculpins provide a prey base. Bull trout, westslope cutthroat trout, brook trout, and brown trout are encountered but much less frequently than the key sport fishery species in Lake Roosevelt (Underwood and Shields 1996; Cichosz et al. 1997). The non-salmonid community, once composed of lamprey, burbot, white sturgeon, suckers, and other native fish such as northern pikeminnow, is now dominated by walleye and smallmouth bass. In addition, mountain whitefish have been displaced, though not entirely, by lake whitefish (Cichosz et al. 1997).

Thirty-three species of fish occur in Rufus Woods Lake, currently or historically. The fish community includes 19 native species and 12 nonnative species. Nonnative species include walleye, smallmouth bass, brook trout, brown trout, and hatchery rainbow trout. Native species include bridgelip sucker, sculpin, dace, and mountain whitefish (Hunner and Jones 1996). The major contributors to Rufus Woods fisheries are walleye, rainbow trout, kokanee, smallmouth bass, lake whitefish, and burbot. Mountain whitefish support midwinter tributary fisheries. Kokanee (a non-anadromous form of sockeye salmon) spawn in the Nespelem River, the largest tributary of Rufus Woods Lake (Beeman et al. 2003). Since kokanee salmon and rainbow trout composed 89 percent of the experimental gillnetting catch in the Grand Coulee Dam forebay, it is assumed a large number of fish immigrating to Lake Rufus Woods are kokanee and rainbow trout (LeCaire 1999).

The anadromous fish passage at Wells Dam enables functional populations of salmon and steelhead to migrate through Wells Reservoir/Lake Pateros to reach spawning grounds in connected tributary streams. The resident fish assemblage in Wells Reservoir and downstream tailrace is composed of a diverse community of native and introduced, warmwater and cold-water, and recreational and non-recreational fish species. Since the construction of Wells Dam in 1967, several assessments have either directly or indirectly studied the resident fish assemblage in the Wells Reservoir (McGee 1979; Douglas County PUD 2007). These assessments have identified more than 20 species of resident fish, including pumpkinseed, rainbow trout, black crappie, smallmouth bass, mountain whitefish, yellow perch, peamouth, northern pikeminnow, dace, shiners, suckers, and sculpins. The resident fish assemblage in Wells Reservoir/Lake Pateros is similar to the assemblages in Lake Roosevelt, except adult Chinook and sockeye salmon migrate through Wells Reservoir to arrive at tributary spawning grounds in the Methow and Okanogan subbasins annually. Migratory bull trout are also present from spawning populations in the Methow and Entiat subbasins.

Native freshwater mollusks in the Columbia River basin include the California floater mussel (*Anodonta californiensis*) and Columbia pebblesnail (*Fluminicola fuscus*) (Oregon Biodiversity Information Center 2016). Their importance in the Columbia River Basin comes from their ecosystem functions, which benefit native fisheries such as kokanee and redband trout. Freshwater mollusks filter algae, bacteria, and plankton from water, and then expel unneeded materials, which become food for aquatic insects (Nedeau et al. 2009). Mussels stir benthic sediments, releasing nutrients and providing habitat for insect larvae for adherence to a substrate (Nedeau et al. 2009).

No Action Alternative

Under the No Action Alternative, current and ongoing activities would continue. These include the collection, transport, and release of adult and juvenile salmon (**Appendix A**) and the operation and maintenance of currently installed equipment (six net pens on Lake Roosevelt and two net pens in Rufus Woods Reservoir) and receivers (**Appendix B**). Additional proposed P2IP-related activities would be less likely to occur due to no assurance of funding. Under the No Action Alternative, current management practices would continue. Other hatchery programs, such as the Chief Joseph Hatchery Program (CJHP), would continue to maintain operations. Up to 180,000 juvenile Chinook salmon, 2,000 adult Chinook salmon, and 500 sockeye salmon would continue to be released annually into the blocked area from previously identified sources. The effects of broodstock collection and hatchery fish production and release from the CJHP are summarized in the ROD for the CJHP and the Tribal Resources Management Plan for the Confederated Tribes of the Colville Reservation (Bonneville 2010; USFWS 2014).

Effects to Resident Fish, Including Non-target Fish Mortality (for example, Bull Trout)

Under the No Action Alternative, the collection, transport, and release of adult Chinook salmon would continue to occur. This would continue to benefit the increase in salmon populations. Though unlikely to occur at Chief Joseph Hatchery, if bull trout are captured, there would be minor effects on individuals, including stress, injury, or potential mortality; this is because they are covered by compliance under current operations (USFWS 2014; Bonneville 2006). However, these activities under the No Action Alternative would take place during times when bull trout are typically in tributaries; therefore, the likelihood of encountering individuals would be extremely low (USFWS 2014; Bonneville 2006).

Releasing salmon would maintain spawning and nursery area productivity for resident predators, such as rainbow trout and bull trout. The resilience of resident fish to withstand the climate-induced stressors, such as drought and increasing water temperatures would be maintained because juvenile salmon releases increase the prey base and adult salmon releases supplement marine-derived nutrient inputs known to benefit aquatic ecosystem productivity (Wipfli et al. 2011; Bilby et. al.1998). Juvenile salmonids provide high-quality forage for bull trout and other native species and increased natural production over time aids in the diversification of the forage base for native species (NOAA, NMFS 2022). Keystone species like Pacific salmon have a disproportionately large effect on the broader natural environment relative to the specific species abundance. Salmon are known as one of nature's "force multipliers," supercharging benefits across entire ecological communities. Their health influences the whole ecosystem, including bull trout. They are food for other species. Their bodies enrich habitats through cycling of nutrients from ocean to rivers (CDFW 2024).

Acclimation facilities use water for incubation, rearing, and acclimation of juvenile fish, and adult holding. This could affect water quality in local areas, particularly for resident species, including freshwater mollusks. Acclimation and net pen waste products include uneaten food, fecal matter, soluble metabolites (for example, ammonia), algae, parasitic microorganisms, drugs, and other chemicals. Thus, fish-rearing effluents may deliver nutrients, solids, and potential pollutants to the receiving environment. These effluent releases can result in increases in temperature, pH, suspended solids, ammonia, organic nitrogen, total phosphorus, and chemical oxygen demand (Ecology 1989). However, hatchery programs are required to comply with all federal, state, and Tribal water quality standards; thus, these impacts would continue to be short term and minor.

Competition for Food and Habitat

Continuation of the current releases of salmon under the No Action Alternative could directly affect the competition with other fish species, resulting in minor competition due to non-limiting populations of zooplankton[22], which are small, aquatic microorganisms eaten by other aquatic organisms (UCUT 2019). Based on studies from Phase 1, competition for space between resident species and reintroduced salmonids would be more likely to occur in tributary habitats, whereas competition for food would be more likely to occur in reservoir habitats. Competition between redband trout and reintroduced salmonids would be more likely in tributary habitats, whereas competition between reintroduced salmonids and kokanee would occur in reservoir habitats (UCUT 2019). Although juvenile salmon would compete for food with native resident fish, the adult salmon would provide nutrients to the watershed when they die. There is uncertainty regarding the net gain or loss of food due to the addition of adult and juvenile salmon.

Predator-Prey Changes

Smallmouth bass, walleye, and northern pike were identified as the primary predators of juvenile salmon in Lake Roosevelt and its tributaries during Phase 1 (UCUT 2019). Walleye were introduced to Lake Roosevelt and have since dispersed throughout the Columbia River Basin (NPCC 2004) and are established and breeding. Suppression efforts by the CTCR, STOI, and WDFW are aimed at keeping northern pike from becoming widely established in Lake Roosevelt. Studies from Phase 1

[22] Non-limiting populations of zooplankton refer to zooplankton species where the population size is not controlled by the availability of their primary food source and can fluctuate based on other factors like predation or environmental conditions.

showed an overall high predation risk to introduced juvenile salmon, which could continue under the No Action Alternative; however, this would vary greatly depending on spatial and temporal overlap with potential predators (UCUT 2019).

Sepulveda et al. (2013) found that juvenile salmon dominated northern pike diet when salmon were present; but pike selected other resident fish for consumption when salmon were not available, thereby interacting with both salmon and resident fish. Phase 1 studies showed that northern pike exhibited a low predation risk to juvenile sockeye, Chinook, coho, and steelhead salmon in tributaries. The risk of predation increased in main stem and reservoir habitats. Thus, the potential benefits for northern pike under the No Action Alternative would continue to depend on where juvenile salmonids would be co-occurring post-introduction.

Multiple pike suppression efforts are underway with multiagency funding and support, such as "Northern Pike Suppression and Monitoring," the joint project between the CTCR, STOI, and WDFW (USACE, Reclamation, Bonneville 2020).

Proposed Action

The Proposed Action would include federal funding and authorizations to support a long-term study to test the feasibility of reintroducing salmon in the blocked area through juvenile and adult salmon research studies; developing and operating fish holding, rearing, and acclimation facilities; and developing, testing, and operating interim fish passage systems. Under the Proposed Action, there would be up to 250,000 juvenile Chinook and sockeye salmon of each species, up to 15,000 adult Chinook salmon, and 15,000 adult sockeye released into the blocked area annually. See **Appendix A** for more information.

Research Studies

Research studies would include obtaining hatchery and natural-origin juvenile Chinook and sockeye salmon from hatcheries, blocked area tributary traps, beach seining, or main stem Columbia River collection facilities downstream of Chief Joseph Dam. Additional screw traps and required anchoring may occur in the Kettle River, Little Spokane River, Hangman Creek, and/or other tributaries of Lake Roosevelt. Fish would be passively trapped, and juvenile salmon would be tagged at the trapping location or while at the facility in which they were reared.

Salmon releases would occur at release locations throughout the Study Area. Juvenile salmon releases may occur via hatchery truck at existing boat ramps, directly from net pens, or shore-based releases by hiking fish in buckets to release locations. Similarly, adult salmon release may occur via hatchery truck at existing boat ramps or shore-based methods. No new facilities or motorized access routes are being proposed to facilitate salmon releases (see **Appendix A** for more information on proposed research studies).

<u>Injury and Mortality to Resident Fish, Including Non-Target Fish Mortality</u>

Under the Proposed Action, the effects of research studies would be similar to those described under the No Action Alternative; however, there would be additional trapping in the blocked area, receivers installed for resident fish studies, and an increase in salmon acquisition and tagging depending on the success of rearing activities and trapping. These could result in minor stress to

individuals and more potential for injury or mortality, compared with the No Action Alternative (Music et al. 2010).

Given the low abundance of bull trout in the P2IP Activity Area, combined with the minor and short-term risk of injury or mortality from the research activities, there would be little to no effect on bull trout (CRSO EIS 2020). There could be minor effects for other resident species that are more abundant. These effects would only occur during the duration of the proposed research activities and would be short term.

There would be EPMs (**Appendix F**) to minimize stress and the potential for injury or mortality, including limitations on the duration of trapping, limits on the duration of traps holding ESA-listed fish, and allowance for free passage of ESA-listed fish migrating through trapping sites in main stem and tributary river locations when those sites are not being actively operated. The Proposed Action would directly benefit salmon species by restoring the decreased populations in the Upper Columbia River Basin. By increasing salmon releases, the Proposed Action would promote restoration of the salmon populations (NOAA, NMFS 2022).

Competition for Food and Habitat

Research activities, including the release of fish at various locations throughout the Study Area, could affect the competition for food and habitat between introduced salmonids and resident species. The effects would be greater than described under the No Action Alternative but would still be short-term and little. Competition for food and habitat would increase at sites where the salmon are released and would diminish as individuals spread throughout the waterbodies within the Study Area. Over the long term, salmon would contribute to the balance for competition between predator and prey. Additionally, the release of more salmon in the blocked area would increase the presence of marine-derived nutrients that anadromous salmon provide, resulting in a beneficial impact on resident fish and their habitat.

Predator-Prey Changes

The release of salmon after rearing, trapping, and tagging could affect predator-prey relationships between salmon individuals interacting with native and nonnative populations. There would be minor and short-term effects on predator-prey relationships, compared with the No Action Alternative, due to the slight increase in more fish being available for resident fish, such as bull trout, to prey on.

The release of salmon after trapping and tagging could potentially benefit northern pike by increasing the availability of prey resources, but the net effect on the native fish populations in the long-term is uncertain. If any minor beneficial effects occur, they would be slightly greater than those described under the No Action Alternative.

Acclimation and Rearing Facilities

The Proposed Action would entail use of existing artificial production facilities and net pens, upgrades to existing facilities, and development of new net pen locations and acclimation facilities. The Proposed Action would implement an expansion to 12 net pens located at Sherman Creek/Kettle Falls and Two Rivers in Lake Roosevelt, and Pacific Aquaculture facilities in Lake

Rufus Woods to rear Chinook salmon from fall parr to yearling smolts. At existing net pen sites, the additional net pens would be attached to existing or new infrastructure, such as docks, and managed similarly to the ongoing rainbow trout net pen programs. Up to four net pens would be installed in the Sanpoil Arm of Lake Roosevelt for overwinter acclimation of salmon. Although the primary near-term need is for Chinook, it is conceivable that net pens would also be used for sockeye in this location at some point during P2IP implementation.

Existing hatchery programs, such as the Wells Hatchery, Entiat National Fish Hatchery, Ford Fish Hatchery, Spokane Tribal Hatchery and nikwin' Hatchery, would continue to maintain P2IP operations under the Proposed Action.

Injury and Mortality to Fish, Including Non-Target Resident Fish Mortality

Under the Proposed Action, salmon would be held in artificial production facilities to rear juvenile salmon from fertilized eggs through subyearling life stages. There is the potential that individuals inside the net pens could endure injury and potential mortality from rearing activities. There would be four new net pens constructed under the Proposed Action, which could cause resident individuals outside net pens to temporarily avoid the area during construction activities. These effects are expected to be little and only for the duration of rearing activities. The proposed activities would take place outside bull trout critical habitat; therefore, encountering individuals would be extremely low (USFWS 2014; Bonneville 2006). To reduce effects on individuals inside the net pens, an artificial production veterinarian would conduct fish health checks if there were any signs of disease or increased observations of mortalities during routine feeding and inspection activities.

Existing net pens and acclimation facilities would continue to be used and expanded. Water quality would be affected from hatchery waste products entering the water, which could influence temperature, pH, and nutrients in the water. Because bull trout are sensitive to environmental changes, these changes in water quality could increase the risk of injury or mortality; however, the impact would be little to no effect due to the application of the EPMs described in **Appendix F**.

Injury to bull trout from rearing facilities would be very unlikely, and there would be little to no effects on individuals. Tribes would conduct a health screening for fish prior to moving the fish to the blocked area to minimize any potential for adverse effects. Additionally, EPM **FR-10** describes that net pens would be checked once per week to remove any mortalities present (see **Appendix F**). This would minimize the potential for the spread of disease.

Competition For Food and Habitat

Acclimation and rearing facilities would not increase the potential for competition for food and habitat in the short term, as fish would be held and fed in hatcheries and net pens until their release (UCUT 2019).

Predator-Prey Changes

Acclimation and rearing facilities would not increase the potential for predator-prey changes in the short term, as fish would be held in hatcheries and net pens until their release. There would be no potential for inadvertent benefits for northern pike because salmon would be kept in net pens until release.

Interim Fish Passage

Under the Proposed Action, trapping and transport of salmon would occur at Chief Joseph Hatchery, Entiat National Hatchery, Wells Hatchery and Dam, Rocky Reach Juvenile bypass, Priest Rapids Dam, and the Okanogan River confluence. Fish would be captured using traps or nets, deposited into a truck, and transported to blocked area release locations.

Injury and Mortality to Fish, Including Non-Target Fish Mortality

As with the No Action Alternative, minor effects on fish species could occur from trap and transport activities. During the course of these activities, fish handling could cause injury or increased stress on individuals (Kock et al. 2020). Under the Proposed Action, there would be a short-term, slight increase in the potential for injury, mortality, or non-target capture of individuals, compared with the No Action Alternative. Operations of facilities would not be extended or increase the fish numbers. However, the CJHP ladder may be operated longer than it has been operated in the past but still within current authorizations. Though unlikely to occur at Chief Joseph Hatchery, if bull trout are captured, there would be minor effects on individuals, including stress, injury, or potential mortality. The same effects would occur on non-target salmon and steelhead that may be incidentally captured during activities. However, the proposed activities would take place during times when bull trout are typically in tributaries and the likelihood of encountering individuals in the main stem would be extremely low (USFWS 2014; Bonneville 2006). Over the long term, resident species and habitat would benefit from the releases of salmon, as described under the *Research Studies* section above.

Incidental capture of non-target fish species could also occur from the proposed interim passage activities. There would be potential for ESA-listed adults to be encountered during adult trapping efforts downstream of Chief Joseph Dam. These effects would occur in the long term. Any effects on salmon and non-target fish species, including bull trout, would be reduced by applying EPMs (**Appendix F**) to minimize the risk of harm to ESA-listed salmon and steelhead. These measures include the same measures as described under *Injury and mortality to fish, including non-target resident fish mortality (for example, bull trout)* subsection for *Research Studies* above.

Trap and transport activities would have little direct effect on water quality because the volume of effluent discharge into waterbodies would be negligible compared with the total volume of the waterbodies. As a result, there would be little to no indirect effects on fish.

Competition For Food and Habitat

Under the Proposed Action, the trapping and transport of adult fish would not directly affect competition for food and habitat. The amount of prey for resident fish in the blocked area would not change as a result of the passing of adult salmon because Pacific Chinook and sockeye cease feeding during their spawning migration. A temporary, increase in competition for zooplankton would occur in localized portions of the blocked area where juveniles are released. Competition for zooplankton would dissipate as juvenile disperse from the release location. An increase in salmon carcasses in the blocked area would increase the abundance of nutrients and potential food for primary consumers that would begin to offset competition for zooplankton over the long-term. Upon the release of salmon, the effects on competition between resident fish and introduced salmonids for food and habitat would be the same as described under the *Research Studies* section.

Additionally, as described above, the release of more salmon in the blocked area would increase the presence of marine-derived nutrients that anadromous salmon provide, resulting in a beneficial impact on resident fish and their habitat.

Predator-Prey Changes

Under the Proposed Action, the trapping and transport of fish would not directly affect predator-prey dynamics. Upon the release of salmon, the effects on predator-prey dynamics between resident fish and introduced salmonids would be the same as described under the *Research Studies* section. Predation of introduced juvenile salmon would vary greatly depending on the spatial and temporal overlap with potential predators, as described under the No Action Alternative.

Trap and transport activities under the Proposed Action could indirectly affect northern pike. Compared with the No Action Alternative, the risk of northern pike predation on introduced salmonids and resident species would be expected to increase in main stem and reservoir habitats based on Phase 1 studies. However, there would be pike suppression efforts to neutralize these impacts (USACE, Reclamation, Bonneville 2020).

Cumulative Effects

Ongoing activities, such as the "Northern Pike Suppression and Monitoring" efforts, would continue under both alternatives. The cumulative effects of this effort would limit the potential for increasing prey abundance to benefit invasive northern pike and walleye. The slight benefits to pike from the Proposed Action, in combination with the suppression activities by the state and Tribes, would result in a neutral outcome (USACE, Reclamation, Bonneville 2020).

Future P2IP activities associated with research studies, acclimation and rearing facilities, and interim passage would impact aquatic and terrestrial wildlife and plants, as described in the Proposed Action; however, these types of activities would occur at additional locations and would be analyzed in a future environmental compliance process when these activities are considered. The potential impacts from the future construction of upgrades to Little Falls acclimation facilities would be analyzed in future environmental compliance documentation if federal funds are used.

Some of the future activities include construction of interim upstream passage equipment and facilities. Any major construction activities such as these would have potential new impacts on terrestrial wildlife, including increased traffic, noise, and surface disturbance. Terrestrial plants may be uprooted or trampled from travel and construction. Additionally, fish may be affected by noise occurring near their habitats, as well as increased sedimentation into waterways from ground disturbance. As more hatcheries and acclimation facilities are constructed, more fish may be reared and released, which could increase the effects described above under the Proposed Action.

The proposed P2IP activities, in combination with present and reasonably foreseeable future activities, would affect fish as described under the Proposed Action. Current and reasonably foreseeable actions unrelated to P2IP in the analysis area with the potential to affect terrestrial and aquatic resources include the existing hatcheries (listed in **Appendix B**) and the Colville Confederated Tribes NTIA 2.5 GHZ Wireless, Middle Mile and Fiber to the Home Project. These actions would require new road development and construction of new towers and fiber cables. This

would cause noise disturbances, which could result in fish and wildlife temporarily avoiding the Study Area until projects conclude. Additional water quality impacts from sediment from construction activities and the potential for injury and mortality of fish species from the other activities could occur.

The reintroduction of salmon to areas upstream of Chief Joseph, Grand Coulee, and Spokane River dams would allow fish access to habitat that may be subjected to climate change effects expected to occur over the next 80 years (see **Section 3.2**). Current salmon releases provide a basis for the research necessary to design fish passage facilities and consider donor stocks' resilience to climate-induced stressors. Indirectly, the addition of anadromous juvenile and adult fish would provide additional direct food resources to native resident fish and indirect resources in the form of more robust invertebrate communities.

Present and reasonably foreseeable future project activities would have their own environmental compliance requirements to reduce potential erosion and other impacts on fish, as described above. Releasing salmon into the blocked area and researching their movements would inform feasibility of restoring salmon to their historical range. The action would benefit most resident fish in the blocked area from prey base and nutrient supplements, partially offsetting the ongoing future actions such as harvest.

ESA-listed bull trout are highly sensitive to environmental disturbances and may endure non-target capture and potential mortality. The probability of P2IP activities encountering a bull trout is low due to bull trout's extremely low abundance in the Study Area. Applying the EPMs over the term of the action will minimize the potential for the action to adversely affect Upper Columbia Steelhead, Spring Chinook, and bull trout. Additionally, other resident fish may experience temporary, minor increased competition from releases of juvenile salmon in localized areas near release sites until those fish migrate.

3.7 Cultural Resources

3.7.1 Cultural Resource Overview

"N p̓ k̓ʷátkʷ" and *"nx̣ʷntkʷitkʷ"*—the Big River (Columbia River)[23]—and its tributaries have served as the backbone of the Columbia River Basin ecosystem since time immemorial (DOI 2024). The river is a living entity that has allowed diverse populations of the ancestral and descendant peoples of the lands now comprising Washington, Oregon, Idaho, and British Columbia to thrive for thousands of years (DOI 2024). Traditional knowledge and oral histories, ethnographic accounts, archaeological studies, and historical records provide information on the relationship of Indigenous peoples to the natural and cultural resources in the vicinity of the P2IP locations. Millennia of

[23] Per the DOI Tribal Circumstances Report (DOI 2024), the Columbia River is known in various regional Indigenous languages by names including "Nch'i-Wàna" (spoken by Palus, Chief Joseph Band of Nez Perce, Warm Springs, Yakama, and other tribes), "np̓k̓ʷátkʷ" (Columbia Salish language, or nxaʔamxčín, spoken by Wenatchee, Entiat, Moses-Columbia, and Chelan), and "nx̣ʷntkʷitkʷ" (Colville-Okanogan language, or nsəlxcin, spoken by Methow, Sanpoil, Okanogan, Nespelem, Colville, and Lakes), all meaning "Big River." The Nez Perce refer to the Columbia River as "q'alawn."

occupation, use, and stewardship of the Columbia Plateau are represented in the numerous cultural resources dating to the precontact and historic periods. These cultural resources include historic buildings, structures, objects, districts, landscapes, archaeological sites, traditional cultural properties (TCPs), historic properties of religious and cultural significance to Indian Tribes (HPRCSITs), and sacred sites.

The NHPA provides direction for federal agencies to meet obligations for the protection of cultural resources. Cultural resources include things and places that demonstrate evidence of human occupation or activity related to history, architecture, archaeology, engineering, and culture. Historic properties, as defined by the regulations implementing Section 106 of the NHPA (36 CFR 800.16(l)), are a subset of cultural resources that meet defined eligibility criteria for inclusion in the National Register of Historic Places (NRHP). Historic properties may be districts, sites, buildings, structures, artifacts, ruins, objects, works of art, or natural features important in human history at the national, state, or local level, or properties of traditional religious and cultural importance to an Indian Tribe. Historic properties include precontact resources that predate European contact and settlement. TCPs are properties eligible for inclusion in the NRHP because of their association with the cultural practices or beliefs of a living community that are rooted in that community's history and are important in maintaining the continuing cultural identity of the community (Parker and King 1998).

The regulations that implement Section 106 require that federal agencies make a "good faith effort" to identify and evaluate cultural resources for eligibility for listing on the NRHP (36 CFR 800.4(b)(1)). They also stipulate that federal agencies evaluate, consider, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties (36 CFR 800.4(c)). This is accomplished through public involvement and consultation with State Historic Preservation Officers, Tribal Historic Preservation Officers, affected Tribes, state and federal agencies, and special interest groups. To support the PEA analysis, the Co-lead Agencies completed a Cultural Resources Overview Report, which details the historic properties located within 1 mile of each P2IP location to support the PEA analysis (Haney et al. 2024). The Co-lead Agencies would complete project-by-project NHPA, Section 106 compliance for specific P2IP activities.

For those projects that would not result in adverse effects on historic properties, even if one were present, the agencies would fulfill their Section 106 responsibilities by preparing the documentation needed for a Finding of No Potential to Cause Effects, as described in 36 CFR 800.3(a)(1). The agencies anticipate applying a Finding of No Potential to Cause Effects to the following seven classes of actions: acquire/collection of eggs, juvenile, or adult salmon; interim passage as provided by trap and transport; mark (tag) salmon; rearing (not to include construction of new rearing facilities); salmon release; spawning and carcass surveys; and operation and maintenance of existing telemetry receivers.

For the other P2IP activities, the agencies have determined that the activities have the potential to result in adverse effects on historic properties, should one be present in the Area of Potential Effects, for those individual actions. For these activities, the agencies would consult with the appropriate state or Tribal Historic Preservation Officer and Tribes, as described in 36 CFR 800.3 to 36 CFR 800.6. This would include consultation about the Area of Potential Effects, the level of

effects to be used to identify historic properties, and findings of effect. In some cases, the agencies would request to expedite consultation as described in 36 CFR 800.3(g), especially for small activities that have little to no potential to result in adverse effects. Should the agencies reach a Finding of Adverse Effects for an individual P2IP activity, they would consult with the appropriate parties on ways to resolve the adverse effects.

3.7.2 Resource Indicators

As defined by federal regulations, historic properties (that is, cultural resources eligible for inclusion in the NRHP) are subject to determination of effects of federal undertakings and the resolution of any adverse effects. The criteria of adverse effect (36 CFR 800.5(a)(1)) are used to determine whether a federal undertaking would affect a historic property. Any element of an undertaking will have an adverse effect if it may alter, directly or indirectly, the characteristics of a historic property that would qualify the property for inclusion in the NRHP, in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration should be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Potential adverse effects include the following:

- Physical, visual, or auditory impacts on known or potential TCPs as a result of P2IP activities
- Physical, visual, or auditory impacts on a historic property or cultural resource through agents such as inundation and shoreline fluctuation or potential ground disturbance
- Damage or alteration of a portion of a historic property, removal or modification of a portion of the property, or changes in the setting or character of a historic property
- The impact indicator for American Indian sacred sites is the potential to disturb or limit access to such sites (Executive Order 13007).

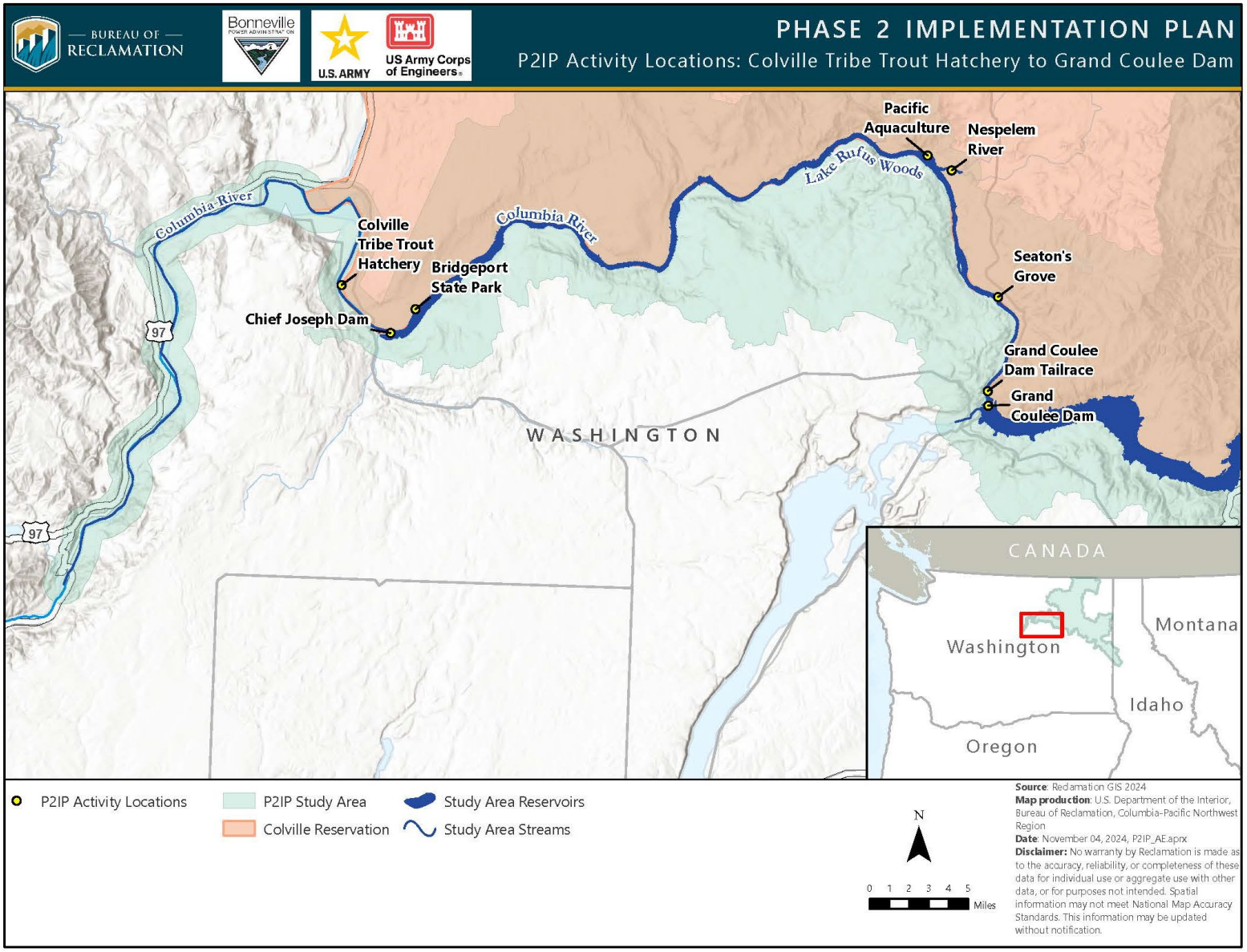

Figure 3-1. P2IP Activities Locations: Colville Tribe Trout Hatchery to Grand Coulee Dam

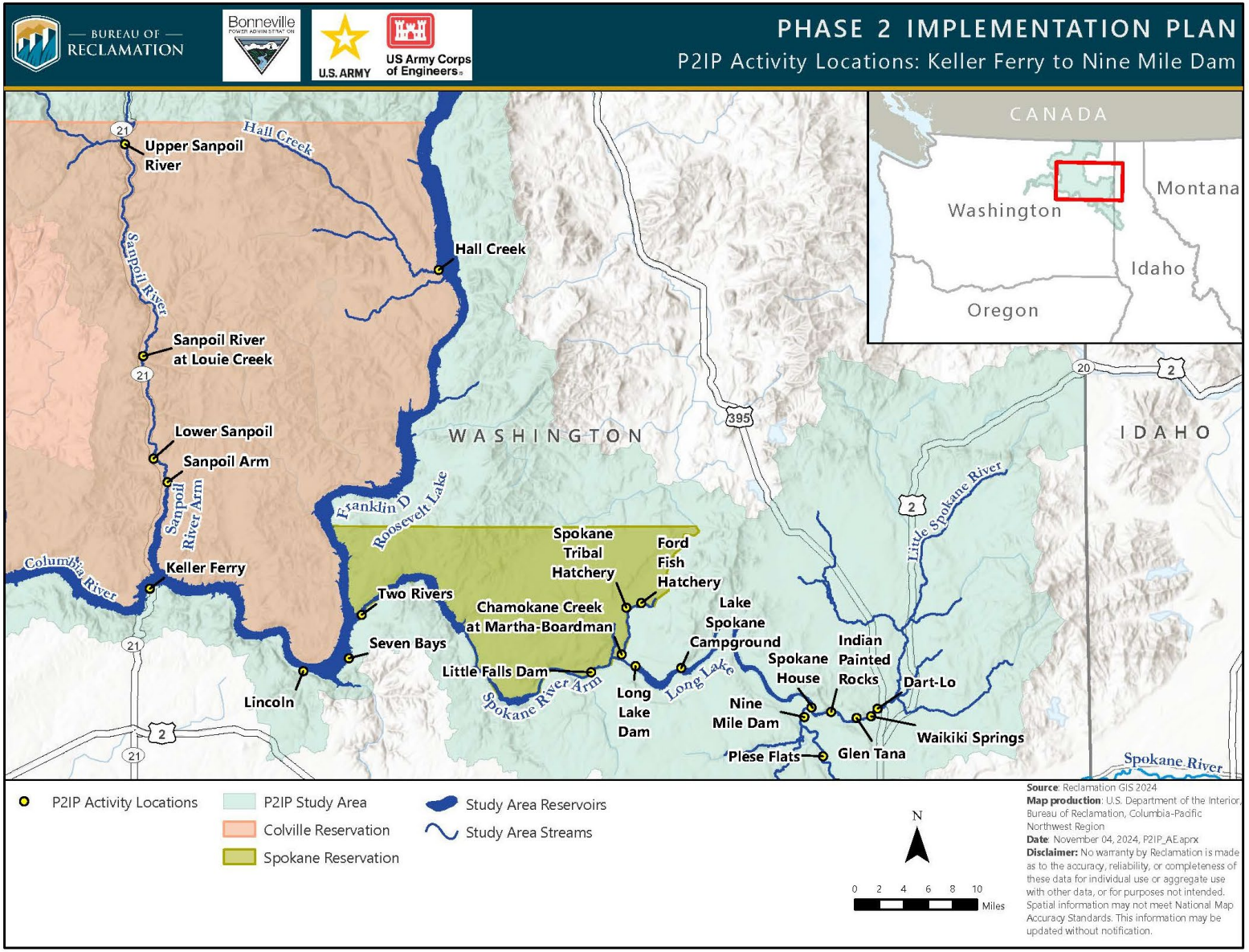

Figure 3-2. P2IP Activities Locations: Keller Ferry to Nine Mile Dam

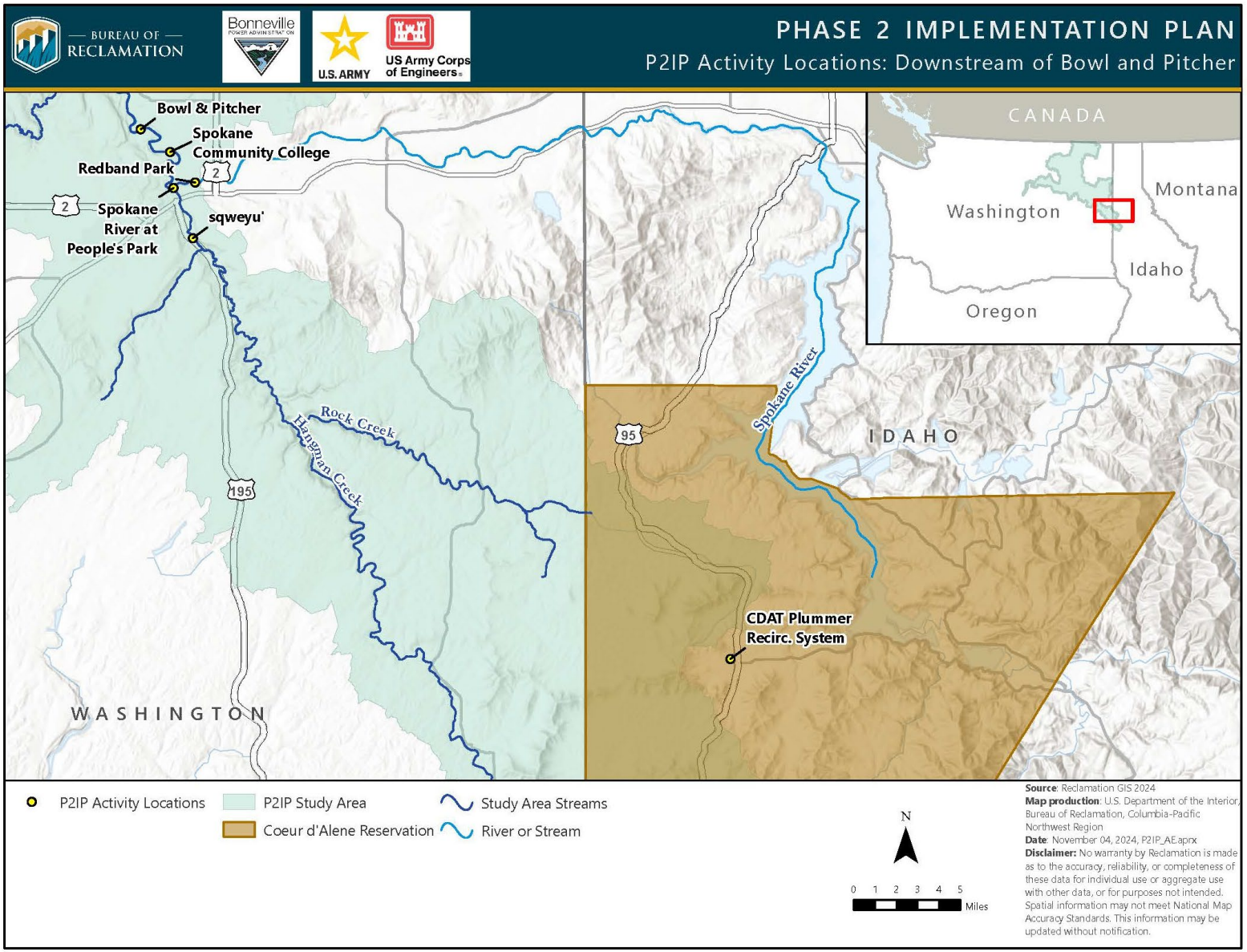

Figure 3-3. P2IP Activities Locations: Downstream of Bowl and Pitcher

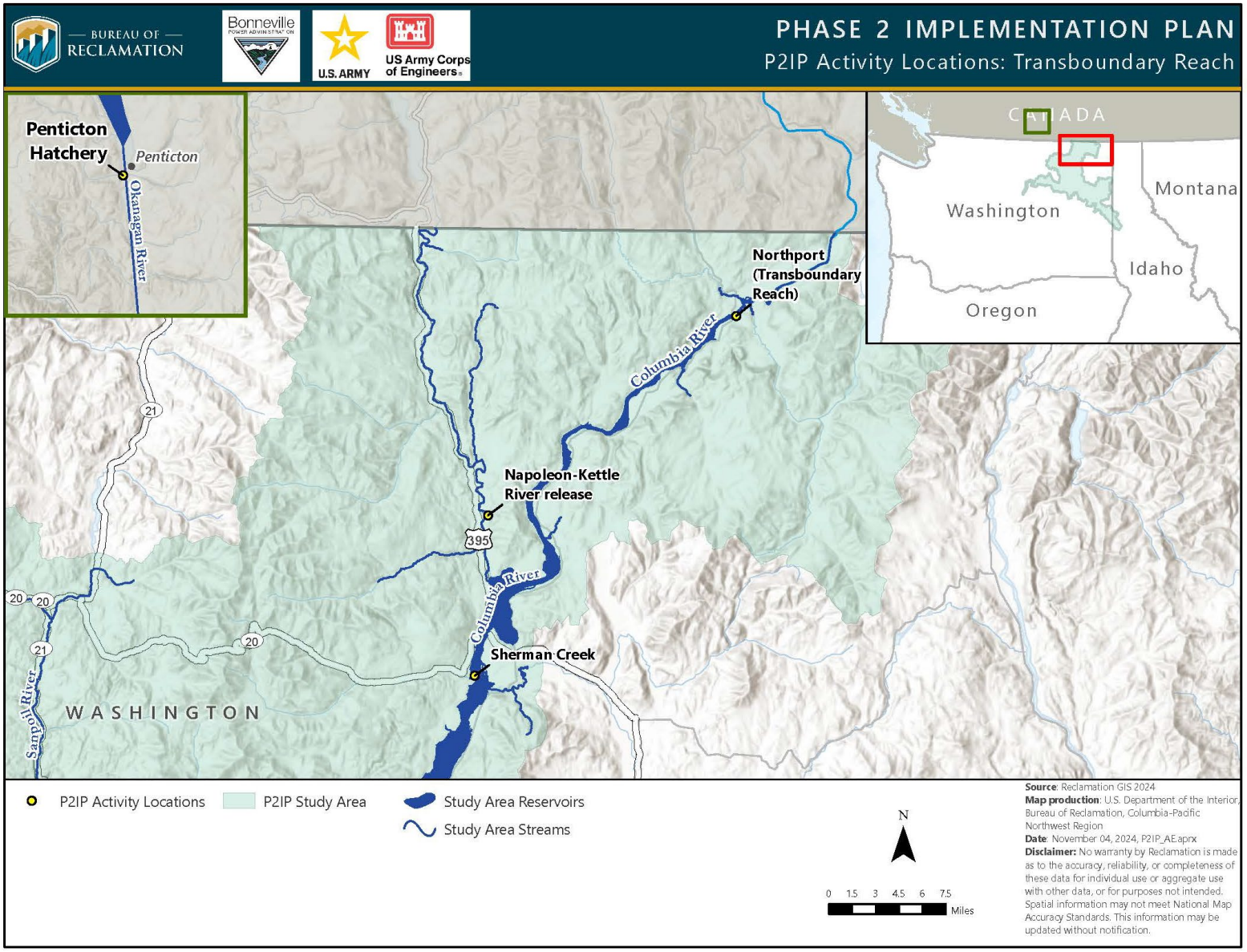

Figure 3-4. P2IP Activities Locations: Transboundary Reach

3.7.3 Impacts on Cultural Resources – Sacred Sites

Affected Environment

A comprehensive review of existing information and coordination with Tribes (see **Sections 4.1.1 and 4.1.2**) resulted in the identification of one sacred site—Kettle Falls—in the P2IP Study Area under Executive Order 13007. The CTCR and the Kalispel Tribe both identified Kettle Falls as a sacred site during the process leading up to the preparation of the Co-lead Agencies' 2020 Columbia River System Operations EIS.

Located on the Upper Columbia River, Kettle Falls is an important location that Tribes have used for millennia. Kettle Falls consists of a series of rapids that salmon had to pass through to reach the Upper Columbia River and its tributaries. The rapids and constriction in the river created excellent conditions for fishing. Therefore, people regularly gathered at Kettle Falls to fish and participate in economic, social, and ceremonial activities. It is estimated that 1,000 to 2,000 people gathered at Kettle Falls seasonally (DOI 2024). The First Salmon Ceremony was held at Kettle Falls each year. Salmon chiefs from the CTCR managed the fishery, although it was used by many Tribes, including the STOI, CDAT, and Kalispel Tribe (DOI 2024).

Kettle Falls is upstream from Grand Coulee Dam. Construction of the dam resulted in the inundation of Kettle Falls in 1940. Prior to inundation, the CTCR organized the Ceremony of Tears, a 3-day gathering to recognize and mourn the loss of this important location (Tate 2005). An estimated 8,000 to 10,000 people attended the event, which included ceremonies, games, dances, tributes, and expressions of grief (Tate 2005). The enormity of the loss of this location was noted by those who attended, both Tribal and non-Native attendees (NPCC 2024). Just weeks after the ceremony, Kettle Falls was inundated under what is now Lake Roosevelt. The size of Grand Coulee Dam did not allow for fish passage; therefore, with the dam's construction, salmon were unable to pass to the upper reaches of the Columbia River and Kettle Falls. Salmon continued to be seen at the base of the dam until 1946 (NPCC 2024).

Other sacred sites may be present in the P2IP Study Area, but the Tribes involved in this project have not yet identified other sites. However, this does not mean they are not present. These locations are often associated with sensitive information; as such, their locations and associated information may not be shared with non-Tribal members. Should these locations be identified during future P2IP project activities, potential impacts would be assessed and avoided, minimized, or mitigated, where feasible.

No Action Alternative

Under the No Action Alternative, the Co-lead Agencies would maintain the current funding of ongoing P2IP activities. Therefore, there would be no assurance of additional funding for research studies, acclimation and rearing facilities, or interim fish passage studies; the activities would continue to occur as funding allows. Without federal additional funding and research into the reintroduction of salmon to the Upper Columbia River, salmon would continue to be absent from this area or reintroduction would occur on a delayed timeframe. Given the connection between

salmon and sacred sites, such as Kettle Falls, a component of what makes these sites sacred would continue to be absent.

Proposed Action

None of the work to be performed as a part of the P2IP activities would result in negative effects on Kettle Falls as a sacred site into the long-term time frame. Part of the reason that Kettle Falls is sacred to Tribes is the role that it played in traditional lifeways, especially fishing and all the related ceremonies and observances that weave together subsistence activities into an integrated worldview. While the Proposed Action would not change the inundation of places like Kettle Falls, it would contribute to the potential return of salmon to an area where they are critical for maintaining cultural and spiritual connections with sacred sites.

Additionally, while there could be impacts related to the installation of telemetry receivers and other equipment or use of the area to release salmon and monitor their movement, these impacts are anticipated to be short term. Ultimately, activities that support the restoration of anadromous salmon to the Kettle Falls area would enhance the functionality of Kettle Falls as a sacred site and would be beneficial.

Cumulative Effects

The construction of future P2IP acclimation facilities is being considered at Ford Fish Hatchery, Glen Tana, Little Falls Dam, Sanpoil Arms, Sanpoil River, sqweyu', and Upper Sanpoil River. Construction of interim or permanent upstream or downstream passage is being considered at all five dams: Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile Dams. While these construction activities may have some short-term impacts on sacred sites, such as changes in the auditory or visual landscape, they would facilitate the potential reintroduction of salmon to areas that are currently blocked. This would result in long-term, beneficial impacts on sacred sites such as Kettle Falls.

Other reasonably foreseeable future projects are being considered, particularly in the vicinity of Grand Coulee and Chief Joseph Dams. However, most of these projects are related to dam maintenance or construction activities and would occur within or on the dams themselves; therefore, they are not anticipated to impact sacred sites. Given that these reasonably foreseeable future projects are unlikely to result in significant impacts on sacred sites and that the P21P activities have the potential to result in positive benefits, no adverse cumulative impacts are anticipated when these projects are considered with the P2IP activities included in the Proposed Action.

3.7.4 Impacts on Cultural Resources – Traditional Cultural Properties (TCPs)

Affected Environment

This section details the potential TCPs and historic properties of religious and cultural significance to Indian Tribes that are present within 1 mile of proposed P2IP locations based on Native American place-name data gathered from existing ethnographic data for the P2IP studies. The results are organized by P2IP study location type (acclimation pond, dam, hatchery, net pen, release site, and telemetry site), though some P2IP location types may have multiple proposed activities. Traditional Tribal place-names are used as a method to identify potential locations of these

resources; however, they do not encompass all Tribal cultural resources within 1 mile of the P2IP locations. Additionally, many Tribes consider other cultural resources, such as archaeological sites and buildings, to be TCPs or HPRCSITs. Ongoing consultation with the Tribes is essential to identify additional TCPs and potential impacts. This will be accomplished on a project-by-project basis through Tribal consultation when the impacts of individual P2IP activities are evaluated under future environmental compliance processes.

There are 71 place-names within with the P2IP locations. Place-names are locations that have Tribal names; while the names themselves may provide some insight into the cultural significance of a location, in many instances there is additional information available through ethnographic or oral histories and from Tribal databases regarding these locations. This information can provide insight into the potential for TCPs or HPRCSITs in an area, as well as information on the importance of locations for continued use, how they relate to oral histories and stories, and their role as to First Foods. For the cultural resource analysis, locations with Tribal place-names are used to identify the presence of, and potential for, TCPs and to discuss possible impacts on these resources. Additionally, Tribal named places are often TCPs, as they document Tribal existence and traditional language, and relate to numerous traditional, sacred, and deeply rooted cultural elements of great antiquity passed down through oral history that are important aspects of cultural identity.

Acclimation Ponds

Temporary acclimation ponds are proposed at the Upper Sanpoil, Sanpoil River at Louie Creek, Glen Tana (Little Spokane River), and sqweyu' P2IP locations. Two place-names are associated with the acclimation pond sites: one at Glen Tana and one at sqweyu'. These place-names indicate that the area was used for settlement and collection of First Foods. No place-names were identified at Sanpoil River at Louie Creek or the Upper Sanpoil River locations.

Dams

Five P2IP locations are associated with the Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams. Place-names were identified at all five dam locations for a total of 15 place-names; however, most were associated with Little Falls, Long Lake, and Nine Mile dams. The place-names associated with dam sites indicate use of the areas for historic Tribal settlement (often large village sites); collection of First Foods, particularly salmon; ceremonial use; and legendary sites and stories.

Hatcheries

Three place-names were identified at the Ford Fish Hatchery, kł cp̓əlk̓ stim̓ (Penticton) Hatchery[24], and Colville Tribe Trout Hatchery P2IP locations. These place-names are associated with settlements or the names of specific landscape features. No place-names were identified at the Spokane Tribal Hatchery.

[24] The kł cp̓əlk̓ stim̓ (Penticton) Hatchery is operated by the Okanagan National Alliance on the Okanagan River near Penticton, British Columbia, Canada. This hatchery is part of a long-term program to restore the historic range of sockeye salmon in the upper Okanagan watershed in the Upper Columbia River Basin. The hatchery is primarily funded by the Grant and Chelan Public Utility Districts, Washington, USA (https://syilx.org/fisheries/hatchery/).

Net Pens

Net pen locations include Kettle Falls/Sherman Creek, Sanpoil Arm, Keller Ferry, Lincoln, Two Rivers Marina, and Seven Bays. There are a total of 15 place-names identified for these locations. Most of these are related to settlements or uses of locations for collecting First Foods, especially salmon. Place-names also refer to specific landscape features or landmarks and resource uses. A couple of place-name locations are related to ceremonial uses or legendary sites and stories. No place-names were identified at the Seven Bays net pen location.

Release Sites

Release sites are proposed at Northport, Napoleon-Kettle River, Lower Sanpoil, Bridgeport State Park, Pacific Aquaculture, Nespelem River, Seaton Grove, Grand Coulee Dam Tailrace, Martha-Boardman Bridge, Lake Spokane Campground, and Spokane River (Obj ID15). Research identified 34 place-names associated with these release site locations (no place-names were identified at the Bridgeport State Park release site location). Most of these place-names are associated with settlements or First Foods harvest. Several are associated with ceremonial uses or legendary sites and history. Other place-names relate to landscape features or specific resource collection and gathering.

Telemetry Sites

Telemetry sites are proposed at Spokane House, Hall Creek, Indian Painted Rocks, Waikiki Springs, Dart-Lo, Plese Flats, Bowl and Pitcher, Spokane Community College, and Kendall Yards/Spokane Falls (Redband Park). There are 26 place-names associated with these P2IP locations; most are associated with landscape features. However, there is at least one known settlement site and a First Foods location associated with these P2IP locations. Additionally, there is ceremonial use and a legendary site and history associated with one telemetry location. No place-names were identified at the Dart-Lo telemetry site.

No Action Alternative

Under the No Action Alternative, the Co-lead Agencies would maintain current funding of ongoing P2IP activities. Therefore, there would be no assurance of additional funding for research studies, acclimation and rearing facilities, or interim fish passage studies; however, the activities would continue to occur as current and opportunistic funding streams allow. Because additional activities would be less likely under the No Action Alternative, there would be the potential for long-term impacts on TCPs and historic properties of religious and cultural significance to Indian Tribes, particularly those locations that are tied to fishing and traditional knowledge related to fishing and First Foods. P2IP activities are less likely to occur or may take longer in the blocked area under the No Action. Without these activities to reintroduce salmon, it may be difficult for Tribes to maintain cultural continuity and their connections with TCPs related to fishing and salmon.

Proposed Action

Activities that cause ground disturbance, introduce new visual or auditory changes to an important area, or reduce access to place-name locations could result in impacts on TCPs and historic properties of religious and cultural significance to Indian Tribes. Because the Tribes defined the Proposed Action and P2IP study locations, little impact is anticipated overall and would be outweighed by the beneficial impacts of the Proposed Action. Reintroducing salmon to the blocked area of the Columbia River and its tributaries would result in long-term beneficial impacts on

cultural resources that are tied to salmon and Tribal relationships and use thereof, such as TCPs and historic properties of religious and cultural significance to Indian Tribes considered in this section. Overall, the P2IP would facilitate the salmon reintroduction to the blocked area and be beneficial to Tribal communities and cultural resources associated with Tribal histories, use, and cultural traditions.

Research Studies

Research studies would include the acquisition and collection of eggs, juvenile salmon, and adult salmon; marking (tagging) salmon; salmon releases; spawning and carcass surveys; and telemetry receiver installation and maintenance. These activities are not anticipated to impact place-name locations; this is because they would occur at or within existing facilities or require little to no modification of the setting or location where they occur. Similarly, the maintenance of existing telemetry equipment is unlikely to result in changes to the setting, use or importance of place-name locations.

The Co-lead Agencies are proposing to install new telemetry receivers at several locations, including Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams. New telemetry receivers could also be installed at other locations, including Dart-Lo, Gifford, Little Spokane River, Indian Painted Rocks, Keller Ferry, Kendall Yards/Spokane Falls (Redband Park), Kettle Falls, Northport, Pacific Aquaculture, Plese Flats, Spokane Community College, Spokane House, Two Rivers Marina, Marcus Flats, and Waikiki Springs. While there are known place-names associated with the dams and other telemetry locations, the installation of new equipment is not anticipated to impact these locations. Telemetry equipment is generally small in size and would not modify the setting, use, or importance of these locations.

Acclimation and Rearing Facilities

Acclimation and rearing activities include the incubation, early rearing, and acclimation of salmon; data collection regarding facility design; and installment of temporary acclimation facilities. Studies related to facility design are largely research based; however, there may ground-disturbing data collection to design the acclimation facilities. Long-term land-based acclimation facilities are also proposed for construction; therefore, impacts are possible on place-name locations and their setting, use, and importance.

Existing facilities would be used for incubation, rearing, and acclimation, although acclimation tanks could be added to some locations. Three place-names are associated with P2IP acclimation and rearing facilities; all are related to settlements and use of areas for First Foods. Overall, development and construction of acclimation and rearing activities are anticipated to impact place-name locations. Acclimation and rearing activities are already occurring at these locations and are vital to providing salmon for the region. The installation of new acclimation tanks would introduce new visual elements into several P2IP locations with associated place-names. Although new tanks would be consistent with existing use and unlikely to modify the visual or auditory setting of place-name locations or cultural resources, the specific impacts of the proposed activities would be identified, and the Co-lead Agencies would consult with the appropriate State Historic Preservation Office, Tribal Historic Preservation Office, affected Tribes, and others, as appropriate, to satisfy NHPA Section 106 requirements.

Interim Passage

Interim passage activities include adult trap and transport, data collection on interim passage design, and eventually, construction and testing of interim upstream and downstream passage following completion of additional environmental compliance processes, as appropriate. Trap and transport of salmon would occur at Chief Joseph Hatchery, Entiat National Hatchery, Wells Hatchery and Dam, Priest Rapids Dam, and the Okanogan River confluence. Fish would be captured using traps or nets and transported via barge or truck to another location. This activity would not require ground disturbance or placement of new facilities that could impact place-name locations. The increase in activity during the trap and transport of fish could result in some auditory or visual changes and potentially impact access to and use of place-name locations in the P2IP Study Area. As fish management activities at these locations are already common, impacts would be short term and unlikely to impact the setting, use, or importance of nearby place-name locations.

Data collection on downstream and upstream passage and siting would occur at Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams. Similar to studies related to acclimation and rearing, this is largely a research-based activity and would not result in ground disturbance. Therefore, data collection regarding interim passage design is also unlikely to result in impacts on place-name locations. While the ground disturbance related to data collection would have the potential to result in adverse effects on archaeological resources, it is not likely that the data collection itself (like digging exploratory geotechnical trenches or drill holes) would result in permanent damage to the appearance or integrity of named places or TCPs. Construction of new facilities, on the other hand, would have the possibility of resulting in adverse effects. These effects would be addressed through the Section 106 compliance process.

Cumulative Effects

The construction of future P2IP acclimation facilities is being considered at Ford Fish Hatchery, Glen Tana, Little Falls Dam, Sanpoil Arms, Sanpoil River, sqweyu', and Upper Sanpoil River. Construction of interim or permanent upstream or downstream passage is being considered at all five dams: Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams. There are known place-names associated with many of these acclimation and dam locations; most of these place-names relate to settlements and First Foods. The construction of new facilities could result in visual, auditory, or physical impacts on nearby place-name locations. However, the construction of facilities at these locations, including the specific location of the buildings, is unknown and would be determined through the completion of other studies. As such, future environmental compliance processes would be required prior to the construction of any new facilities. Consistent with federal policy and regulations, Tribal consultation would occur as part of the NEPA process and prior to any construction activities. Consultation would facilitate the identification and avoidance of impacts on TCPs and historic properties of religious and cultural significance to Indian Tribes. Given the Tribal involvement in the P2IP overall, adverse impacts are anticipated to be unlikely due to continued coordination.

There are other reasonably foreseeable future projects, particularly associated with Grand Coulee and Chief Joseph Dams. These projects largely relate to repairs, maintenance, or replacement of components of the dams and facilities themselves, which are unlikely to result in cumulative effects on named locations. Reasonably foreseeable future actions that could result in impacts on place-

name locations include the Colville Reservation Middle Mile to Home fiber-optic line and several proposed projects at Grand Coulee Dam, such as the Boise Cove Roadway and the site investigation report proposed borehole exploration project at Two Rivers Marina. However, the reasonably foreseeable future projects described above are unlikely to result in significant impacts on place-name locations due to EPMs, particularly consultation with Tribes, to avoid, minimize, or mitigate impacts.

Overall, the P2IP is anticipated to have little or no adverse impacts on TCPs and HPRCSITs. The P2IP would result in long-term, beneficial impacts through the reintroduction of salmon to the blocked area. Given this, when the Proposed Action is considered with other reasonably foreseeable future projects, there is little potential for cumulative impacts on place-name locations that are connected to fishing and associated activities.

Impacts on Cultural Resources – Archaeology

Affected Environment

This section details the known archaeological resources previously identified within the 1-mile Study Area for each P2IP location, by proposed activity. A total of 552 archaeological resources were previously identified within the analysis area, including 8 listed on the NRHP or Washington Heritage Register (WHR); 22 resources that have been previously determined eligible for listing; and 16 that have been previously recommended eligible. Thirty-one archaeological resources in the analysis area have been previously determined not eligible for listing on the NRHP or WHR; 30 resources have been previously recommended as not eligible for listing; and 418 archaeological resources have not been previously evaluated. The remaining 27 resources are located around the Penticton Hatchery in British Columbia, Canada.

Acclimation Ponds

Temporary acclimation ponds are proposed at the Upper Sanpoil, Sanpoil River at Louie Creek, Glen Tana (Little Spokane River), and sqweyu' P2IP locations. Eleven previous cultural resource surveys have been completed within 1 mile of these locations. These surveys resulted in the identification of 21 archaeological sites. Of the archaeological sites, 1 has been previously listed on or determined eligible for listing on the NRHP or WHR; none have been recommended eligible for the NRHP; 9 have been previously determined not eligible for the NRHP; and 11 have not been previously evaluated for NRHP eligibility.

Dams

At the P2IP locations at Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams, 55 previous cultural resource surveys have been conducted, resulting in the identification of 61 total archaeological sites. Of the archaeological sites, 5 have been previously listed on or determined eligible for listing on the NRHP, none have been recommended eligible, 3 have been previously determined not eligible, 6 have been previously recommended not eligible, and 47 have not been evaluated.

Hatcheries

At the kɬ cp̓əlk̓ stim̓ (Penticton), Colville Tribe Trout, Spokane Tribal, Ford Fish, and Plummer RAS hatchery locations, background research identified 13 previously conducted cultural resource surveys and 44 previously recorded archaeological sites. Of the archaeological sites, 4 have been previously listed or determined eligible for listing on the NRHP or WHR; 1 has been previously determined not eligible; 1 has been previously recommended not eligible; and 11 have not yet been evaluated. The remaining 27 sites are located in Penticton in British Columbia, Canada.

Net Pens

At the Sherman Creek/Kettle Falls, Sanpoil Arm, Keller Ferry, Lincoln, Seven Bays, and Two Rivers Marina net pen P2IP locations, background research identified 67 previously conducted cultural resources surveys and 60 previously recorded archaeological sites. Of the archaeological sites, 5 have been listed on the NRHP or WHR or determined eligible for listing; none have been recommended eligible; 1 has been determined not eligible; 3 have been recommended as not eligible; and 51 have not been evaluated.

Release Sites

At the Northport, Napoleon-Kettle River, Lower Sanpoil, Bridgeport State Park, Pacific Aquaculture, Nespelem River, Seaton Grove, Grand Coulee Dam Tailrace, Martha-Boardman Bridge, Lake Spokane Campground, and Spokane River (Obj ID15) P2IP locations, background research identified 87 previously conducted cultural resources surveys and 255 previously recorded archaeological sites. Of the archaeological sites, 13 have been previously listed on the NRHP or WHR or determined eligible for listing; 6 have been previously recommended as eligible; 7 have been previously determined not eligible; 8 have been previously recommended not eligible; and 221 have not been evaluated.

Telemetry Sites

Background research on nine telemetry sites—the Spokane House, Hall Creek, Indian Painted Rocks, Waikiki Springs, Dart-Lo, Plese Flats, Bowl and Pitcher, Spokane Community College, and Kendall Yards/Spokane Falls—identified 122 previously conducted cultural resources surveys and 110 total archaeological sites. Of the archaeological sites, 1 has been listed on the NRHP or WHR or determined eligible for listing; 7 have been recommended eligible; 11 have been determined not eligible; 10 have been recommended not eligible; and 81 have not been evaluated.

No Action Alternative

Under the No Action Alternative, the Co-lead Agencies would maintain current funding of ongoing P2IP activities. Therefore, there would be no assurance of additional funding for research studies, acclimation and rearing, or interim fish passage. These activities would continue to occur as funding allows. Archaeological resources would continue to be managed under relevant state or federal regulations. Additional P2IP activities would be less likely to occur under the No Action Alternative. If P2IP activities continue under other funding sources, the potential for adverse effects to archaeological resources would be addressed under applicable state and federal compliance processes.

Proposed Action

Activities that include ground disturbance are the most likely to directly impact archaeological resources. Ground disturbance, such as that associated with construction activities, can result in the displacement of cultural materials and in situ cultural deposits, which is a long-term or permanent impact on the resource. Activities outside the boundaries of archaeological sites may not directly impact resources, but they can result in indirect impacts due to changes in the visual setting of an archaeological site if the aspects of integrity that make such sites eligible for the NRHP are linked to location, setting, or feeling and association. In particular, indirect impacts, such as visual changes outside a defined site, can result in adverse impacts on archaeological sites where NRHP eligibility is tied to the integrity of setting.

Research Studies

Research studies include the acquisition and collection of eggs, juvenile salmon, and adult salmon; marking (tagging) salmon; salmon releases; spawning and carcass surveys; and telemetry receiver operation and maintenance. All these activities would have no adverse effects on historic properties, even if one were present. Installation of new telemetry receivers could result in adverse effects; therefore, the installation of receivers may require site-specific NHPA Section 106 compliance be completed prior to installation.

Similarly, spawning and carcass surveys would occur where the above activities occur, and no facilities or construction would be required. The maintenance of existing telemetry equipment is also anticipated to have little impact because the equipment is already installed and in use. Therefore, these activities are temporary and limited in time; they would be unlikely to result in direct or indirect impacts on archaeological resources.

The Project Proponents are proposing to install new telemetry receivers at several locations where there are known archaeological sites. There are 7 NRHP-listed or eligible archaeological sites and 77 archaeological sites that have not been evaluated for eligibility within 1 mile of new Proposed Action telemetry sites. However, most of the telemetry equipment is proposed for installation on existing facilities and would be temporary, and no new construction or ground disturbance would be required. Additionally, many of the known archaeological sites at telemetry locations are located distant from the proposed installation locations. Overall, under the Proposed Action, there would be little potential for research activities to impact archaeological resources due to the lack of associated ground disturbance and distance of proposed activities from known resources.

Acclimation and Rearing Facilities

Acclimation and rearing activities include the incubation, early rearing, and acclimation of salmon; data collection regarding facility design; and construction of acclimation facilities. While there are known archaeological sites within 1 mile of these sites, existing facilities would be used for incubation, rearing, and acclimation; therefore, these activities are not anticipated to impact archaeological sites. Similarly, studies related to facility design that are largely research based and do not require on-the-ground data collection, construction, or installation of facilities or infrastructure would be unlikely to impact archaeological resources.

Geotechnical and hydrologic data collection to inform design, and construction activities could result in impacts on archaeological sites, such as disturbance of cultural materials or changes in the visual or auditory setting of archaeological sites. For the data collection and construction proposed for 2025 implementation covered under the current PEA, NHPA compliance would be completed prior to implementation. Future site-specific environmental compliance processes, including NHPA Section 106 compliance, would be completed prior to data collection and construction for these activities.

Interim Passage

Interim passage activities would include adult trap and transport, data collection on interim passage design, and, eventually, construction and testing of interim upstream and downstream passage. Trap and transport of salmon would occur at Chief Joseph Hatchery, Entiat National Hatchery, Wells Hatchery and Dam, Priest Rapids Dam, and the Okanogan River confluence. These activities would not require ground disturbance or placement of new facilities. Fish would be captured using traps or nets and transported via barge or truck to another location. There would be no impacts on archaeological resources at any of the above locations as a result of trap and transport of fish.

Data collection regarding interim passage design would also be unlikely to result in impacts on archaeological sites. Similar to studies related to acclimation and rearing, this activity is largely a research-based activity and would not result in ground disturbance or construction of new facilities.

Geotechnical and hydrologic data collection to inform interim passage design may result in impacts on archaeological sites. Similar to studies related to acclimation and rearing, this activity is largely a research-based activity but could include some ground disturbance to test water and soils. Data collection on downstream and upstream passage and siting would occur at Chief Joseph Dam, Grand Coulee Dam, Little Falls Dam, Long Lake Dam, and Nine Mile Dam. The Co-lead Agencies would assess geotechnical and hydrologic data collection activities to determine the potential for impacts on archaeological resources. Potential impacts on specific sites would be identified and avoided, minimized, or mitigated through NHPA Section 106 compliance.

Cumulative Effects

Future potential P2IP activities include the construction of rearing and acclimation facilities, as well as fish passage-related facilities, as described above under *Rearing and Acclimation* and *Interim Passage*. The construction of acclimation facilities is being considered at Ford Hatchery, Glen Tana, Little Falls Dam, Sanpoil Arms, Sanpoil River, sqweyu', and Upper Sanpoil River. The construction of interim or permanent upstream or downstream passage is being considered at all five dams: Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams.

There are known archaeological sites associated with some of these locations. Additionally, as the specifics of these geotechnical and hydrologic data collection and construction activities are not yet defined, future environmental compliance, including NHPA Section 106 compliance, would be required prior to geotechnical and hydrologic data collection and construction activities. During these processes, cultural resources and the specific impacts of the proposed activities would be identified and would consult with the appropriate State Historic Preservation Office, Tribal Historic Preservation Office, affected Tribes, and others as appropriate, to satisfy Section 106 requirements.

Impacts would be avoided, minimized, or mitigated via the NHPA Section 106 process for resolving adverse effects.

Other projects with the potential to impact archaeological resources are those that would result in ground disturbance or that could alter the visual or auditory setting of NRHP-listed or NRHP-eligible archaeological sites. Reasonably foreseeable future actions that could result in impacts on archaeological resources include the Colville Reservation Middle Mile to Home fiber-optic line and several proposed projects at Grand Coulee Dam, such as the Boise Cove Roadway and the site investigation report proposed borehole exploration project at Two Rivers Marina.

In general, the reasonably foreseeable future projects described above are unlikely to result in significant impacts on archaeological resources due to EPMs to avoid, minimize, or mitigate impacts. NHPA Section 106 compliance would be completed prior to the implementation of activities, allowing for the identification and avoidance of archaeological sites. If sites cannot be avoided, impacts would be mitigated in consultation with the State of Washington Department of Archaeology and Historic Preservation's State Historic Preservation Officer and the CTCR, CDAT, and STOI Tribal Historic Preservation Officers. Given that these reasonably foreseeable future projects are unlikely to result in significant impacts on archaeological resources, no cumulative impacts are anticipated when these are considered with the P2IP activities included in the Proposed Action.

Impacts on Cultural Resources – Built Environment

Affected Environment

This section details the known NRHP-listed or NRHP-eligible built-environment resources (historic buildings and structures) identified within the 1-mile Study Area for each P2IP location, by proposed activity. A total of 1,095 built-environment resources were identified within the Study Area. Of these, 219 have been listed or previously determined eligible for listing on the NRHP, WHR, or State Register of Historic Places; 21 have been previously recommended as eligible; 420 have been previously determined not eligible; 10 have been previously recommended as not eligible; and 425 have not been evaluated.

Acclimation Ponds

Temporary acclimation ponds are proposed at the Upper Sanpoil, Sanpoil River at Louie Creek, Glen Tana (Little Spokane River), and sqweyu' locations. Eleven previous cultural resources surveys have been completed within 1 mile of these locations. These surveys resulted in the identification of 135 previously documented built-environment resources. Of the built-environment resources identified within 1 mile of acclimation pond P2IP locations, 8 have been previously listed or determined eligible for listing on the NRHP; 54 have been previously determined or recommended not eligible; and 73 have not yet been evaluated.

Dams

The P2IP locations at Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams, 56 previous cultural resource surveys have been conducted, resulting in the identification of 71 previously recorded built-environment resources. Of the built-environment resources identified

within 1 mile of the dam P2IP locations, 27 have been previously listed on or determined eligible for listing on the NRHP or WHR; 9 have been previously recommended as eligible; 18 have been previously determined not eligible; 4 have been previously recommended as not eligible; and 13 have not been evaluated. All these dams are listed or are eligible for listing on the NRHP, as are some of the associated facilities and buildings (see **Section 4.1.2**).

Hatcheries

At the kɬ cp̓əlk̓ stim̓ (Penticton), Colville Tribe Trout, Spokane Tribal, Ford, and Plummer RAS hatchery locations, background research identified 13 previously conducted cultural resource surveys and 15 built-environment resources. Of the built-environment resources identified within 1 mile of hatchery locations; 5 have been previously listed on or determined eligible for listing on the NRHP; 1 has been previously recommended eligible; and 9 have not yet been formally evaluated.

Net Pens

At the Sherman Creek/Kettle Falls, Sanpoil Arm, Keller Ferry, Lincoln, Seven Bays, and Two Rivers Marina net pen locations, background research identified 66 previously conducted cultural resources surveys and 24 previously recorded built-environment resources. Of the built-environment resources identified within 1 mile of net pen locations, 3 have been previously listed on or determined eligible for listing on the NRHP; 13 have been previously determined not eligible; and 8 have not yet been formally evaluated.

Release Sites

At the Northport, Napoleon-Kettle River, Lower Sanpoil, Bridgeport State Park, Pacific Aquaculture, Nespelem River, Seaton Grove, Grand Coulee Dam Tailrace, Martha-Boardman Bridge, Lake Spokane Campground, and Spokane River (Obj ID15) P2IP locations, background research on 11 release sites identified 87 previously conducted cultural resources surveys and 243 previously recorded built-environment resources. Of the built-environment resources identified within 1 mile of release site P2IP locations, 45 have been previously listed on or determined eligible for listing on the NRHP or WHR; 6 have been previously recommended as eligible; 41 have been previously determined not eligible; none have been previously recommended as not eligible; and 151 have not been evaluated.

Telemetry Sites

Background research on nine telemetry sites—the Spokane House, Indian Painted Rocks, Waikiki Springs, Dart-Lo, Plese Flats, Bowl and Pitcher, Spokane Community College, and Kendall Yards/Spokane Falls—identified 113 previously conducted cultural resources surveys and 615 previously recorded built-environment resources. Of the built-environment resources identified within 1 mile of telemetry site P2IP locations, 128 have been previously listed on or determined eligible for listing on the NRHP and WHR; 8 have been previously recommended as eligible; 304 have been previously determined not eligible; 3 have been previously recommended as not eligible; and 172 have not been evaluated.

No Action Alternative

Under the No Action Alternative, the Co-lead Agencies would maintain the current funding of ongoing P2IP activities. Therefore, there would be no assurance of additional funding for research

studies, acclimation and rearing, or interim fish passage. Built-environment resources would continue to be managed under relevant state or federal regulations. As such, there would be no direct or indirect impacts on built-environment resources under the No Action Alternative. Additional P2IP activities would be less likely to occur under the No Action Alternative. If P2IP activities continue under other funding sources, the potential for adverse effects to element of the built environment would be addressed under applicable state and federal compliance processes.

Proposed Action

Research Studies

Research studies include the acquisition and collection of eggs, juvenile salmon, and adult salmon; marking (tagging) salmon; salmon releases; spawning and carcass surveys; and telemetry receiver installation and maintenance. Most of these activities would have no impact on built-environment resources because they would occur within existing facilities and would require no modifications to those facilities or new construction. Similarly, spawning and carcass surveys would happen where these activities occur, and no facilities or construction would be required. The maintenance of existing telemetry equipment is also anticipated to have little impact because the equipment is already installed and in use.

There is the potential for the installation of new or additional telemetry receivers to impact built-environment resources. The Project Proponents are proposing to install new telemetry receivers at several locations; some of these are NRHP-listed, NRHP-eligible, or unevaluated built-environment resources. For example, three telemetry receivers would be installed at Chief Joseph Dam, including one on the forebay, one on the left tailrace bank, and one on the right tailrace bank. Similar actions are proposed at Grand Coulee Dam, Little Falls Dam, Long Lake Dam, and Nine Mile Dam. New telemetry receivers may also be installed at other locations, including Dart-Lo, Gifford, Little Spokane River, Indian Painted Rocks, Keller Ferry, Spokane Falls, Kettle Falls, Northport, Pacific Aquaculture, Plese Flats, Spokane Community College, Spokane House, Two Rivers Marina, Marcus Flats, and Waikiki Springs.

The installation of telemetry receivers within or on NRHP-listed, or NRHP-eligible, or unevaluated resources would result in the modification of a historic structure. However, telemetry receivers are generally small in size, require minimal installation, and are easily removed. Overall, the small size of these devices, coupled with their ease of removal, would result in little to no impacts on built-environment resources. Any impacts would be temporary (the lifespan of the research study); after the study, the building would be returned to previous conditions.

Acclimation and Rearing Facilities

Existing buildings and facilities would be used for incubation, rearing, and acclimation. While there are built-environment resources present at some of these locations, no modifications of those facilities are anticipated for these activities to occur, except where new tanks might be required for acclimation. However, these tanks would be located at P2IP locations where existing infrastructure likely already exists for acclimation, such as hatcheries, and the addition of tanks is unlikely to result in long-term modification or impacts on built-environment resources. Therefore, incubation, rearing, and acclimation are not anticipated to impact built-environment resources, regardless of the

activity's location. Similarly, studies related to facility design are largely research based and may not require ground disturbance or installation of facilities or infrastructure. There could be some geotechnical and hydrologic data collection to inform design and future construction. This ground disturbance could result in auditory and visual impacts on adjacent built-environment resources, although these impacts would be short term in nature.

Interim Passage

Trap and transport of salmon would occur at Chief Joseph Hatchery, Entiat National Hatchery, Wells Hatchery and Dam, Priest Rapids Dam, and the Okanogan River confluence. This activity would not require the construction of new buildings and facilities. Fish would be captured using traps or nets and transported via barge or truck to another location. Therefore, it is anticipated that trap and transport would result in no impacts on NRHP-listed, NRHP-eligible, or unevaluated built-environment resources at any of the above locations.

Data collection on downstream and upstream passage and siting would occur at Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams. While there are NRHP-listed, NRHP-eligible, and unevaluated buildings associated with each of these locations, including the dams themselves, data collection regarding interim passage design would be unlikely to result in impacts on built-environment resources. Similar to studies related to acclimation and rearing, data collection is largely a research-based activity and would not result in the construction of new facilities or modification of existing buildings.

Geotechnical and hydrological data collection may occur as part of research studies to inform interim passage design, which may impact built-environment resources by altering the auditory and visual setting of nearby resources. These impacts would be short term in nature, occurring during the activity itself. The Co-lead Agencies would review all proposed geotechnical and hydrological studies prior to their implementation to determine the nature and extent of impacts on built-environment resources.

Cumulative Effects

Future potential P2IP activities include the construction of rearing and acclimation facilities as well as interim fish passage facilities. The construction of acclimation facilities is being considered at Ford Hatchery, Glen Tana, Little Falls Dam, Sanpoil Arms, Sanpoil River, sqweyu', and Upper Sanpoil River. Construction of interim or permanent upstream or downstream passage is being considered at all five dams: Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams.

The construction of new buildings and facilities or the modification of existing NRHP-listed, NRHP-eligible, or unevaluated buildings could result in long-term adverse impacts on built-environment resources. Impacts would include modification of historic buildings that changes the overall setting and integrity of the structure for the NRHP or visual or auditory changes that impact the setting of NRHP-listed, eligible, or unevaluated built-environment resources.

There are known NRHP-listed, NRHP-eligible, and unevaluated built-environment resources associated with the locations above that could be impacted by future construction activities,

particularly activities at dam locations; this is because the dams are all historic built-environment resources. Impacts could include direct modification of built-environment resources, such as additions, installation of new equipment, changes in the layout or design of buildings, or the construction of new buildings in an area with known built-environment resources. The construction of new buildings could alter the visual or auditory setting of NRHP-listed, NRHP-eligible, or unevaluated buildings, causing indirect impacts on these resources.

The exact nature of geotechnical or hydrological data collection and construction activities related to rearing, acclimation, and fish passage are currently unknown and would be determined through additional study and design. Future environmental compliance and NHPA Section 106 compliance would be required prior to construction activities. During these processes, cultural resources and specific impacts of the proposed activities would be identified and the Co-lead Agencies would consult with the appropriate State Historic Preservation Office, Tribal Historic Preservation Office, affected Tribes, and others as appropriate, to satisfy Section 106 requirements. These impacts would be avoided, minimized, or mitigated via the NHPA Section 106 process for resolving adverse effects through a Memorandum of Agreement.

Other projects with the potential to impact NRHP-listed or NRHP-eligible built-environment resources are those that would result in direct modification or additions to a known resource or introduce new buildings or facilities in the vicinity of known built-environment resources, resulting in changes to the auditory and visual setting of those resources. Reasonably foreseeable future actions that could result in impacts on built-environment resources include multiple projects at the Grand Coulee and Chief Joseph dams, both of which are NRHP-eligible or NRHP-listed properties. Other reasonably foreseeable future actions that could result in impacts on built-environment resources include the Colville Reservation Middle Mile to Home fiber-optic line and several proposed projects at Grand Coulee Dam, such as the Boise Cove Roadway and the site investigation report proposed borehole exploration project at Two Rivers Marina.

Because other reasonably foreseeable future projects would involve federal funding or federal lands, NHPA Section 106 compliance would be required prior to any geotechnical or hydrological data collection and construction. In general, the reasonably foreseeable future projects described above are unlikely to result in significant impacts on built-environment resources due to the environmental protection measures to avoid, minimize, or mitigate impacts. NHPA Section 106 compliance would be completed prior to the implementation of activities, allowing for the identification and avoidance or minimization of impacts. If built-environment resources cannot be avoided, impacts would be mitigated in consultation with the State of Washington Department of Archaeology and Historic Preservation State Historic Preservation Officer and the CTCR, CDAT, and STOI Tribal Historic Preservation Officers. Given that these reasonably foreseeable future projects are unlikely to result in significant impacts on built-environment resources, no cumulative impacts are anticipated when these projects are considered with the P2IP activities included in the Proposed Action.

3.8 Tribal Interests

The Study Area is in a region defined ethnographically as the Plateau culture area, which includes the Columbia River Basin. The Study Area lies within the traditional homelands of the Project Proponents—the CTCR, STOI, and CDAT. Tribal use and occupation of the Columbia River Basin have occurred for millennia, resulting in well-established cultural relationships and identities that are tied to the region as well as the natural and cultural resources within it. Locations within the Study Area continue to be important fishing or gathering locations and are associated with important Tribal events, history, stories, and traditional knowledge.

The P2IP was brought forward by the Project Proponents, with assistance from UCUT. In defining the Proposed Action, the Project Proponents identified the specific locations for consideration of P2IP activities. Some of these locations are on Tribal or federal land where Indian Trust Assets (ITAs) may be present and could be affected by P2IP activities.

The Co-lead Agencies would continue to closely coordinate P2IP studies and associated activities with the Project Proponent Tribes, as appropriate. Consultation would further define locations of importance and use as well as potentially impacted ITAs.

3.8.1 Resource Indicators

The following resource indicator is used to determine the potential impacts to Tribal interests resulting from the No Action and Proposed Action alternatives:

- The extent to which the alternatives contribute to the cultural identities and traditions of associated Tribes

3.8.2 Affected Environment

The Columbia River Basin has been occupied by Indigenous peoples since time immemorial. The Columbia River, its tributaries, and the many fish and animal species that rely on these waterways have shaped Indigenous lifeways and identities throughout this time. Tribal members continue to live along the Columbia River and its tributaries, bury their family along the shores, and rely on the rivers for subsistence and transportation. The importance of the Columbia River, its tributaries, and its abundant resources is reflected in Tribal histories, cultural practices, stories, and spiritual beliefs (DOI 2024).

For most Columbia Basin Tribes, life and cultural identities center around the many species of salmon that live in the Columbia River and its tributaries and their lifecycles (DOI 2024). As such, historic settlement locations and seasonal movements were intricately connected to the lifecycles of salmon. While people moved throughout the region to gather seasonally abundant resources, they always returned to the rivers. During the winter, Tribes lived in large, aggregated villages, especially along the Columbia and Snake Rivers (Ruuska et al. 2024). These villages were often located in places that were productive fishing locations.

With the return to the river and large villages, winter was also a time for community social and ceremonial gatherings, storytelling, and sharing of histories and knowledge (Ruuska et al. 2024).

People interacted with neighboring villages, strengthening relationships through marriage and trade. Even during the spring through fall, when people traveled away from the rivers in smaller groups to gather other resources, groups would return to the river to fish for salmon and steelhead as they returned upriver (Ruuska et al. 2024).

Water, salmon and other fish, big game, roots, and berries are First Foods to many Tribes in the Columbia River Basin (DOI 2024). Although First Foods may vary geographically and by Tribe, they are considered those foods that have been staples for Tribal people for millennia and remain culturally significant today (DOI 2024). There are numerous traditions and knowledge associated with First Foods, some of which are reflected in Tribes' creation stories, which are rooted in the understanding that the health and well-being of the Tribes is intricately connected to the health and well-being of natural resources (DOI 2024). The Tribes recognize the interdependence of all life; respect and reciprocity are interwoven into stories, songs, and ceremonial activities associated with subsistence (Ruuska et al. 2024). First Foods are honored in stories, in the sharing of traditional knowledge, and during ceremonial feasts.

At the arrival of Euro-Americans in the Columbia River Basin, Tribes were largely living as they had for millennia, following a seasonal cycle centered around the rivers, First Foods, and other resource collection. However, the impact of Euro-Americans' presence was felt long before they arrived in the region. The arrival of the horse preceded Euro-American arrival and was quickly integrated into all aspects of Tribal culture. Other impacts were more devastating: disease epidemics swept through the region ahead of Euro-American arrival, decimating Indigenous peoples who had no immunity to these diseases.

Tribes throughout the Northwest actively engaged with and managed relationships with newly arrived Euro-American populations. Tribes in the Columbia River Basin recruited Euro-Americans into the existing social, diplomatic, and trade networks (Ruuska et al. 2024). However, as Euro-American populations increased throughout the Pacific Northwest, tensions between them and Tribes increased. With increasing settlement and pressure on the U.S. government to provide land for settlers, the U.S. conducted treaty negotiations with Tribes to place groups on reservations in the 1850s. In 1871, the United States decided to stop negotiating treaties with Tribes and instead used executive orders to establish reservations, again significantly smaller than the Tribes' original territories. Pursuant to this change in policy, executive orders set aside reservation lands to serve as homelands for the Colville, Spokane, and Coeur d'Alene Tribes.

The establishment of reservations and subsequent fracturing of Tribal lands under the Dawes Act made traditional subsistence and reliance on First Foods more difficult. Fishing also became more difficult due to exploitative fishing practices by Euro-American settlers and use of methods that were destructive to the health of salmon runs. Not only was there a major drop in fish numbers overall, but with it came an associated drop in the number of fish that made it to the upper reaches of the rivers (Ruuska et al. 2024). The construction of hydropower dams on the Columbia and Snake Rivers further devastated the salmon runs, completely impeding salmon from the blocked area and thereby removing them from habitats that they had returned to for thousands of years.

Despite the centuries of impacts on Tribes as a result of Euro-American arrival and settlement, the Tribes have maintained intense connections and traditions associated with the land, natural and cultural resources, First Foods, and their ancestors and descendants. These connections are maintained in a variety of ways distinct to those who maintain them; this includes oral histories and stories and cultural practices, passed down since time immemorial.

3.8.3 No Action Alternative

Under the No Action Alternative, the Co-lead Agencies would maintain current funding of ongoing P2IP activities. Therefore, there would be no assurance of additional funding for research studies, acclimation and rearing facilities, or interim fish passage studies. These activities would continue to occur as current or opportunistic funding allows.

Because additional P2I2 activities would be less likely to occur under the No Action Alternative, there would be the potential for long-term impacts on Project Proponent Tribal communities, particularly as it relates to cultural identities and traditions associated with salmon and steelhead. Without assurance of additional funding to examine the feasibility of reintroducing salmon to the blocked area, there is potential for salmon to return to these areas to take longer and delay the reconnection of these Tribes with the use of the area for traditional fishing activities and subsistence. This would further the impacts on these Tribes that are detailed in the DOI Tribal Circumstances Report (DOI 2024), which extend beyond the loss of an important resource to include impacts on the cultural and spiritual identities of these Tribes.

3.8.4 Proposed Action

The reintroduction of salmon would allow for the continuation and maintenance of important Tribal economic, cultural, and spiritual activities. As such, the Proposed Action is anticipated to have long-term beneficial impacts on Tribes and the continuation of traditional uses and practices. There could be some short-term impacts associated with specific activities (see below); however, because the Tribes defined the Proposed Action and P2IP locations, and because the overall goals of the proposed activities to reintroduce an important First Food, adverse impacts are anticipated to be little overall. Overall, the P2IP project would facilitate the potential salmon reintroduction and would be beneficial to Tribal communities.

Research Studies

Overall, research studies are not anticipated to have adverse impacts on Tribal communities. This is because they would occur at or within existing facilities or require little to no modification of the setting or location where they occur. While there are locations of Tribal importance within the vicinity of P2IP locations (see **Section 3.7**, Cultural Resources), ultimately, many of these locations are tied to cultural uses of the area for settlement and subsistence. The completion of studies to facilitate the reintroduction of salmon to currently blocked areas would have a long-term beneficial impact on Tribal communities by allowing them to maintain important cultural and spiritual traditions.

Acclimation and Rearing Facilities

Existing facilities would be used for incubation, rearing, and acclimation, although acclimation tanks could be added to some locations. Overall, impacts are anticipated to be similar to those described above for *Research Studies*.

The installation of new acclimation tanks would introduce new visual elements into several P2IP locations that are associated with Tribal areas of importance; however, new tanks would be consistent with existing facilities and unlikely to modify the visual or auditory setting of locations of Tribal use or interest. Overall, modification of some of these P2IP locations would facilitate the reintroduction of salmon and result in long-term beneficial impacts on Tribal communities.

Interim Passage

Interim passage activities include adult trap and transport and data collection on interim passage design. Trap and transport of salmon occur at developed facilities or existing equipment; therefore, this activity is not anticipated to impact ITAs. However, fish may be released at locations owned or managed by Tribes, including Reservations. Release activities are not expected to impact access to locations owned or managed by the Tribes.

Data collection on downstream and upstream passage and siting would occur at Chief Joseph and Grand Coulee dams, both managed by federal agencies. Similar to studies related to acclimation and rearing, this is largely a research-based activity and is not anticipated to impact ITAs.

3.8.5 Cumulative Effects

Future potential P2IP activities include the construction of rearing and acclimation facilities and fish passage-related facilities. The construction of acclimation facilities is being considered at Ford Fish Hatchery, Glen Tana, Little Falls Dam, Sanpoil Arms, Sanpoil River, sqweyu', and Upper Sanpoil River. Construction of interim or permanent upstream or downstream passage is being considered at all five dams: Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams. There are known locations of Tribal use and traditional importance associated with many of these acclimation and dam locations, most of which relate to settlements and First Foods. The construction of facilities at these locations, including the specific location of the buildings, is unknown and would be determined through the completion of other studies. As such, future environmental compliance processes would be required prior to the construction of any acclimation facilities. Consistent with federal policy and regulations, Tribal consultation would occur as part of the NEPA process and prior to any construction activities. Consultation would facilitate the identification and avoidance of impacts on Tribes. Given the Tribal involvement in the P2IP overall, impacts are anticipated to be unlikely due to continued coordination.

Overall, the P2IP project is anticipated to have little or no impacts on locations of Tribal use and importance. The project would result in long-term, beneficial impacts through the reintroduction of salmon to the currently blocked area. Given this, when the Proposed Action is considered with other reasonably foreseeable future projects, there is little potential for cumulative impacts on locations of Tribal communities and their traditional use and cultural connections to the area.

3.9 Socioeconomics and Environmental Justice

The two resources analyzed in this section are socioeconomics and environmental justice. Additional details are provided in the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f).

To assess potential impacts from proposed P2IP activities, the socioeconomic analysis evaluates how the alternatives would potentially impact regional economic output, jobs, and income and the benefits provided to communities and Tribes by salmon. Currently, the estimated required funding for all P2IP activities planned through 2043 is at least $300 million. Federal funding to support P2IP activities would result in direct and indirect effects on the regional economy during the 20-year implementation period.

To assess potential impacts from proposed P2IP activities on communities with environmental justice concerns, differential patterns of consumption of natural resources are identified (525 DM 1, I(1)(d)). Then, the environmental justice analysis evaluates the potential for disproportionate beneficial effects and disproportionate high and adverse human health or environmental effects on low-income, minority, and Tribal populations. Tribal use and occupation of the Columbia River Basin have occurred for millennia, resulting in well-established cultural relationships and identities that are tied to the region as well as the natural and cultural resources within it (**Section 3.8**, Tribal Interests).

3.9.1 Resource Indicators

The following resource indicators are used to determine the impacts to socioeconomics and environmental justice resulting from the No Action and Proposed Action alternatives:

- Socioeconomic impacts resulting from translocation of salmon into the blocked area
- Regional jobs and income associated with construction, operations, and maintenance activities
- Economic contributions associated with recreational fishing
- Economic contributions associated with commercial fishing
- Differential effects on low-income, minority, Indigenous, and/or Tribal populations

A detailed analysis methodology for each of the above resource indicators is provided in the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f). Analysis assumptions are provided below:

- There would be some overall increases to the population levels of salmon in the Upper Columbia River CRS, through P2IP activities and translocation of salmon into the blocked area. Increases in the number of salmon would be concentrated in the blocked area, but some increases would also be observed in downstream areas due to natural production in the blocked area. There would be little to minor beneficial impacts on the number of fish available for

recreational and commercial fishing in the temporary time frame into the long-term time frame in the Study Area and downstream of the Study Area. This is due to the following factors:

  - The number of adults being released depends on surplus adults from hatcheries and other collected adults and the number of research stock (released juveniles) that return to Chief Joseph Dam.
  - Under the P2IP, limited numbers of juveniles are being released to identify and quantify survival. Exact release numbers depend on the availability of eggs or juvenile fish, or both. Production thresholds for the P2IP fall within currently approved management plans of partner facilities. Availability and the level of mortality contribute to relatively few adults returning to Chief Joseph Dam; there are enough to meet the needs for P2IP adult studies.

- Because the majority of the most recent available data are from 2022, data are presented in 2022 price values unless otherwise noted.
- The analysis area for the socioeconomic analysis is defined as the area in which the majority of social and economic impacts are likely to occur and includes Chelan, Douglas, Grant, Ferry, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, and Whitman Counties in Washington, and Benewah and Kootenai Counties in Idaho. See the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f) for additional details related to the definition of this area.

3.9.2 Socioeconomic Conditions & Regional Jobs and Income

Affected Environment

Population

Table 3-8 displays the population estimates between 2010 and 2022 for counties within the analysis area, including Chelan, Douglas, Grant, Ferry, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, and Whitman Counties in Washington; Benewah and Kootenai Counties in Idaho; and the states of Idaho and Washington. Between 2010 and 2022, all the counties within the analysis area, except Ferry County, experienced population increases. Additionally, both Idaho and Washington experienced population increases at the statewide level during this time frame. Kootenai County, Idaho, experienced the largest population growth (28.6 percent), followed by Spokane and Grant Counties, Washington (16.8 and 16.4 percent, respectively). Benewah County, Idaho, and Lincoln, Okanogan, and Pend Oreille Counties, Washington, experienced a relatively smaller population growth (4.6, 4.8, 5.2, and 5.2 percent, respectively). Between 2010 and 2022, the only county where population growth exceeded the respective state population growth (21.4 percent) was Kootenai County, Idaho (Headwaters Economics 2024).

Table 3-8. Population Estimates 2010–2022

Geographic Area	2010	2022	Population Change	Population Percent Change
Counties				
Benewah, ID	9,302	9,731	429	4.6
Kootenai, ID	134,851	173,396	38,545	28.6
Chelan County, WA	70,995	79,076	8,081	11.4

Geographic Area	2010	2022	Population Change	Population Percent Change
Douglas County, WA	37,160	43,189	6,029	16.2
Ferry County, WA	7,504	7,206	-244	-3.3
Grant County, WA	85,142	99,145	14,003	16.4
Lincoln County, WA	10,533	11,036	503	4.8
Okanogan County, WA	40,238	42,336	2,098	5.2
Pend Oreille County, WA	12,904	13,570	666	5.2
Spokane County, WA	461,262	538,711	77,449	16.8
Stevens County, WA	43,171	46,774	3,603	8.3
Whitman County, WA	43,747	47,141	3,394	7.8
States				
Idaho	1,526,797	1,854,109	327,312	21.4
Washington	6,561,297	7,688,549	1,127,252	17.2

Source: Headwaters Economics 2024

Table 3-9 provides observed and projected population estimates for the analysis area. The Washington Office of Financial Management provides county- and state-level annual population projections through 2030. The Idaho Department of Labor provides state- and regional-level annual population projections through 2029. Where available, state-level estimates from the Idaho Department of Labor are provided in **Table 3-9**; however, county-level estimates are not available.

Table 3-9. Population Projections

Geographic Area	2020 Population (Observed)	2025 Population (Projected)	2020–2025 Percent Change	2030 Population (Projected)	2025–2030 Percent Change
Counties					
Benewah, ID		N/A	N/A	N/A	N/A
Kootenai, ID		N/A	N/A	N/A	N/A
Chelan County, WA	79,141	82,483	4.22	85,889	4.13
Douglas County	42,938	45,336	5.58	47,750	5.32
Ferry County	7,178	7,218	0.56	7,239	0.29
Grant County	99,123	105,140	6.07	111,367	5.92
Lincoln County	10,876	11,094	2.00	11,270	1.59
Okanogan County	42,104	42,897	1.88	43,676	1.82
Pend Oreille County, WA	13,401	13,922	3.89	14,442	3.74
Spokane County	539,339	563,048	4.40	587,377	4.32
Stevens County, WA	46,445	48,314	4.02	50,215	3.93
Whitman County, WA	47,973	48,649	1.41	49,489	1.73
States					
Idaho	1,801,623	1,910,520	6.04	1,990,232*	4.17*
Washington	7,706,310	8,100,384	5.11	8,502,764	4.97

Sources: Washington Office of Financial Management 2022; Idaho Department of Labor 2020
*Idaho Department of Labor provides projections through 2029; this estimate is for 2029.

Housing

As shown in **Table 3-10**, in 2022 the percentage of occupied housing units in each county in the analysis area, except Spokane County, was lower than the percentage of occupied housing units in their respective states. For the Washington counties, Pend Oreille County had the largest vacancy rate at 28.2 percent, followed by Ferry County at 26.2 percent, Okanogan County at 22.4 percent, and Lincoln County at 21.7 percent. For comparison, Washington's vacancy rate was 7.4 percent in 2022. Both Idaho counties had vacancy rates exceeding the state vacancy rate of 11 percent.

Similarly, except for Spokane and Whitman Counties, all the counties in the analysis area had a higher proportion of vacant housing units that were categorized as "seasonal, recreational, and occasional," compared with Idaho and Washington (Headwaters Economics 2024).

Table 3-10. Housing Occupancy, 2022

	Washington	Idaho	Benewah County, ID	Kootenai County, ID	Chelan County, WA	Douglas County, WA	Ferry County, WA	Grant County, WA	Lincoln County, WA	Okanogan County, WA	Pend Oreille County, WA	Spokane County, WA	Stevens County, WA	Whitman County, WA
Percent Occupied Housing Units	92.6	89.0	82.0	88.5	80.9	88.7	73.8	86.7	78.3	77.6	71.8	94.9	82.8	85.6
Percent Vacant Housing Units	7.4	11.0	18.0	11.5	19.1	11.3	26.2	13.3	21.7	22.4	28.2	5.1	17.2	14.4
For rent	1.4	1.0	0.1	0.9	1.2	0.9	0.2	1.6	0.4	1.1	0.7	1.0	0.3	6.0
Rented, not occupied	0.4	0.3	0.1	0.0	0.2	0.1	0.1	0.7	0.3	0.6	0.1	0.3	0.2	1.5
For sale only	0.5	0.5	0.6	0.5	0.6	0.7	0.3	0.6	1.1	0.5	0.8	0.4	0.8	0.6
Sold, not occupied	0.3	0.4	0.1	0.7	0.2	0.1	1.1	0.5	1.2	0.1	1.8	0.3	0.4	0.2
Seasonal, recreational, and occasional	2.6	6.3	14.0	8.1	14.7	6.1	18.9	7.6	11.7	13.4	20.0	0.8	11.3	0.6
For migrant workers	0.0	0.1	0.0	0.0	0.4	1.1	0.0	1.0	0.1	0.9	0.0	0.0	0.0	0.0
Other vacant	2.1	2.5	3.1	1.4	1.7	2.3	5.6	1.3	6.8	5.8	4.8	2.3	4.2	5.4

Source: Headwaters Economics 2024

Employment and Income

As shown in **Table 3-11,** the per capita income in the counties within the analysis area increased between 2010 and 2022. For the analysis area counties in Washington, all counties experienced a smaller per capita income increase between 2010 and 2022 than the state of Washington. Of the Washington counties in the analysis area, Chelan County experienced the largest increase in per capita income from 2010 through 2022, followed by Grant County and Douglas County, Ferry County, and Okanogan County (Bureau of Economic Analysis 2022a). Lincoln County experienced the smallest increase in per capita income from 2010 through 2022.

Table 3-11. Per Capita Personal Income (2022 price value)

Geographic Area	Per Capita Income 2010	Per Capita Income 2022
Benewah, ID	36,766	43,568
Kootenai, ID	41,901	60,474
Chelan County, WA	45,985	62,685
Douglas County, WA	39,355	49,114
Ferry County, WA	35,885	44,144
Grant County, WA	38,687	48,963
Lincoln County, WA	46,673	51,953
Okanogan County, WA	40,375	49,552
Pend Oreille County, WA	40,837	48,892
Spokane County, WA	34,979	54,223
Stevens County, WA	31,787	46,750
Whitman County, WA	39,908	46,672
Idaho	41,455	56,614
Washington	54,919	75,332

Source: Bureau of Economic Analysis 2022a
Note: data provided in 2022 price value, 2010 data adjusted for inflation based on the Bureau of Labor Statistics Consumer Price Index inflation calculator

For the analysis area counties in Idaho, between 2010 and 2022, Benewah County experienced an increase in per capita income that was lower than the state of Idaho. Kootenai County experienced an increase in per capita income higher than the state (Bureau of Economic Analysis 2022a).

Table 3-12 shows county-level income earned by industry for the counties in the analysis area and state-level data for Idaho and Washington (for comparison) in 2022. The information in **Table 3-12** characterizes the composition of income by industry for the counties in the analysis area. Income earned in information industry jobs represented the largest contribution (11.6 percent) to total income for Washington. However, for the counties included in the analysis area, the total income earned from jobs in the information industry was relatively low, ranging from 0.4 percent in Whitman County, Washington, to 2.9 percent in Grant County, Washington. Income earned in health care and social assistance industry jobs represented the largest contribution (11.7 percent) to total income for Idaho. For Kootenai County, Idaho, the total income earned from jobs in the health care and social assistance industry was higher than it was for the state (12.8 percent). For Benewah County, Idaho, income earned in manufacturing jobs represented the largest contribution (16.6 percent) to total income for the county.

Income earned by industry can be an indicator of industries with the potential to be impacted by management decisions. For instance, a community in which income earned is largest for the forestry, fishing, and agricultural services industry may be more impacted by management decisions changing access to or use of forest products, fishing, and agricultural services. For the counties within the analysis area, the industries that contribute the most to income earned, such as the health care and social assistance or information industries, are those that would not be impacted by P2IP-related activities. Because P2IP activities involve construction elements, detailed information on the construction industry is provided in **Table 3-14**.

For each county within the analysis area, the largest contribution to total income varied for each industry; the largest contributor to overall income was retail trade in Douglas County, Washington, and Kootenai County, Idaho (11.2 and 9.1 percent of total income, respectively); manufacturing in Whitman County, Washington (16.8 percent of total income); construction in Kootenai County, Idaho, and Lincoln County, Washington (11.2 and 10.4 percent of total income, respectively); and healthcare/social assistance in Chelan and Spokane Counties (18.1 and 16.5 percent, respectively; Bureau of Economic Analysis 2022a).

Table 3-13 shows 2022 employment (number of jobs) by industry for the counties in the analysis area and state-level data for Idaho and Washington (for comparison). During 2022, farming was the largest industry in employment for Grant, Lincoln, and Okanogan Counties, Washington. Farming accounted for 14.4 percent of total employment in Okanogan County, 14.5 percent in Grant County, and 15.9 percent in Lincoln County. For Kootenai County, Idaho, and Douglas, Ferry, and Pend Oreille Counties, Washington, the retail sector was the largest industry in employment. For Chelan, Spokane, and Stevens Counties, Washington, health care and social assistance was the largest industry in employment. In contrast, for Benewah County, Idaho, and Whitman County, Washington, the largest industry in employment was manufacturing.

Other industries with relatively large employment for counties in the analysis area were the retail trade and healthcare/social assistance industries. Compared with all other counties and the states, Kootenai County, Idaho, and Lincoln County, Washington, supported relatively large construction workforces (9.5 percent and 8.8 percent of the total, respectively; Bureau Economic Analysis 2022b).

Future P2IP activities have the potential to impact the level of construction industry jobs and income. **Table 3-14** presents the details for the current construction sector's total income and employment (number of jobs) in 2022 for each county in the analysis area.

Table 3-12. Income by Industry, 2022 (2022 dollar value)

	Benewah County, ID	Kootenai County, ID	Chelan County, WA	Douglas County, WA	Ferry County, WA	Grant County, WA	Lincoln County, WA	Okanogan County, WA	Pend Oreille County, WA	Spokane County, WA	Stevens County, WA	Whitman County, WA	Idaho	Washington
Total earnings by place of work ($000)	282,308	5,811,080	3,503,111	924,601	133,647	3,534,192	279,866	1,177,305	273,982	21,683,601	920,533	1,848,797	70,592,136	420,116,387
Percentage of total employment														
Non-services related														
Farm	2.2	0.0	3.7	9.5	2.6	10.6	18.5	7.4	1.3	0.4	2.3	7.7	3.9	0.9
Forestry, fishing, and agricultural services	(D)	0.7	(D)	3.6	2.8	(D)	2.9	(D)	(D)	0.2	(D)	(D)	0.9	0.6
Mining (including fossil fuels)	(D)	0.5	(D)	0.0	(D)	(D)	0.1	(D)	(D)	0.1	(D)	(D)	0.4	0.1
Construction	4.8	11.2	10.3	9.5	5.0	5.8	10.4	6.0	7.8	7.4	8.2	3.0	9.1	6.7
Manufacturing	16.6	7.6	4.2	4.6	(D)	10.9	(D)	2.3	3.8	6.2	10.1	16.8	9.6	7.2
Services related														
Utilities	0.7	0.8	0.1	0.0	0.0	0.1	(D)	0.3	0.0	0.2	(D)	(D)	0.7	0.2
Wholesale trade	6.0	3.6	4.6	4.4	0.7	5.3	4.4	1.2	1.4	4.9	(D)	2.2	5.3	4.0
Retail trade	3.9	9.1	6.4	11.2	4.1	5.6	4.4	8.7	3.8	7.3	6.7	4.0	9.1	5.1
Transportation and warehousing	6.7	2.1	1.3	1.8	1.8	3.6	(D)	2.4	0.6	3.9	4.0	(D)	3.3	3.5
Information	1.3	1.5	0.7	1.9	0.7	2.9	(D)	0.9	1.4	1.3	0.5	0.4	1.3	11.6
Finance and insurance	1.6	4.5	2.1	1.8	0.5	1.5	0.9	1.3	0.6	6.4	2.5	1.1	4.4	3.8
Real estate and rental and leasing	2.1	4.3	6.3	3.9	2.7	4.7	(D)	2.5	4.9	4.3	3.9	3.3	3.2	3.3
Professional and technical services	1.7	8.0	3.8	(D)	2.8	7.3	5.2	(D)	5.2	6.9	(D)	3.7	8.3	10.8
Management of companies	(D)	0.5	0.2	(D)	(D)	0.1	0.0	(D)	0.0	2.0	(D)	(D)	1.5	5.5
Administrative and waste services	(D)	4.3	4.1	2.4	(D)	2.6	1.1	1.6	1.2	4.1	2.2	(D)	4.8	3.8
Educational services	(D)	0.9	0.5	0.2	0.4	0.3	(D)	0.5	(D)	1.7	0.4	0.3	1.2	0.8
Health care and social assistance	(D)	12.8	18.1	6.3	(D)	5.6	(D)	9.1	(D)	16.5	13.7	6.3	11.7	9.3
Arts, entertainment, and recreation	0.1	2.2	0.8	1.7	(D)	0.3	0.3	1.8	0.3	0.9	1.0	0.7	1.0	1.1
Accommodation and food services	1.6	5.0	5.3	4.4	(D)	2.6	1.3	4.4	3.3	3.9	2.2	2.9	3.6	2.9
Other services, except public administration	3.5	3.9	3.1	3.9	3.6	2.3	2.5	3.4	3.1	3.3	5.0	2.1	3.3	2.8

Source: Bureau of Economic Analysis 2022b

(D) = Not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

Note: data presented in 2022 price value

Table 3-13. Employment by Industry, 2022

	Benewah County, ID	Kootenai County, ID	Chelan County, WA	Douglas County, WA	Ferry County, WA	Grant County, WA	Lincoln County, WA	Okanogan County, WA	Pend Oreille County, WA	Spokane County, WA	Stevens County, WA	Whitman County, WA	Idaho	Washington
Private employment (number of jobs)	5,307	105,602	57,307	18,025	2,835	54,670	5,063	23,675	5,160	333,510	18,489	27,703	1,190,624	4,815,623
Percentage of total employment														
Non-services related														
Farm	5.9	0.8	8.1	11.6	8.0	14.5	15.9	14.4	5.4	1.1	6.7	4.8	3.4	1.9
Forestry, fishing, and agricultural services	(D)	0.7	(D)	4.4	4.2	(D)	3.0	(D)	(D)	0.2	(D)	(D)	1.2	0.9
Mining (including fossil fuels)	(D)	0.3	(D)	0.2	(D)	(D)	0.6	(D)	(D)	0.2	(D)	(D)	0.4	0.1
Construction	5.4	9.5	6.0	7.1	6.1	5.1	8.8	4.9	7.3	6.1	6.7	3.0	7.8	6.1
Manufacturing	11.4	5.6	4.2	3.6	(D)	8.5	(D)	2.7	3.3	5.3	7.3	11.1	6.7	5.9
Services related														
Utilities	0.4	0.4	0.1	0.1	0.0	0.0	(D)	0.2	0.0	0.1	(D)	(D)	0.3	0.1
Wholesale trade	2.0	2.4	3.8	3.5	0.8	4.0	3.8	1.2	1.2	3.7	(D)	1.9	3.3	3.1
Retail trade	9.1	11.7	9.8	13.2	8.3	8.7	7.9	10.5	8.5	10.4	10.4	6.8	10.3	8.9
Transportation and warehousing	4.9	3.3	1.8	2.9	2.0	3.8	(D)	2.1	1.7	5.3	3.4	(D)	4.3	5.2
Information	1.1	1.1	0.8	1.5	1.0	1.3	(D)	0.8	1.6	1.2	0.7	0.7	1.1	4.0
Finance and insurance	2.1	5.3	3.3	3.7	2.5	2.4	2.7	2.4	2.4	6.1	2.9	1.8	4.8	4.4
Real estate and rental and leasing	3.3	7.8	6.3	5.5	4.6	4.5	(D)	4.1	5.5	5.8	4.7	4.9	6.2	5.4
Professional and technical services	2.5	6.4	4.3	(D)	3.3	3.9	4.8	(D)	4.7	6.1	(D)	4.6	6.5	8.1
Management of companies	(D)	0.4	0.2	(D)	(D)	0.2	0.0	(D)	1.1	1.0	(D)	(D)	0.9	2.3
Administrative and waste services	(D)	4.9	4.1	4.0	(D)	3.8	2.0	2.3	2.5	5.0	3.1	(D)	5.5	4.9
Educational services	(D)	1.9	0.9	0.8	0.4	0.7	(D)	0.9	(D)	2.2	0.9	1.2	2.2	1.7
Health care and social assistance	(D)	9.1	13.1	6.3	(D)	6.8	(D)	8.2	(D)	14.8	11.8	7.0	10.2	10.6
Arts, entertainment, and recreation	0.6	3.1	2.0	2.4	(D)	0.9	1.0	2.0	1.5	1.9	2.0	1.5	2.1	2.1
Accommodation and food services	4.5	8.6	9.0	6.5	(D)	5.6	3.0	5.9	5.5	6.7	4.7	7.0	6.9	6.2
Other services, except public administration	5.9	5.0	4.1	5.0	6.0	3.5	4.6	4.3	5.3	4.6	6.2	3.8	4.7	4.5

Source: Bureau of Economic Analysis 2022b

(D) = Not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

Table 3-14. Construction Income and Employment in 2022 (2022)

Geographic Area	Total Construction Income ($000)	Total Construction Employment
Counties		
Benewah, ID	$13,597	287
Kootenai, ID	$650,108	10,040
Chelan County, WA	$359,681	3,463
Douglas County, WA	$87,869	1,278
Ferry County, WA	$6,617	173
Grant County, WA	$204,256	2,767
Lincoln County, WA	$29,014	444
Okanogan County, WA	$70,514	1,157
Pend Oreille County, WA	$21,435	378
Spokane County, WA	$1,613,142	20,303
Stevens County, WA	$75,092	1,240
Whitman County, WA	$56,055	838
Analysis Area Total	$3,187,380	42,368
States		
Idaho	$6,395,606	93,405
Washington	$28,017,551	293,062

Sources: Bureau of Economic Analysis 2022a, 2022b
Data presented in 2022 price value

As presented in **Table 3-15**, unemployment rates between 2012 and 2023 followed a similar trend in the analysis area, as well as in the states. Unemployment rates in the analysis area counties were generally higher than the unemployment rates in their respective states. Of the counties in the analysis area, Ferry County had the highest unemployment rates between 2012 and 2023. Between 2012 and 2018, there was an overall decrease in unemployment rates, with slightly higher unemployment rates reported in the analysis area in 2019. In 2020, the COVID-19 pandemic affected local and regional economies through a severe short-term reduction in employment and industrial output. While employment rates in 2021 appeared to have recovered to pre-pandemic levels, the economic impacts of the COVID-19 pandemic remain to be seen and are not distributed evenly across industries (Bureau of Labor Statistics 2022).

Table 3-15. Unemployment Rates

Geographic Area	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Counties												
Benewah, ID	12.4	11.1	7.4	6.1	5.7	5.6	4.5	5.2	7.6	5.4	4.4	5.0
Kootenai, ID	9.0	8.1	5.3	4.7	4.5	3.9	3.5	3.5	7.1	4.2	3.4	3.6
Chelan County, WA	7.3	7.1	6.0	5.4	5.6	4.8	4.6	4.9	8.3	5.4	4.6	4.3
Douglas County, WA	8.3	8.1	6.9	6.2	6.8	5.6	5.3	5.6	8.4	5.6	5.1	4.7
Ferry County, WA	14.4	13.2	11.1	9.9	10.1	10.9	11.6	11.3	11.5	8.9	9.0	8.4
Grant County, WA	8.7	8.5	7.2	7.1	7.0	6.2	6.2	6.8	8.8	6.7	5.7	5.2
Lincoln County, WA	6.6	6.7	5.6	5.7	5.5	4.9	4.9	5.0	6.7	5.0	5.1	4.9
Okanogan County, WA	8.7	8.4	6.9	6.7	6.5	6.7	6.4	6.7	8.9	6.7	6.1	5.5
Pend Oreille, WA	11.7	11.7	9.7	9.4	8.8	7.3	7.1	7.9	10.4	7.6	6.6	6.0
Spokane County, WA	8.3	8.0	6.8	6.3	6.0	5.3	5.2	5.3	8.7	5.4	4.6	4.2
Stevens County, WA	10.8	10.6	9.1	8.7	8.1	7.2	7.1	7.0	9.3	6.7	6.4	6.0
Whitman County, WA	6.0	5.9	5.1	4.7	4.9	4.3	4.4	4.4	5.7	4.3	4.4	4.0
States												
Idaho	7.4	6.8	4.4	3.9	3.7	3.2	2.9	2.9	5.5	3.6	2.8	3.1
Washington	7.7	6.6	5.9	5.4	5.2	4.6	4.4	4.2	8.5	5.2	4.1	4.1

Source: Bureau of Labor Statistics 2022

No Action Alternative

Existing socioeconomic conditions in the analysis area would continue as described under *Affected Environment*. Under the No Action Alternative, current and ongoing activities, such as collection, transport, and release of adult Chinook salmon, would continue to occur. Additional proposed activities would be less likely to occur; therefore, no new direct or indirect effects on social or economic conditions from additional P2IP-related activities would be likely to occur. Current activities would continue to support existing jobs and income in the region. No new federal actions to support the P2IP as described in the Proposed Action would occur; therefore, no additional jobs and income would be supported by these activities in the region. Other hatchery programs, such as the CJHP, would continue to operate and provide employment. No impacts to population or housing would be anticipated under this alternative. No impacts on population or housing would be anticipated under this alternative.

Proposed Action

The Proposed Action would include three categories of P2IP activities: research studies, salmon-rearing facilities, and interim fish passage, as presented in Chapter 2 and Appendices A, B, and C. Under the P2IP Agreement, total implementation costs for P2IP activities over the expected 20-year duration were estimated to be at least $300 million through (excluding internal federal agency costs incurred when implementing P2IP). Under the Agreement, Bonneville committed to provide the Proponents $10 million per year for the duration of the Agreement, expected to be 20-years, for a total of $200 million (adjusted for inflation). Reclamation and USACE committed in the P2IP agreement to work with the Project Proponents and Bonneville to identify additional funding needs for the implementation of P2IP and seek additional funding as necessary and appropriate to ensure full funding of P2IP. The Co-Lead Agencies also committed to use all appropriate legal authorities to fund, support, and implement the agreement. Funding and support under the P2IP Agreement would enable implementation of juvenile and adult research studies, data collection, design, and construction of new salmon rearing facilities (e.g., land-based acclimation facilities) and upgrades to existing hatchery facilities, and interim upstream and downstream passage at the five dams in the study area including trap and transport, data collection, and design, construction, and testing of interim passage facilities. As discussed in the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f), jobs and income directly supported by P2IP activities would support additional indirect jobs and spending in the regional economy. These can be described in terms of economic multipliers, which provide an estimate of how the output in a particular industry translates into wider employment changes throughout the economy. These indirect impacts would include short-term benefits from construction personnel's spending on fuel, food, and lodging, as well as the spending of the construction industry on materials and supplies.

Three types of multipliers are presented below:

1. **Output multiplier**: This multiplier describes the total output generated as a result of a change in output in the target industry.
2. **Employment multiplier**: This multiplier describes the total jobs generated as a result of one job in the target industry.
3. **Labor income multiplier**: This multiplier describes the dollars of labor income generated as a result of one dollar of labor income in the target industry.

Due to a lack of P2IP activity-specific details, estimated multipliers of direct spending are provided to give context for the level of potential indirect and induced impacts related to a given level of direct spending for activities in the region in specific economic sectors. Multipliers presented are based on impact analysis for planning (IMPLAN) 2022 data for the areas defined below. Information is provided for key IMPLAN economic sectors in which direct spending could occur as a result of proposed activities- including scientific research (for near term activities) and construction (for future activities). Data are presented in Type SAM Multiplier (where SAM stands for Social Accounting Matrix), which measures an industry's connection to the wider local economy by way of input purchases, payments of wages and taxes, and other transactions. The sub-analysis areas are defined as follows:

- Idaho Analysis Area (Coeur d'Alene Reservation):
  - Benewah County, Idaho
  - Kootenai County, Idaho
  - Spokane County, Washington
  - Whitman County, Washington
- Eastern Analysis Area-Washington (including Spokane Reservation and portions of Colville Reservation):
  - Spokane County
  - Stevens County
  - Lincoln County
  - Ferry County
  - Whitman County
  - Pend Oreille County
- Western Analysis Area-Washington (including portions of the Colville Reservation):
  - Chelan County
  - Douglas County
  - Grant County
  - Okanagan County

Research Studies

The Project Proponents would staff research studies. Staffing requirements associated with research studies are anticipated to require one to two additional full-time staff for each of the three Tribes and at UCUT, resulting in four to eight additional permanent positions. While proposed research

studies, as identified, could result in minor long-term changes to direct employment, it is anticipated that these actions would result in little change to the total employment, labor income, or economic output in the region, compared with the No Action Alternative.

The level of indirect and induced impacts for specific project components within a subregion can be estimated with the use of multipliers for IMPLAN sector 464, which includes North American Industry Classification System (NAICS) sector 541715—fisheries research and development laboratories or services. The multipliers for direct spending are presented below for each identified economic analysis area. Detailed methodology and assumptions for the analysis of economic contributions are provided in the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f).

Idaho Analysis Area

For direct spending, it is estimated that for every dollar of direct output for P2IP research activities, there would be an additional $1.91 of indirect and induced output. For employment, for every 1 direct employee supported, there would be an additional 2.13 jobs including indirect and induced employment supported in the region. For labor income, for every direct dollar in labor income supported, there would be an additional $1.84 in indirect and induced labor income.

Eastern Analysis Area-Washington

For direct spending, it is estimated that for every dollar of direct output for P2IP research activities, there would be an additional $1.76 of indirect and induced output. For employment, for every 1 direct employee supported, there would be an additional 1.98 jobs including indirect and induced employment supported in the region. For labor income, for every direct dollar in labor income supported, there would be an additional $1.71 in indirect and induced labor income.

Western Analysis Area-Washington

For direct spending, it is estimated that for every dollar of direct output for P2IP research activities, there would be an additional $1.59 of indirect and induced output. For employment, for every 1 direct employee supported, there would be an additional 1.77 jobs included indirect and induced employment supported in the region. For labor income, for every direct dollar in labor income supported, there would be an additional $1.51 in indirect and induced labor income.

In addition to the contributions presented above, all direct spending would support additional tax contributions at the local, county, and state levels (for example, in the form of sales tax and income tax).

Acclimation and Rearing Facilities and Interim Passage

Proposed additional P2IP activities related to rearing and acclimation facilities and interim passage in the near term could result in minor, temporary changes to direct employment and additional employment to support data collection for facility design and installment of temporary acclimation facilities. As discussed above under the research studies multipliers, it is anticipated that these actions would result in little change to the total employment, labor income, or economic output in the region, compared with the No Action Alternative. The level of indirect and induced impacts for specific project components within a subregion can be estimated. Detailed methodology and

assumptions for the analysis of economic contributions are provided in the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f).

Additionally, there would be no material changes to CRS facility operations and maintenance under the Proposed Action. The proposed P2IP activities would be implemented within the operational limitations of existing in-season management plans for Grand Coulee and Chief Joseph dams and their associated facilities. As such, there would be no changes to -power generation and its regional economic contributions.

The economic contributions presented below in this section are those associated with future P2IP construction activities and employment, which would be fully analyzed in future environmental compliance documentation. Detailed methodology and assumptions for the analysis of economic contributions are provided in the P2IP Socioeconomics and Environmental Justice Resource Report (Reclamation 2024f). Data are presented based on direct impacts in IMPLAN's sector 56, Construction of other new nonresidential structures.

Construction actions and modifications would be required at some existing fish-rearing facilities to accommodate artificial production activities proposed for the future P2IP activities (see **Appendix B**). Construction would temporarily result in an increased number of construction-related jobs and the income for construction personnel. Impacts on socioeconomic conditions would also depend on the entities hired to carry out construction. For instance, local contractors performing construction activities could have a different impact on the regional economy than nonlocal contractors.

As discussed in the methods section, multipliers of direct spending are presented below for each of the identified economic analysis areas.

Idaho Analysis Area

For direct spending, it is estimated that for every dollar of direct output for P2IP construction activities, there would be an additional $1.90 of indirect and induced output. For employment, for every 1 direct employee supported, there would be an additional 1.62 indirect and induced employment supported in the region. For labor income, for every direct dollar in labor income supported, there would be an additional $1.59 in indirect and induced labor income.

Eastern Analysis Area-Washington

For direct spending, it is estimated that for every dollar of direct output for P2IP construction activities, there would be an additional $1.74 of indirect and induced output. For employment, for every 1 direct employee supported, there would be an additional 1.53 indirect and induced employment supported in the region. For labor income, for every direct dollar in labor income supported, there would be an additional $1.48 in indirect and induced labor income.

Western Analysis Area-Washington

For direct spending, it is estimated that for every dollar of direct output for P2IP construction activities, there would be an additional $1.56 of indirect and induced output. For employment, for every 1 direct employee supported, there would be an additional 1.42 indirect and induced employment supported in the region. For labor income, for every direct dollar in labor income supported, there would be an additional $1.32 in indirect and induced labor income.

In addition to the contributions presented above, all direct spending would support additional tax contributions at the local, county, and state levels (for example, in the form of sales tax and income tax).

Any permanent increases in employment or income expected to occur from operation and maintenance activities—once construction has been completed—would vary by facility. The installation of additional net pens would result in increased capacity for fish-rearing operations, thereby increasing the need for additional employment for operations and maintenance at some facilities. This would result in a likely little, but permanent, increase in employment. Due to the minimal level of direct economic contributions, no regional modeling is provided for operations and maintenance activities in this programmatic document. The potential impacts of operations and maintenance activities on regional income and employment may be considered in future environmental review processes, as needed.

Depending on project details, such as timing, location, and the number of workers required, employment demands have the potential to have localized impacts on housing demand. The potential for these impacts would be analyzed in future environmental review.

Cumulative Effects

Under the Proposed Action, impacts on economic contributions from future P2IP activities (construction-related activities) are discussed. Due to a lack of project-specific details, multipliers were provided to add for the level of potential indirect and induced impacts related to a given level of direct spending for construction activities in the region.

Overall, the proposed P2IP activities are expected to have minor impacts on regional jobs and income due to the limited direct employment associated with the three types of proposed activities in the near term. Given this, when the Proposed Action is considered with other reasonably foreseeable future projects, there is little potential for cumulative impacts on regional jobs and income.

3.9.3 Benefits Provided by Translocation of Salmon into the Blocked Area

Affected Environment

Tribal Importance

This section provides a brief discussion of the historical importance of fisheries for Tribal populations, and some identified social and cultural values for Tribes. **Section 3.9.6**, Differential Effects on Low-income, Minority, Indigenous, and/or Tribal Populations, includes a brief discussion of the three Tribal populations with a potential to be impacted by P2IP activities. More information regarding Tribes can be found in the cultural resources and Tribal interests sections (**Sections 3.8** and **3.9**).

For millennia, salmon have been the central focus of the economies, cultures, lifestyles, and identities of the Tribes of the Columbia River Basin. Modern non-Native commercial overfishing and historical dam construction on the Columbia River have devastated salmon runs and altered Tribal communities (Baldwin et al. 2022). Despite the diminishment of the resource, salmon

continue to be a key resource of critical importance to the Tribes of the region for personal and family consumption; informal, interpersonal distribution and sharing; community distribution; ceremonial uses; and identity. Salmon play a central role in a variety of ceremonies important to regional Tribes, including winter ceremonies, the First Salmon ceremonies, naming ceremonies, feasts, and funerals.

In addition to these uses, salmon are also an essential component of and vehicle for intergenerational transfer of knowledge and culture. Elders teach the young people the use of fishing gear, harvest methods, preparation and preservation of salmon (such as by smoking), and an appreciation for and awareness of the natural environment and the place of salmon within it (USACE 2020). In recent years, several Tribes, including the Project Proponents, have made initial efforts to implement cultural and educational releases of salmon upstream of Chief Joseph Dam and Grand Coulee Dam (Baldwin et al. 2022). According to Baldwin et al. (2022), ceremonial and educational salmon releases supported short-term Tribal goals, including reconnecting Tribal members with the salmon and the salmon with the habitat, exercising ceremonies and traditions to keep salmon culture alive and thriving, and, in some cases, providing harvest opportunities (Baldwin et al. 2022).

Market and Nonmarket Value

In addition to benefits of salmon provided to Tribes within the analysis area, salmon provide both market and nonmarket value. Passive-use values, also referred to as "nonuse values," are the values people hold for the continued existence of a resource beyond any current or future use. These values are thought to measure the intrinsic values people hold for natural resources or ecological health and functioning. While different definitions are used across studies, economists divide these values into the following three categories (Bureau of Reclamation Economics Guidebook, Economics Group Technical Service Center):

- Existence value, defined as the benefit gained simply from knowing the resource exists
- Option value, allowing for potential use of the resource in the future
- Bequest value, reflecting a desire to ensure the continued existence of the resource for future generations

As described in the Biological Resources Report, many Columbia River Basin fish species, including salmon, are threatened or endangered. Salmon provide passive-use value, such as existence value, for those in the analysis area. A report by UCUT assessed the current value of the Columbia River Basin. Using Census Bureau data and a model from Richardson and Loomis (2009) on existence value for various species from around the United States, including several cases of Pacific Northwest anadromous salmon populations, UCUT estimated the total existence value of salmon for households in the Colombia River Basin under 2017 conditions to be $46 million annually, when adjusted for inflation to 2022 values (UCUT 2017).

No Action Alternative

Current and ongoing P2IP activities would continue to contribute to testing the long-term feasibility of reintroducing salmon in the blocked area. Under the No Action Alternative, current and ongoing

activities, such as collection, transport, and release of adult Chinook salmon, would continue to occur at a limited scale, and salmon would continue to provide commensurate benefits to Tribes within the analysis area. As described in the biological resources section (**Section 3.6**), annually up to 180,000 juvenile Chinook salmon, 2,000 adult Chinook salmon, and 500 sockeye salmon would continue to be released into the blocked area from below Chief Joseph Dam. Tribes would continue to have a limited number of salmon for ceremonial, research, and subsistence purposes.

As described in the Tribal Interests section (**Section 3.8**), there would be no assurance of additional funding for research studies, acclimation and rearing facilities, or interim fish passage studies. There would likely be fewer activities related to the reintroduction of salmon to the currently blocked area, as compared with the Proposed Action. The lack of additional funding would delay and potentially reduce the opportunity to reintroduce salmon, which would impact Tribal use of this important resource. For instance, as described in the Cultural Resource Report, without salmon it would be difficult for Tribes to maintain cultural continuity and connections with TCPs related to fishing and salmon. As a result, there would be potential long-term impacts on the continuation of benefits provided by fish.

Additionally, as described in the P2IP Tribal Interest Resource Report (Reclamation 2024i), there would be the potential for continuation of long-term adverse impacts by the CRS on Tribal communities, particularly related to cultural identities and traditions associated with salmon and steelhead. Without additional funding to examine the feasibility of reintroducing salmon to areas that are currently blocked, there would be long-term adverse impacts by the CRS on the continuation of social, cultural, and economic benefits to Tribes associated with traditional fishing activities and subsistence.

Proposed Action

Research Studies, Acclimation and Rearing Facilities, and Interim Passage

Pacific Northwest Tribes revere salmon as a central element of their cultural and spiritual identity, and salmon have been a critical food resource for millennia. In addition to the intrinsic benefits that salmon provide to Tribes within the analysis area, salmon provide both market and nonmarket value. Under the Proposed Action, P2IP activities would have a beneficial additive effect for the nonmarket value of salmon by improving conditions for salmon in the blocked area over the long term.

As described in the biological resources section (**Section 3.6**), under the Proposed Action, annually there would be up to 250,000 juvenile Chinook salmon, up to 250,000 juvenile sockeye salmon, up to 10,000 adult Chinook salmon, and 10,000 adult sockeye released into the blocked area, in addition to up to 180,000 salmon already released under the No Action Alternative.

Under the Proposed Action, there would be a potential for short-term, beneficial impacts provided by the translocation of salmon into the blocked area for Tribes. As described in Affected Environment, the Project Proponents have made initial efforts to implement cultural and educational releases of salmon upstream of Chief Joseph Dam and Grand Coulee Dam (Baldwin et al. 2022). A 2022 paper published by fisheries biologists for the three Tribes documented that past

cultural and educational salmon releases were found to have achieved some Tribal goals and objectives in the short term (Baldwin et al. 2022). Under the Proposed Action, research activities would involve salmon releases. While salmon releases implemented as part of this PEA would be for research purposes, there could be a potential for releases to contribute to the Tribes' short-term goals and objectives, such as those identified in the Baldwin et al. paper.

However, some impacts may occur in the short term related to the availability of subsistence salmon obtained from hatcheries. While Tribes would still obtain subsistence salmon as surplus from the existing hatcheries, the number of subsistence fish may be decreased because a portion of these fish would be transported and released to make progress on satisfying P2IP's purpose.

Should translocation result in long-term increases in the number of salmon available to Tribes, there would be the potential for benefits to Tribes by increasing the number of salmon available for ceremonial, subsistence, and research purposes. While the P2IP would test the feasibility of salmon reintroduction in the Upper Columbia River Basin, in the long term, P2IP activities would contribute to the goals of restoring Tribal traditional and cultural practices related to salmon and restoring access to salmon for Tribal and non-Tribal communities in the blocked area.

Cumulative Effects

As described in **Chapter 2**, future P2IP activities that would be addressed through future environmental compliance processes include construction of acclimation facilities to support rearing activities and construction and testing of interim upstream and downstream fish passage. These activities are also anticipated to contribute to the improvement of conditions for salmon and the feasibility of reintroduction in the long term. As a result, future P2IP activities could have a beneficial additive effect for the passive-use value of salmon. Compared with the No Action Alternative, such activities would also contribute further to the goals of restoring Tribal traditional and cultural practices related to salmon and restoring access to salmon for Tribal and non-Tribal communities in the blocked area.

Overall, the proposed P2IP activities could have a beneficial additive effect by reestablishing the presence of salmon in the blocked area and improving conditions for salmon, which are critically important to the Project Proponents. As described in the P2IP Biological Resource Report, the reintroduction of salmon to areas upstream of Chief Joseph Dam and Grand Coulee Dam would allow salmon access to habitats that will be subjected to climate change impacts over the next 80 years. Salmon releases in the blocked area provides the research data to design interim fish passage facilities and donor stocks that would be resilience to climate-induced stressors. Climate change is cumulative in nature. Climate change continues to impact plants and animals of cultural and economic importance to the Project Proponents, including salmon, and the benefit they provide to these Tribes. Salmon and the benefits they provide to these Tribes are vulnerable to climate change (Krosby and Morgan 2018). Any reasonably foreseeable future actions that would increase the number of salmon translocated into the blocked area would help contribute to the benefits provided to these Tribes through translocation and reestablishment of salmon in the blocked area. Other programs outside the P2IP proposed activities that allow for increased salmon available to these Tribes for ceremonial, spiritual, education, research, and/or subsistence would contribute to the benefits of salmon to Tribes.

3.9.4 Economic Contributions Associated with Recreational Fishing

Affected Environment

The operation of the Study Area dams and reservoirs regulates water flows, creating a mixture of reservoir and in-stream recreational opportunities. These opportunities attract recreational visitors each year. The study area supports fish and wildlife habitat. Salmon, steelhead, sturgeon, walleye, bass, and rainbow trout are popular species for recreational fishing opportunities. Recreation sites in the analysis area include national recreation areas, national wildlife refuges, national forests, state parks, county and municipal parks, port-operated marinas and boat launches, private recreation lands, and other forms of access. Fish of the analysis area are caught in commercial, recreational, and Tribal ceremonial and subsistence fisheries. The discussion in this section is focused on recreational fishing and the associated economic opportunities, given that recreational fishing is the recreational use with the potential to be impacted by proposed activities.

Recreational activities are valued by recreationists. The economic value of recreation is the difference between the maximum amount a recreationist would be willing to pay to participate in a recreational activity and the actual cost of participating in that activity. Economists refer to this as consumer surplus or net economic value. Put simply, this is a recreationist's value of a trip after all expenses have been paid. For example, if a recreationist is willing to pay $105 to go fishing, but only incurs $75 of expenses, the recreationist receives $30 of consumer surplus value.

Recreational use also produces economic activity. As visitors travel to and from recreation areas, they spend money in local communities on food, gas, lodging, and other trip-related expenses. Visitors who live outside the analysis area stimulate economic activity and inject new money into local economies, supporting jobs and income for residents. For example, if a nonlocal recreationist spends $75 on gas, food, and other supplies to go fishing, these expenditures provide sales for businesses in the region. In turn, these businesses make purchases from other firms in the region to support their operations, and employees of these firms make additional purchases with their wages. The summation of these effects represents the total economic impact of recreational activities on the region, which can be measured in terms of sales (spending), jobs, income, and value added, although other measures may be used.

No Action Alternative

The level of recreation use for water-based recreation depends on specific factors and site characteristics. These include the flows and elevations of rivers and reservoirs, the number and quality of facilities at a site (for example, campgrounds, restrooms, or marinas); proximity to population centers, which affects the travel cost and time to reach a site; water quality (for example, clarity and cleanliness); availability of fish (that is, abundance and types of species), which influences catch rates for anglers; crowding; the range of activities that can be pursued; and the amenities and aesthetic quality of the site/area. Under the No Action Alternative, the level of recreational fishing and associated economic contributions would continue to be influenced by the above factors, and no overall change to the level of fish available or the related economic contributions is anticipated.

Proposed Action

Under the Proposed Action, some P2IP activities, including egg collection, adult salmon transport, juvenile salmon rearing at existing hatcheries, ground-disturbing data collection to inform the design of acclimation and interim passage facilities, and monitoring activities, would have no to little effects on recreational opportunities in the analysis area through the long-term time frame; this is because these activities would occur in areas with relatively low recreation use. Other activities, such as boat- and land-based salmon releases; installation, operations, and maintenance of telemetry receivers and net pens; and monitoring activities, could displace or disrupt recreation users in the vicinity of these actions in a temporary time frame (see **Table 3-1** and the recreation discussion for additional information). Negligible impacts on recreational economic contributions are anticipated from these actions.

In the long term, small increases in the abundance of key anadromous commercial fishing species are anticipated, particularly Chinook and sockeye salmon, increasing fishing opportunities for these species over the long term. As a result, there is the potential for increased net economic value as well as direct and indirect economic contributions associated with this use. The level of changes would depend on the specific change to commercial fishing levels and spending and would be addressed through future environmental compliance analysis. While site-specific impacts may be larger, overall, for the analysis area based on estimated fish population changes (**Section 3.6**, Biological Resources), impacts are expected to be minor.

Cumulative Effects

Overall, the proposed P2IP activities are expected to have minor impacts on the analysis area-wide net economic value and economic contributions associated with recreational fishing. As described in **Chapter 2**, future P2IP activities would be addressed through future environmental compliance processes. Existing factors such as the flows and elevations of rivers and reservoirs, recreational experience, area population, and environmental factors influencing fish populations would continue to impact recreational fishing and the related economic net value and contributions.

3.9.5 Economic Contributions Associated with Commercial Fishing

Affected Environment

Commercial fisheries refer to fishing and catch, either in whole or in part, intended for commerce through documented sale, barter, or trade through licensed fish dealers. Commercial fishing for Columbia River Basin–origin fish is conducted by both the Tribes and the non-Tribal public. Salmonid species, specifically Chinook salmon and coho salmon, dominate commercial catch of Columbia River Basin–origin fish both within the Columbia River and in Pacific Ocean fisheries.

Commercial fishing on the Columbia River main stem is managed in cooperation with other state, federal, and Tribal co-managers through a salmon and steelhead fisheries management agreement[25]

[25] U.S. v. Oregon Management Agreement provides a framework for managing salmon and steelhead fisheries and hatchery programs in much of the Columbia River Basin. The agreement assures equitable catch, provides for conservation, and the framework for developing annual plans to determines specific fishing opportunities. The Nez Perce, Umatilla, Warm Springs, Yakama, and Shoshone-Bannock tribes; the states of Washington, Idaho, and Oregon;

(*U.S. v. Oregon 1969)*, the Columbia River Compact[26] process, and statewide salmon season setting conducted as part of the North of Falcon process[27]. Fishing occurs at specific times and areas, with catch limits determined by the size of the runs and the number of allowable impacts on species listed under the ESA (WDFW 2024b).

The majority of commercial fishing in the Columbia River Basin occurs in the main stem of the Columbia River between the mouth of the river and just upstream of McNary Dam. This is outside the Study Area but has the potential to be impacted by project activities should overall changes in commercial fish species occur in the basin. Anadromous fish originating from the Columbia River Basin also contribute to commercial ocean fisheries in Oregon, Washington, and southeast Alaska, and to a lesser extent, in British Columbia (NMFS 2014b).

As detailed in the 2020 Columbia River Systems Operations EIS (USACE, Reclamation, and Bonneville 2020), the average annual value of coho salmon and Chinook salmon caught in the Columbia River Basin between 2013 and 2017 was $13.7 million, based on 2017 dollar value and an average annual landed weight of 5.6 million pounds. The average annual value of Tribal commercial salmon catch in commercial fishing zones of the Columbia River between 2013 and 2017 was $8.2 million in 2017 value and an average annual landed weight of 3.4 million pounds. Ocean fishing ex-vessel value (that is, the price received by a captain [at the point of landing] for the catch) represented additional economic value ($11.2 million and 1.1 million annual ex-vessel value for Chinook and coho salmon, respectively, based on 2017 dollar values).

Tribal commercial value data were only available for Chinook salmon and coho salmon. Even then, data are only for sales made to licensed fish buyers, not direct sales to the general public, which may be substantial and may underrepresent the commercial sale value.

Commercial recreational fisheries play an important role in the economy of Columbia River communities through the direct and indirect spending associated with this industry. For example, the fisheries provide local jobs and business, including, but not limited to, seafood-related businesses, such as fish buyers, processors, and dealers; fish markets; grocery stores; and restaurants. Commercial fisheries on the Columbia River also support shoreside businesses, including boat builders, mechanics, and marine suppliers.

No Action Alternative

The level of commercial fishing in the main stem of the Columbia River and the associated economic contributions depend on numerous factors, including, but not limited to, catch limits

and NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS) and Bureau of Indian Affairs (BIA) are signatories of the Management Agreement (https://www.fisheries.noaa.gov/west-coast/sustainable-fisheries/2018-2027-united-states-v-oregon-management-agreement).

[26] The Columbia River Compact is an agreement between Oregon and Washington through which the two states set commercial fishing regulations for concurrent-jurisdiction waters of the Columbia River. https://wdfw.wa.gov/fishing/management/columbia-river/compact.

[27] The North of Falcon process is a series of annual meetings between state, federal, and Tribal fishery managers to plan the Pacific Northwest's recreational and commercial salmon fisheries. https://wdfw.wa.gov/fishing/management/north-falcon#:~:text=North%20of%20Falcon%20Each%20year%20state%2C%20federal%20and,is%20known%20as%20the%20North%20of%20Falcon%20process

based on stock sizes in the basin for commercial fish species and other legal and treaty obligations as determined by state, federal, and Tribal co-managers; weather and climate conditions; and market conditions. Under the No Action Alternative, the level of commercial fishing and associated economic contributions would continue to be influenced by the above factors, and no overall change to the level of fish available or the related economic contributions is anticipated.

Proposed Action

Under the Proposed Action, near-term P2IP activities would have no to little effects on commercial operations and the associated economic contributions. In the long term, small increases in the abundance of key anadromous commercial fishing species are anticipated, particularly for Chinook and sockeye salmon. As a result, there is the potential for increased net economic value as well as direct and indirect economic contributions associated with this use. The level of changes would depend on the specific change to commercial fishing levels and spending and would be addressed through future environmental compliance. While site-specific impacts may be larger overall for the analysis area based on estimated fish population changes (**Section 3.6**, Biological Resources), impacts on commercial fishing for both Tribal and non-Tribal parties are expected to be minor.

Cumulative Effects

Overall, the proposed P2IP activities are expected to have minor impacts on analysis area–wide net economic value and economic contributions associated with commercial fishing. As described in **Chapter 2**, future P2IP activities would be addressed through future environmental compliance processes. Existing factors such as catch restrictions, legal and treaty obligations, and market conditions would continue to impact commercial fishing and the related economic net value and contributions.

3.9.6 Differential Effects on Low-income, Minority, Indigenous, and/or Tribal Populations

Affected Environment

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 *Federal Register* 7629, February 11, 1994), formally requires federal agencies to incorporate environmental justice as part of their missions. Specifically, it directs them to address, as appropriate, any disproportionate and adverse human health or environmental effects of their actions, programs, or policies on minority and low-income populations. Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All (88 *Federal Register* 25251), was enacted on April 21, 2023, to complement Executive Order 12989.

This analysis consists of two steps: (1) the screening of populations within the analysis area to identify the presence of communities for further environmental justice consideration, and (2) a review of impacts to determine the potential for disproportionate adverse impacts on these communities.

Communities with environmental justice concerns could experience benefits and/or burdens as a result of effects on resources. Impacts, including benefits, specific to Tribal communities are detailed

in **Section 3.8** (Tribal Interests) and **Section 3.7** (Cultural Resources), as well as the discussion of benefits provided from salmon reintroduction in the socioeconomic discussion in **Section 3.9.3**.

Two counties in Idaho and 10 counties in Washington compose the analysis area. Each county was screened to identify the presence of low-income, minority, and Native American populations that would meet the criteria for identification as communities with environmental justice concerns.

Low-income populations—The CEQ guidance on environmental justice (CEQ 1997) defines low-income populations based on the U.S. Census Bureau's annual statistical poverty thresholds. The guidance does not provide criteria for determining low-income populations. To conservatively bound this analysis, low-income populations are defined as households whose income is less than or equal to twice (200 percent of) the federal poverty level. For this analysis, populations are considered low-income populations when (1) 50 percent of the population is classified as low income, or (2) any geographic area of analysis has a low-income percentage of the population equal to or higher than the reference area.

Minority populations—The total minority populations are defined as the total population minus those who identify as White, of non-Hispanic descent. CEQ 1997 guidance states that minority populations should be identified where either (1) the minority population of the affected area exceeds 50 percent, or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For this analysis, "meaningfully greater" is defined here as 10 percent higher than the reference area population. In this analysis, county-level population data are compared to respective state data, because the state is considered the reference area.

Tribal Nations—All federally recognized Tribes (Federally Recognized Indian Tribe List Act of 1994) within the Study Area are analyzed. Tribes are considered communities with environmental justice concerns due to a history of being underserved and overburdened. Impacts on the rights of Tribal Nations are evaluated in **Section 3.8** (*Tribal Interests*).

Indigenous populations—For this analysis, additional screening was used to review U.S. Census Bureau data for Indigenous populations (those who identify as American Indian or Alaska Native alone or in combination with one or more other races). This analysis also used a threshold analysis and meaningfully greater analysis to identify Indigenous populations that meet the criteria for environmental justice consideration. For this analysis, populations are considered to meet the criteria for environmental justice consideration when (1) 50 percent of the population is Indigenous, or (2) any geographic area of analysis has an Indigenous population percentage equal to or higher than the reference area.

Additional information is also provided below in the discussion on Tribal populations with the potential to be affected by the Proposed Action.

Low-Income and Minority Populations

Both minority and low-income populations have been identified for further environmental justice consideration in the analysis area. **Table 3-16** presents minority and low-income population percentages for counties included in the analysis area as well as the states of Idaho and Washington.

The "meaningfully greater" analysis for low-income populations has been provided with respect to the state comparison population. All populations examined at the county level, except Kootenai County, Idaho, qualified for further environmental justice consideration based on at least one of the specified minority, low-income, or Tribal thresholds.

Table 3-16. Minority, Indigenous, and Low-Income Populations

Geographic Area	Minority Population[1]			Low-Income Population[2]			Indigenous Population[3]		
	Percent Minority	Meaningfully Greater than the State	Exceeds 50 Percent	Percent Low Income	Meaningfully Greater than the State	Exceeds 50 Percent	Percent Indigenous	Meaningfully Greater than the State	Exceeds 50 Percent
Benewah County, ID	16.3	No	No	41.5	Yes	No	11.5	Yes	No
Kootenai, ID	12.5	No	No	27.5	No	No	2.6	No	No
Chelan County, WA	33.6	No	No	29.1	Yes	No	2.3	No	No
Douglas County, WA	38.8	Yes	No	26.8	Yes	No	2.2	No	No
Ferry County, WA	28.5	No	No	41.2	Yes	No	22.9	Yes	No
Grant County, WA	49.0	Yes	No	35.6	Yes	No	3.5	Yes	No
Lincoln County, WA	10.5	No	No	28.6	Yes	No	3.6	Yes	No
Okanogan County, WA	37.3	No	No	41.1	Yes	No	13.2	Yes	No
Pend Oreille County, WA	15.1	No	No	34.2	Yes	No	5.0	Yes	No
Spokane County, WA	17.6	No	No	28.8	Yes	No	3.3	Yes	No
Stevens County, WA	14.8	No	No	31.7	Yes	No	7.2	Yes	No
Whitman County, WA	24.2	No	No	42.2	Yes	No	2.5	No	No
States									
Idaho	19.9	—	22.9	23.0	—	—	2.8	—	—
Washington	34.5	—	38.0	30.5	—	—	3.2	—	—

Sources: U.S. Census Bureau 2022a, 2022b, 2022c

[1] The total minority populations are defined as the total population minus those who identify as White, of non-Hispanic descent.

[2] Low-income populations are defined as people whose income is less than or equal to twice (200 percent of) the federal poverty level.

[3] Indigenous population is defined as those who identify as American Indian or Alaska Native alone or in combination with one or more other races.

As such, the analysis area has 11 environmental justice populations at the county level. Douglas and Grant Counties, Washington, had minority populations that were meaningfully greater than the state of Washington's minority population. All counties within the analysis area, excluding Kootenai County, Idaho, had low-income populations that were meaningfully greater than their respective state reference populations. Benewah County, Idaho, and Ferry, Grant, Lincoln, Okanogan, Pend Oreille, Spokane, and Stevens Counties, Washington, had Indigenous populations that were meaningfully greater than their respective state populations.

Tribal Nations

As described above, federally recognized Tribes are considered communities with environmental justice concerns due to a history of being underserved and overburdened. The analysis area lies within the traditional territory of numerous Tribes in the Columbia River Basin. Tribal use and occupation of the Plateau region have occurred for millennia, resulting in countless locations of use and importance to Tribal communities (see **Section 3.8**, Tribal Interests). The P2IP proposal is brought forward by the three Tribes in the analysis area—the CTCR, STOI, and CDAT—through and with the assistance of the UCUT, collectively the Project Proponents.

The Project Proponents have defined the studies, activities, and P2IP locations needed to determine the feasibility of salmon reintroduction (see **Appendix A**). As such, the Tribes have been instrumental in defining the Proposed Action and identifying P2IP locations and activities. More information regarding Native American Tribes can be found in the P2IP Cultural Resources and Tribal Interests Reports (Reclamation 2024g; Reclamation 2024h). The P2IP Tribal Interests Resource Report describes the potentially affected resources of traditional importance to Tribes and the potentially affected Tribal populations. The P2IP Cultural Resource Report describes the cultural context of and cultural resources in the analysis area. Additionally, a confidential Cultural Resources Overview Report was prepared for the P2IP PEA to conduct archaeological and architectural research, cultural resource reviews and inventories, and compilation of ethnographic information.

No Action Alternative

Under the No Action Alternative, current and ongoing activities, such as collection, transport, and release of adult Chinook salmon, would continue to occur. Ongoing P2IP activities would not result in disproportionate, adverse impacts on communities with environmental justice concerns within the analysis area. Existing socioeconomic conditions in the analysis area would continue as described under **Section 3.9.2**. New P2IP-related activities would not occur; therefore, no new direct or indirect effects on communities with environmental justice concerns from additional P2IP-related activities would occur.

Under the No Action Alternative, new research studies, expanded acclimation and rearing facilities, and interim passage activities would not occur. Therefore, substantial additional contributions to the long-term potential for reintroduction of salmon through those three activities would not occur. Salmon would continue to provide benefits and nonmarket value to communities with environmental justice concerns, including Tribes, within the analysis area.

Proposed Action

Communities with environmental justice concerns could experience benefits as a result of impacts on resources from the Proposed Action. Impacts, including potential benefits, specific to Tribal communities are detailed in **Section 3.8** (Tribal Interests) and **Section 3.7** (Cultural Resources), as well as the discussion of benefits provided from salmon in the socioeconomic discussion in **Section 3.9.3**. Beneficial impacts on biological resources are discussed in **Section 3.6** (Biological Resources). Further, future environmental compliance processes would also evaluate potential impacts on relevant affected resources, including potential benefits, in those respective resource analyses.

Research Studies

Juvenile and adult salmon research studies conducted at least through the year 2043 are not anticipated to have disproportionate adverse impacts on communities with environmental justice concerns; this is because they would occur at or within existing facilities or require little to no modification of the setting or location where they occur. As described in the P2IP Tribal Interests Report (Reclamation 2024i), research studies are not anticipated to have adverse impacts on Tribal communities.

By contrast, benefits would accrue to Tribes through the translocation of salmon into the blocked area. For juvenile studies, the installation, operation, and maintenance of PITs and acoustic receivers throughout the analysis area, including at dams, would not cause ground disturbance, disrupt existing use, or impact regional economic conditions for any population, including low-income, minority, and Tribal populations. Any changes to dam operations to install, operate, or maintain receivers would be conducted in a manner that would result in nonmaterial changes to dam operations. The same is true for installation of radio telemetry receivers associated with adult research studies.

Adult research activities would involve trap and transport programs. The trapping and transportation of adult tagged salmon via truck may result in increased emissions for all populations, including communities with environmental justice concerns. However, emissions associated with transportation activities would depend on multiple factors, such as the distance traveled, and equipment used. As described in **Section 3.4** (Climate and Air Quality), emissions resulting from research studies would be minor. Overall impacts on air quality from trap and transport–related greenhouse gas emissions are not expected to result in disproportionate adverse impacts on communities with environmental justice concerns.

Acclimation and Rearing Facilities

The development of fish-holding, fish-rearing, and acclimation facilities is not anticipated to have disproportionate, adverse impacts on communities with environmental justice concerns. Under the Proposed Action, modifications would be required at some existing fish-rearing facilities to accommodate artificial production activities proposed for the P2IP (see **Appendix B**). This may include construction (see **Appendix B**). To characterize site conditions and inform designs, activities may include geotechnical studies, surveying, and well drilling, which would cause minor ground disturbance. Any associated potential noise or visual impacts would be temporary and minor in magnitude, and they would not impact large portions of the analysis area. For instance, if a potential acclimation site were adjacent to an important site or an area where Tribal members engage

in cultural practices, Tribal members may experience some short-term noise or visual impacts (for an hour or two), should visits overlap ground-disturbing activities.

As described in the P2IP Tribal Interests Resource Report (Reclamation 2024i), activities that cause ground disturbance, introduce new visual or auditory changes to an important area, or reduce access to areas of Tribal use would be most likely to impact Tribal interests. Because the Tribes defined the Proposed Action and P2IP locations, impacts are anticipated to be minor. Further, when considering the potential for disproportionate impacts on Tribes resulting from the three categories of P2IP activities discussed above (research studies, acclimation facilities, and interim passage), it is relevant to consider that the Project Proponents would submit acclimation site (and interim passage) proposals. The Co-lead Agencies would continue to closely coordinate with the Project Proponents on P2IP studies and associated activities. Overall, development of fish-holding, fish-rearing, and acclimation facilities would contribute to the long-term goals of testing salmon reintroduction feasibility, which has been identified as being of key importance to Tribal members. Additionally, reintroducing salmon to the currently blocked area of the Columbia River and its tributaries would result in long-term beneficial impacts on Tribal interests.

Opportunities to develop new acclimation facilities also exist in the Spokane and Sanpoil watersheds. However, as described in **Chapter 2** of this PEA, construction of new acclimation facilities would be evaluated through future environmental compliance processes. As a result, the potential for disproportionate, adverse impacts on communities with environmental justice concerns associated with construction of new acclimation facilities would be analyzed through future environmental compliance processes.

Interim Passage

Interim upstream and downstream fish passage facilities would have some of the same impacts as described above. This is because interim passage would involve (a) the trapping and transportation of adult salmon and (b) data collection activities to inform proposed interim passage design (see **Appendix C**). As noted above, the trapping and transporting of adult tagged salmon via truck may result in increased GHG emissions for all populations, including communities with environmental justice concerns. However, trap-and transport-related GHG emissions are de minimis and not expected to result in disproportionate adverse impacts on communities with environmental justice concerns.

There is currently not sufficient information to provide a site-specific review of individual fish passage facility designs in the PEA. However, it is assumed fish passage activities would also involve geotechnical studies and surveys to inform the design process. Data collection activities necessary to inform the design process could result in temporary ground disturbance and impacts similar to those described above.

Construction of downstream fish passage facilities at one or more of the five blocked area dams, including the resulting potential for disproportionate, adverse impacts on communities with environmental justice concerns, would be evaluated under future environmental compliance processes.

Cumulative Effects

As described in **Chapter 2**, future P2IP activities that would be addressed through future environmental compliance processes include construction of acclimation facilities to support rearing activities and construction and testing of interim upstream and downstream fish passage. Specific jobs, income, and economic output associated with these specific activities would be determined based on economic analysis in future environmental compliance processes using information for the appropriate subregion for economic analysis. Site-specific impacts and the potential for disproportionate, adverse impacts on communities with environmental justice concerns associated with construction activities would be evaluated under future environmental compliance processes.

Overall, the proposed P2IP activities are not expected to have disproportionate adverse impacts on communities with environmental justice concerns. Given this, when the Proposed Action is considered with other reasonably foreseeable future projects, there is little potential for cumulative adverse impacts on communities with environmental justice concerns. P2IP activities could have a beneficial additive effect because they could improve conditions for salmon that are important to Tribes.

Trends of population growth and climate change have impacted—and will continue to impact—the condition of and demand for resources within the analysis area. Climate change is cumulative in nature. Communities with environmental justice concerns, including Native Americans, are among the most at risk from climate change, often experiencing the worst effects because of higher exposure, higher sensitivity, and lower adaptive capacity for historical, socioeconomic, and ecological reasons (CDC 2021; EPA 2017b; USGCRP 2018). Further, as noted in **Section 3.4.3**, Cumulative Effects, climate change will continue to impact plants and animals of cultural and economic importance to Tribes under both alternatives. Such impacts from cumulative climate change effects may result in disproportionate, adverse impacts on Tribes. However, P2IP activities could provide beneficial additive effects for salmon in the face of cumulative climate change effects. Thus, activities may contribute to the long-term reduced severity for potential future disproportionate, adverse environmental justice impacts related to salmon.

As described in the P2IP Tribal Resource Report (Reclamation 2024i), future P2IP activities that involve construction, including ground disturbance and installation of new facilities and building, could have the potential to impact ITAs where those activities coincide with tribally or federally owned lands (see also **Section 3.11**, Indian Trust Assets). Additionally, the P2IP is anticipated to have little or no impacts on locations of Tribal use and importance. Application of EPMs and mitigation measures would further minimize potential impacts on cultural resources, ITAs, and locations of Tribal use and importance. Subsequently, this would indirectly contribute to avoiding potential disproportionate adverse impacts on communities with environmental justice concerns, specifically Tribes. Overall, cumulative impacts are unlikely when the Proposed Action is considered with other reasonably foreseeable future actions.

3.10 Visual Resources

3.10.1 Resource Indicators

The following resource indicator is used to evaluate the potential impacts to visual resources from the No Action and Proposed Action alternatives:

- Changes to visual quality and contrast as perceived by recreationists and area visitors

Impacts on historic and cultural landscapes associated with the Proposed Action were not considered as an indicator for this analysis of impacts on visual resources. **Section 3.7**, Cultural Resources, addresses potential visual impacts on historic properties and cultural resources.

3.10.2 Changes to Visual Quality and Contrast as Perceived by Recreationists and Area Visitors

Affected Environment

The visual setting is largely characterized by the diverse topography and vegetation of the analysis area. Topography ranges from rolling to rugged forested hills in the northern Upper Columbia River Basin, to flatter or slightly rolling forested hills toward the south as the river basin transitions into the Columbia Plateau ecoregion. Vegetation ranges from dense coniferous and deciduous forests interspersed with grasslands and herbaceous plants in the relatively moist northern portion of the analysis area, to sagebrush steppe and forbs in the more arid southern portion of the analysis area. Vegetation ranges from shades of green to brown, depending on the season, and is characterized by a variety of organic textures on the landscape.

Reservoirs and Columbia River tributaries are important visual features in the analysis area. Franklin D. Roosevelt Lake (more commonly known as Lake Roosevelt), the most prominent water body in the analysis area, is an approximately 125-square-mile reservoir formed by the impoundment of the Columbia River by Grand Coulee Dam. The Spokane River, which lies to the east of Lake Roosevelt, is also impounded by numerous dams that have created reservoirs. Recreationists who are boating, fishing, hunting, hiking, and camping on reservoirs and Columbia River tributaries, as well as those visiting historically important dams in the analysis area, experience expansive views of calm, flat water bounded by rolling vegetated hillsides, forests, grassy areas, and gravelly shorelines. These features are interspersed with areas developed for recreational uses such as flat, grassy campgrounds and day use areas, paved or dirt paths, and educational signage. The relatively flat or uniform lines and forms associated with development may contrast with the surrounding natural forests and grasslands.

Dams, dam infrastructure, and visitor centers consisting of smooth, angular, blocky, gray and muted earth tone structures situated atop or immediately adjacent to waterbodies are also visible from various locations along Lake Roosevelt and Columbia River tributaries. Notable dams in the analysis area include the Chief Joseph Dam downstream of Rufus Woods Lake; Grand Coulee Dam downstream of Lake Roosevelt; and Nine Mile, Little Falls, and Long Lake dams on the Spokane River.

Other human-made elements that compose the visual setting include roads and parking lots, which are characterized by flat, horizontal planes of gray pavement and asphalt, and grassy areas developed for agricultural land uses. The surrounding area, which is largely rural, also contains large tracts of undeveloped lands, numerous municipalities, and Tribal reservations. Major roadways include U.S. Route 97 and Washington State Route 155. These roads follow the Columbia River and Lake Roosevelt throughout the analysis area and are visible to recreationists from waterbodies.

Light sources throughout the analysis area are generally confined to the municipalities throughout the area, such as the towns of Coulee Dam and Spokane. This built environment is visible to recreationists and visitors from reservoirs and Columbia River tributaries, with the extent of development depending on location. Dam security lighting, road lights, and lighting associated with artificial production facilities contribute smaller amounts of light that are apparent to recreationists and visitors in the dark.

Shore-based receivers and buoys attached to submersible receivers associated with ongoing P2IP activities are visible to recreationists and visitors present on and along waterbodies and streambanks in the P2IP Activity Area. Floating equipment may feature reflective elements to remain visible to nighttime boaters. The human-made nature of this equipment is apparent, as it consists of round or angular forms that may contrast with the surrounding water or vegetation and attract attention. Given the size and dispersed nature of this equipment, it is generally visible only to recreationists engaging in activities on waterbodies, riverbanks, and lakeshores. It is not visible to recreationists and visitors who are viewing waterbodies from dams and roads. Recreationists and visitors may observe artificial production facilities related to the rearing and restoration of native salmonid populations. These facilities, described in **Appendix B**, generally consist of low-lying, blocky structures in shades of gray and muted earth tones adjacent to waterbodies. These facilities are interspersed along waterbodies throughout the analysis area and may be visible to recreationists on waterbodies or those viewing waterbodies from dams and roads.

No Action Alternative

Under the No Action Alternative, ongoing P2IP activities would continue to occur. These activities, which consist of fish rearing, capture, and monitoring as well as maintenance at existing facilities and research sites. Additional P2IP activities would be less likely to occur due to no assurance of funding under the No Action Alternative. Visual features on the landscape would remain approximately in their current state, as ongoing P2IP activities would involve little to no additional equipment installation or ground disturbance. Therefore, under the No Action Alternative, there would likely be little change to the form, line, and color of the visual setting. Impacts on visual quality as perceived by recreationists and area visitors would not occur.

Proposed Action

Research Studies

Impacts from the research studies described in **Appendix A** would be minor, as this component of the Proposed Action would consist of small-scale, site-specific research and monitoring activities. Such activities may entail minor ground-disturbing activities related to the installation of new shore-based telemetry receivers and screw traps. Installation would be noticeable to recreationists engaging

in fishing, boating, and camping in the P2IP Activity Area and would cause minor temporary impacts on visual quality.

Once shore-based and submersible telemetry receivers and screw traps are installed, they would remain throughout the lifetime of the P2IP studies. Their presence would create minor contrast by introducing additional small structures to the shores, banks, and surfaces of waterbodies. Shore-based receiver installations would be accompanied by thin wooden or metal posts, job boxes, communication equipment, small solar panels, and cables. Submersible telemetry receivers would require the installation of buoys on the surfaces of waterbodies. Buoys would likely be white with orange reflective materials to remain visible at night. Screw traps would appear as dispersed, low-lying, metal geometric platforms approximately 4 to 6 feet in diameter. They would float atop the water surface and be anchored to streambanks.

Shore-based and submersible telemetry receiver equipment and screw traps would introduce into the landscape small, low-lying blocky and rounded forms, geometric lines, and smooth textures. The degree of contrast relative to existing conditions would be low due to the small size and dispersed nature of equipment. These changes would only be visible to recreationists from a short distance as they engage in fishing, boating, hiking, and camping along waterbodies. Recreationists and visitors would likely not be able to view changes from far distances, such as from scenic overlooks and dams.

Given the low degree of contrast that would be created by the installation of shore-based and submersible telemetry receivers and screw traps, impacts on visual quality from research studies would be long term but minor.

Other research activities under the Proposed Action would include the addition of telemetry receivers to existing resident fish telemetry buoys; salmon tagging, rearing, and release; the acquisition of eggs and juveniles from existing hatcheries; trap and transport for upstream adult passage; as well as salmon spawning and carcass surveys. These activities are not expected to have impacts on visual quality, as they would not entail equipment installation, ground-disturbing activities, or construction.

Acclimation and Rearing Facilities

Data Collection and Site Assessment Activities

Short-term impacts on visual quality would result from formal site assessments conducted to collect data and assess the suitability of locations being considered for the construction of new artificial production facilities. Data collection may involve temporary ground-disturbing activities, including, but not limited to, vegetation clearing and the drilling of temporary groundwater and geotechnical wells necessary for siting and facility design. Following data collection, these wells would be decommissioned according to EPMs outlined in **Appendix F** and applicable regulations.

Data collection and site assessment activities, in addition to associated equipment and workers, may be visible to recreationists at dispersed fishing, boating, and camping sites throughout the analysis area. These activities would likely not be visible from dams on Lake Roosevelt and the Spokane River. Activities would introduce into the landscape human-made structures, specifically wells

consisting of dispersed geometric or angular lines and forms, as well as smooth textures. Associated vegetation clearing would change the color of the ground, introducing more shades of brown and gray due to increased exposure of underlying soils and rocks. Overall, the limited human-made structures and ground disturbance would create a low degree of contrast relative to the existing visual setting.

Because ground-disturbing activities associated with site assessments would occur over a period of days or weeks and would be dispersed throughout the analysis area, the temporary impacts from these activities would be minor. Site assessment activities would not be expected to cause long-term impacts on visual quality because the effects of vegetation clearing and well drilling would diminish over time after wells are decommissioned and as vegetation regrows.

Installation of Net Pens

As described in **Appendix B**, the Proposed Action would involve the installation of up to four 20-square-foot net pens and an associated dock measuring 6 feet by 46 feet at the log landing area near where the Sanpoil Arm meets French Johns Lake. Net pens would be installed via boat and may be connected to existing log landing features. One or more ecological block anchors would be placed at the log landing site via a flatbed truck. Placing these anchors would create temporarily increased boat and vehicular traffic that may be visible to recreationists in the immediate area, causing temporary impacts on visual quality.

The net pens would be situated in an area of the Sanpoil Arm that has already been developed with log landings and a paved road. Although net pens would follow the horizontal plane of the water, these structures would create some visual contrast via the introduction of blocky, human-made forms. Moreover, as intended for safety purposes, nighttime boaters would notice additional lighting that would be introduced by a solar-powered flashing dock light. Additional net pens would introduce minor contrast relative to the existing visual setting because they would be built in an area that has been developed with human-made structures and nighttime lighting, and they would only be visible from the foreground of recreational activities occurring in the immediate vicinity of the net pens. The long-term impacts from this minor contrast would be perceived by nearby fishing, boating, and camping recreationists on the Sanpoil Arm of Lake Roosevelt.

Regularly scheduled net pen maintenance and fish care would entail the presence of boats or vehicles stationed near net pens for several hours at a time approximately every few weeks or months; however, given the temporary nature and localized scale of this component of the Proposed Action, the extent of this impact on visual quality is expected to be minor.

Overall, the installation of new net pens on the Sanpoil Arm would cause minor impacts on visual resources because, although this action would introduce new human-made structures and associated lighting, the visual effects of the installation would be relatively localized and occupy a small portion of the Sanpoil Arm that has been developed with human-made structures.

Interim Passage

Interim passage actions would largely encompass adult trap and transport, data collection, additional research studies, and site reconnaissance visits at dams throughout the analysis area. Adult trap and

transport, data collection, research, and site reconnaissance may cause temporary increases in vehicular and boat traffic and may introduce views of temporarily staged vehicles at selected areas for up to several hours at a time. These actions would not require the installation of permanent equipment, and there would be little increase to traffic. Interim fish passage activities would occur within the built environment and may be noticeable to recreationists from dams on Lake Roosevelt and the Spokane River. Overall, this degree of contrast and visibility to recreationists would result in minor temporary impacts on visual quality.

Cumulative Effects

Detailed designs and siting plans for the future P2IP activities are currently in development. These activities are anticipated to cause site-specific impacts that would be analyzed in future environmental compliance processes.

Construction of New Acclimation Facilities

Depending on the site assessment results, the construction of proposed artificial production facilities at the Glen Tana, Louie Creek, and Upper Sanpoil[28] acclimation sites and the sqweyu' artificial production facility and acclimation site would entail ground-disturbing activities that would change the visual character of undeveloped sites. Construction activities may include excavation, trenching, installation of pipes and tanks, the staging of heavy equipment, and security lighting. The sights and sounds associated with these activities would be noticeable to recreationists and potentially alter viewsheds from key viewpoints along the dams and reservoirs on the Spokane River. Construction itself would therefore cause moderate short-term impacts on visual quality. Impacts from construction activities would diminish following the completion of artificial production facilities.

The presence of additional artificial production facilities would potentially change key viewsheds from dams and reservoirs on the Spokane River, causing moderate long-term impacts on visual quality. The addition of human-made structures would introduce to the landscape blocky and geometric forms, sharp horizontal and vertical lines, and smooth textures associated with human-made building materials. Structures would blend in with the muted earth tones of the surrounding landscape. New artificial production facilities would also require additional light sources, which would follow light pollution mitigation measures, such as limiting lighting color temperatures to 3,000 kelvins and shielding all exterior lighting fixtures over 2,000 lumens, based on recommended standards by the International Dark Sky Association (Dark Sky 2018). Overall, these changes would create moderate contrast relative to the existing visual setting.

Impacts would be moderate; although facilities may be visible to recreationists from key viewpoints, EPMs and design features would allow facilities to blend in with surrounding landscape features, mitigating impacts on visual quality. Site-specific impacts from the construction of new artificial production facilities would be evaluated in future environmental compliance processes.

Improvements to Existing Artificial Production Facilities

Improvements to existing artificial production facilities may also be visible to recreationists or visitors to the area, causing temporary and long-term impacts on visual quality. Temporary impacts

[28] The Upper Sanpoil Acclimation Site would be considered as an alternative to the Louie Creek Acclimation Site, depending on the results of formal site assessments.

similar to those described for new artificial production facilities would occur during the construction phase of these improvements. These activities may include the construction of overwintering facilities, the addition of aboveground vessels, the placement of associated equipment needed to distribute brood stock to trucks for transport, and other activities described in **Appendix B**. Long-term impacts would consist of changes to the appearances of existing artificial production facilities, which may also be visible from key viewpoints. Temporary and long-term impacts from improvements to existing artificial production facilities would be little to minor. This is because, while these activities may be perceivable by recreationists, they would occur in areas that have already been disturbed or developed for active artificial production facilities. Site-specific impacts from improvements to existing artificial production facilities would be evaluated in future environmental compliance processes.

Interim Passage

Construction of interim passage facilities would likely entail temporary minor impacts similar to those described for improvements to existing artificial production facilities, as interim passage activities would occur at existing dams. Because interim passage actions would occur within the built environment, they would not introduce significant visual contrast.

The establishment of interim passage infrastructure would result in additional human-made structures, including blocky or geometric forms and lines, in addition to smooth textures. Depending on site-specific designs, visual contrast would be minor to moderate. Site-specific impacts from the construction of interim passage facilities would be fully evaluated under future environmental compliance processes. The testing of interim passage facilities would not impact visual quality, as related activities would not entail ground-disturbing activities or the addition of human-made structures.

Past, Present, and Reasonably Foreseeable Actions

Past, present, and other reasonably foreseeable future actions in the analysis area may be visible to recreationists and visitors and introduce contrast relative to the existing visual setting, thereby changing the visual quality of the landscape in some locations. Ongoing or reasonably foreseeable future actions that could result in impacts on visual quality include several proposed projects at Grand Coulee Dam and Chief Joseph Dam, such as the July 4 Grand Coulee Dam Visitor Center Park vendor fair, in addition to maintenance and construction activities throughout the analysis area.

The vendor fair would create minor, temporary changes to the visual quality of Grand Coulee Dam Visitor Center Park during the week of July 4 by introducing increased vehicular traffic, temporary human-made structures, and anthropogenic noise associated with celebrations. These activities may be apparent to recreationists and visitors in the area surrounding Grand Coulee Dam. Impacts on visual quality from the fair would be temporary and minor, lasting for a period of several weeks once per year in an area that has already been developed with human-made structures.

Maintenance activities, which include various upgrades and repairs to building or switchyard equipment and signage throughout the P2IP Activity Area, would cause temporary, localized increases in vehicular traffic, ground disturbance, and noise generated by maintenance tools and vehicles that may be noticeable by nearby recreationists and visitors. Construction activities

associated with the rerouting of Boise Cove Road and sinkhole repair near Grand Coulee Bridge would result in temporary ground disturbance as well as increased activity and noise from construction vehicles and equipment that may be apparent to nearby recreationists and visitors. Impacts on visual quality from maintenance and construction activities would be temporary and minor because they would occur during limited implementation or construction phases in areas that have already been developed with human-made structures.

Research, rearing, and interim passage activities under the Proposed Action would result in long-term minor changes to visual quality as perceived by recreationists and visitors, primarily in the form of small additional human-made structures and nighttime lighting that would be implemented in developed areas or at a small scale in undeveloped areas. The Proposed Action, in combination with the minor temporary impacts from other past, present, and reasonably foreseeable future actions within the analysis area, would therefore have a minor contribution to cumulative impacts on visual resources.

3.11 Indian Trust Assets

3.11.1 Resource Indicators

The following indicator is used to evaluate the potential impact to Indian Trust Assets (ITAs) from the No Action and Proposed Action alternatives:

- The extent and location(s) of activities that may impact ITAs

3.11.2 Affected Environment

ITAs are legal interests in property held in trust by the United States for federally recognized Indian Tribes or individual American Indians. ITAs may include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights, and in-stream flows associated with trust land (DOI 1995). The General Allotment Act of 1887 allotted land to some Tribes, while other Tribes were allotted land through treaty or specific legislation until 1934. These allotments are ITAs. In 1934, further allotments were prohibited (25 U.S.C. § 14).

The DOI Departmental Manual Part 512.2 delegates the responsibility for ensuring protection of ITAs to the heads of bureaus and offices (DOI 1995). DOI is required to "protect and preserve ITAs from loss, damage, unlawful alienation, waste, and depletion" (DOI 2000). Reclamation is responsible for determining whether proposed activities within its jurisdiction have a potential to affect ITAs.

ITAs can occur outside Tribal reservation boundaries; however, the majority of ITAs are located on reservations. While there is not a comprehensive list of ITAs within proximity to the P2IP locations, ITAs are most likely to be found in the CTCR, STOI, and CDAT reservations where there is the potential for lands to be held in trust for the Tribe or Tribal individuals. ITAs may also be located on federal lands.

Seven of the P2IP locations are owned and managed by federal agencies. Another six locations are owned by state or federal agencies but managed by a Tribe. In total, there are 19 P2IP locations that are owned or managed by federal agencies and Tribes. One of the P2IP locations, Lower Sanpoil, is Indian allotted lands.

Twelve of the P2IP locations are owned or under the jurisdiction of a Tribe. STOI owns or manages one of the acclimation sites (Glen Tana), one of the hatchery locations (Spokane Tribal Hatchery), one net pen location (Two Rivers), and two release sites (Martha-Boardman Bridge and Spokane River). CDAT own or manage one of the acclimation pond locations (sqweyu') and one hatchery (Plummer RAS Hatchery). CTCR own or manage one hatchery (Colville Tribe Trout Hatchery), one net pen location (Sanpoil Arm), and two release sites (Lower Sanpoil and Seaton Grove). There are other off-reservation allotments that may be held in trust for the CTCR, such as Lower Sanpoil. CTCR and STOI co-manage the Spokane River P2IP location, which is on land managed by WDFW.

USACE owns and manages one dam (Chief Joseph). Reclamation owns and manages one dam (Grand Coulee) and owns five of the net pen locations that are managed by other agencies or Tribes (Hall Creek, Lincoln, Seven Bays, Keller Ferry, and Sanpoil Arm). The National Park Service owns and manages one net pen site (Sherman Creek). None of the telemetry sites, other than those proposed at other P2IP locations below, are federally managed.

3.11.3 No Action Alternative

Under the No Action Alternative, the Co-lead Agencies would maintain current funding of existing P2IP activities. There would be no assurance of additional funding for research studies, acclimation and rearing facilities, or interim fish passage studies. These activities would continue to occur only as current and future ad hoc funding allows. Additional P2IP activities would be less likely to occur under the No Action Alternative. If P2IP activities occur under other funding sources, the potential of impacts to ITAs would be evaluated under the appropriate environmental compliance process.

3.11.4 Proposed Action

Potential impacts on ITAs are most likely where lands are owned by Tribes or managed by federal agencies; this totals 19 P2IP locations, 12 owned or managed by Tribes and seven owned and managed by federal agencies. Potential impacts could include changes in access or use of locations, which could impact Tribal trust lands and assets.

Research Studies

Research studies would include the acquisition and collection of eggs, juvenile salmon, and adult salmon; marking (tagging) salmon; salmon releases; spawning and carcass surveys; and telemetry receiver installation and maintenance. These studies could occur at most of the Tribally or federally owned P2IP locations. However, these studies are in line with activities that are already occurring at these locations so are not anticipated to impact any associated ITAs.

Acclimation and Rearing Facilities

Existing facilities would be used for incubation, rearing, and acclimation, although acclimation tanks could be added to some locations, including Glen Tana (STOI) and sqweyu' (CDAT). The use of

existing facilities for acclimation and rearing activities is not anticipated to impact ITAs as is it consistent with current uses. The installation of new acclimation tanks could alter access and use of an area; however, these impacts would be minimized through advance coordination with the appropriate Tribe and identification of ITAs associated with the location.

Interim Passage

Interim passage activities include adult trap and transport and data collection on interim passage design. Trap and transport of salmon would not occur at any of the locations owed by Tribes or federal agencies; therefore, this activity is not anticipated to impact ITAs.

Data collection on downstream and upstream passage and siting would occur at Chief Joseph and Grand Coulee dams, which are both managed by federal agencies. Similar to studies related to acclimation and rearing, this is largely a research-based activity and is not anticipated to impact ITAs.

3.11.5 Cumulative Effects

Future potential P2IP activities include construction of rearing and acclimation facilities and fish passage-related facilities. Construction of acclimation facilities is being considered at Ford Fish Hatchery, which is owned by Reclamation. Construction of interim or permanent upstream and downstream passage is being considered at the five dams within the study area.. Construction activities at these locations could impact ITAs, particularly where new facilities change existing access and uses.

The specific location or design of new facilities is currently unknown; therefore, future environmental compliance processes and Tribal coordination would occur prior to the initiation of any construction or ground-disturbing activity. Similar to the above, the Co-lead Agencies would reach out to the appropriate Tribe on a project-by-project basis to seek their understanding of what assets in the vicinity of the location are held in trust. The Co-lead Agencies could then coordinate with the Tribes to avoid adverse impacts, when possible. If avoidance of adverse impacts on ITAs is not feasible, the Co-lead Agencies would engage with the appropriate Tribes to discuss ways to avoid, minimize, or mitigate the adverse impacts.

Reasonably foreseeable future actions are associated with Grand Coulee and Chief Joseph dams, which are both federally managed. Most of these future actions relate to repair or maintenance of the dams and associated facilities, which is not anticipated to have adverse impacts on ITAs. Future P2IP activities that involve construction, including ground disturbance and installation of new facilities and building, could have the potential to impact ITAs where those activities coincide with Tribally or federally owned lands. However, the majority of the proposed activities are consistent with the current and ongoing use of these P2IP locations and therefore, are anticipated to have little impact. Application of environmental protection measures and mitigation measures (as described in **Appendix F**) would further minimize potential impacts on ITAs. Overall, cumulative impacts are unlikely when the Proposed Action is considered with other reasonably foreseeable future actions.

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Chapter 4. Consultation and Coordination

This chapter describes the consultation and coordination among the Co-lead Agencies and other federal, state, and local agencies; Project Proponents and Native American Tribes; and the public in preparing the PEA. It also includes records of necessary compliance with other applicable statutes and permitting, and any public involvement activities.

4.1 Consultation and Coordination

4.1.1 Tribal Consultation and Coordination

The Co-lead Agencies have worked closely with the Project Proponents on development of this PEA. P2IP coordination meetings with the entire project team, including Project Proponents and Co-lead Agencies, occur on a monthly basis for developing the PEA. As needed, weekly meetings were hosted to work on specific components of the PEA. The Co-lead Agencies would continue to coordinate with the Project Proponents through the future environmental compliance processes.

Executive Order 13175 requires federal agencies to coordinate and consult on a government-to-government basis with sovereign Native American Tribal governments whose interests may be directly and substantially affected by activities on government-administered lands. Coordination and consultation with Native American Tribes are important components of the NEPA scoping process. On February 9, 2024, Reclamation sent letters to notify the Confederated Salish & Kootenai Tribes of the Flathead Reservation, Kalispel Tribe of Indians, Kootenai Tribe of Idaho, Nez Perce Tribe, and Confederated Tribes and Bands of the Yakama Nation, CTCR, STOI, and CDAT of the scoping period for the PEA and opportunity to provide comments on the P2IP to aid the Co-lead Agencies in identifying potential issues and concerns to refine the proposal. To date, the Co-lead Agencies have not received a request from any Tribe for government-to-government consultation. Outreach and coordination would continue throughout the PEA development process. Continued coordination would help to ensure that management actions are consistent with rights retained by Tribes and that the concerns of Tribal groups are considered. The Co-lead agencies would engage in formal government-to-government consultation when requested by the Tribes.

4.1.2 Consultation Under Section 106 of the National Historic Preservation Act

The NHPA requires federal agencies to take into account the effects of their "undertakings" (see **Chapter 6, Glossary**) on historic properties (36 C.F.R. 800.1). Historic properties are significant cultural resources included in, or eligible for inclusion in, the NRHP. The Co-lead Agencies would be initiating consultations with the Washington State Historic Preservation Officer, and Tribal Historic Preservation Officers with the CTCR, CDAT, and STOI on individual P2IP activities or groups of P2IP activities. The Co-lead Agencies would also be consulting with a broader group of Tribes who attach religious and cultural significance to historic properties in the P2IP study area. The Co-lead Agencies have signed a memorandum of understanding (MOU) that establishes a process for one of the agencies to be designated the lead agency for individual P2IP actions. The

designated Section 106 lead agency would then conduct consultation on an activity-by-activity basis on behalf of all of the Co-lead Agencies. Consultations under Section 106 would be completed before implementation of any of the proposed activities. The consultation processes may include an expedited one-stage consultation process for P2IP activities likely to result in a Finding of No Historic Properties Affected or Finding of No Adverse Effects if the State Historic Preservation Officer and Tribal Historic Preservation Officers agree it is appropriate to do so (36 C.F.R. 800.3(g)). Consultation and coordination on this one-stage approach would occur prior to a finding of effect. The consultation process for P2IP activities likely to result in a Finding of Adverse Effects to historic properties would follow a two-stage consultation process on an activity's area of potential effect and level of effort to identify historic properties then findings of effect. For more information, see **Section 3.7**, Cultural Resources, and **Section 3.8**, Tribal Interests.

4.1.3 Endangered Species Act Consultation

Under Section 7(c) of the ESA (16 U.S.C. 1531–1544), any federal agency (action agency) providing funding, providing oversight, or having the responsibility of issuing a permit(s) for the construction and/or operation of a "project" must consult with either the USFWS or the NMFS to assess whether the actions of that federal agency would affect any federally listed species under the protection and management jurisdiction of those two regulatory agencies. Therefore, to comply with ESA Section 7(a)(2) and 50 C.F.R. 402, the Co-lead agencies have prepared a biological assessment to determine the potential impacts of the Proposed Action on federally listed species and critical habitats in the analysis area. Consultation with the USFWS and NMFS is anticipated to begin in November 2024. During consultation, the Co-lead agencies will present a P2IP study overview and describe measures to reduce potential effects of the Proposed Action on listed fish species in the analysis area.

4.1.4 Public Scoping

In accordance with 40 C.F.R. 1506.6 and 40 C.F.R. 1501.9, a scoping period was scheduled for 30 days from February 9, 2024, to March 11, 2024. In response to a public request for a comment period extension, the Co-lead Agencies extended the period an additional week, to March 18, 2024. During this period, the Co-lead Agencies sought public comments to determine relevant issues that could influence the scope of the environmental analysis, including alternatives, and to guide the process for developing the PEA. Reclamation, on behalf of the Co-lead agencies, maintained two websites to disseminate background information on the PEA to the public. The Co-lead Agencies hosted two in-person public meetings during the public scoping period on February 27 and February 28, 2024, which were attended by a total of 17 participants. The meetings were provided in an open house format with informational stations and opportunities for the public to interact with Reclamation, Bonneville, USACE, and representatives from CTCR, STOI, CDAT, and UCUT.

The Co-lead agencies documented the results of public scoping in a scoping report published on October 28, 2024. Issues identified during scoping were used to refine the alternatives analyzed in the PEA.

4.2 Cooperating Agencies

Cooperating agencies are those federal, state, and local agencies and Tribes that have jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternatives (40 C.F.R. 1501.8). At the outset of the PEA process, the Co-lead Agencies asked federal, state, and local agencies and Tribes if they would like to be cooperating agencies, which were established through individual MOUs. The following agencies and Tribes did not accept cooperating agency status: FERC, Confederated Salish & Kootenai Tribes of the Flathead Reservation, Kalispel Tribe of Indians, Kootenai Tribe of Idaho, Nez Perce Tribe, and Confederated Tribes and Bands of the Yakama Nation. The Co-lead Agencies have hosted meetings with the cooperating agencies throughout the PEA development process and will continue through the remainder of the NEPA process. **Table 4-1** summarizes each agency and Tribal status.

Table 4-1. Cooperating Agencies List

Agencies and Tribes	Role
Coeur d'Alene Tribe	Project Proponent & Cooperating Agency
Spokane Tribe of Indians	Project Proponent & Cooperating Agency
Confederated Tribes of the Colville Reservation	Project Proponent & Cooperating Agency
Upper Columbia United Tribes	Project Proponent & Cooperating Agency
U.S. Fish and Wildlife Service	Cooperating Agency
Washington Department of Fish and Wildlife	Cooperating Agency
National Oceanic and Atmospheric Administration Fisheries	Cooperating Agency
National Park Service	Cooperating Agency
State of Idaho Office of Species Conservation	Cooperating Agency
Idaho Fish and Game	Cooperating Agency
Bureau of Indian Affairs	Cooperating Agency

4.3 Preparers and Contributors

The PEA was prepared by the individuals identified in **Table 4-2**.

Table 4-2. List of Preparers

Name	Role/Responsibility	Agency
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Name	Role/Responsibility	Agency
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Chapter 6. Glossary

Archaeological site—A location that contains material remains of past human activities, generally defined as over 50 years old.

Artifact—A human-modified object, often appearing on an archaeological site, that typically dates to over 50 years in age.

Beneficial uses—Uses of water for domestic use; stock watering; industrial, commercial, agricultural, and irrigation use; hydroelectric power production; mining; fish and wildlife maintenance and enhancement; recreational use; thermal power production; preservation of environmental and aesthetic values; and all other uses compatible with the enjoyment of the public waters of the state.

Biomagnification—The concentration of toxins in an organism due to the organism ingesting other plants or animals in which toxins are more widely dispersed.

Cultural resources—The present expressions of human culture and the physical remains of past activities, such as historic buildings, structures, objects, districts, landscapes, archaeological sites, historic properties of religious and cultural importance to Indian Tribes (HPRCSITs) and traditional cultural properties (TCPs). These resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features of landscapes that are significant to living communities.

Effects (or Impacts)—Changes to the human environment from a proposed action or alternatives that are reasonably foreseeable (see 40 C.F.R. 1508(i)).

Effluent—Wastewaters (liquid waste or sewage) that flow directly into surface waters, either treated or untreated.

Embeddedness—The extent to which rocks and snags are covered or sunken into silt, sand, or mud of the stream bottom.

Historic built environment—Buildings, structures, objects, districts, and linear features, such as roads, trails, and irrigation ditches, that are at least 50 years old.

Historic district—An area possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects unified historically or aesthetically by plan or physical development.

Historic Properties of Religious and Cultural Significance to Indian Tribes (HPRCSITs)- Properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria.

Historic property—A cultural resource, such as a historic building, structure, object, district, or archaeological site, that is listed on, or eligible for listing on, the NRHP.

Local-origin Salmon— Local-origin salmon are defined as a hatchery fish that were reared and released upstream of Chief Joseph Dam as a juvenile or natural origin progeny of adult salmon spawning in the blocked area.

Naïve Salmon— Naïve salmon are defined as fish that originate (i.e., are hatched, reared, and released) from below Chief Joseph Dam. These adult salmon are considered naïve to the blocked area.

National Register of Historic Places (NRHP)—A listing of resources that are considered significant at the national, state, or local level and that have been found to meet specific criteria of historic significance, integrity, and age.

Polychlorinated biphenyls (PCBs)—A group of human-made organic chemicals manufactured from 1929 until manufacturing was banned in 1979. The group has a range of toxicity and varies in consistency. PCBs do not readily break down in the environment and can remain for long periods cycling between air, water, and soil. They can be carried long distances.

Substrate—The substance on the bottom of a stream.

Total maximum daily load (TMDL)—A numerical value that represents the highest amount of a pollutant a surface waterbody can receive and still meet the water quality standards for that particular pollutant.

Traditional cultural properties (TCPs)—Ethnographic resources, such as sacred sites, that are associated with the cultural practices of a living community and that meet the criteria for listing on the National Register of Historic Places.

Undertaking— A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval (36 C.F.R. 800.16(y)).

Viewer sensitivity—The measure of how responsive or aware an individual is to visual elements in their environment.

Visual quality—The relative attractiveness of the existing landscape, assessed based on differing combinations of the landscape's features.

Appendix A

Research Studies

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Appendix A. Research Studies

A.1 Overview of Actions Associated with P2IP Research Studies

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Actions: The following are generalized descriptions and background of all actions that would be undertaken during the research studies throughout the Phase 2 Implementation Plan. Refer to the following sections for detailed actions specific to each study.

- Obtain hatchery- and natural-origin juvenile Chinook (yearlings and subyearlings) and sockeye (yearlings).
    - Potential sources of Chinook juveniles would be hatcheries, natural-origin Chinook collected from blocked area tributary traps, beach seining, or mainstem Columbia River collection facilities downstream of Chief Joseph Dam (see **Table A-1**, P2IP Activities).
        - Phase 1 analysis ranked Chief Joseph Hatchery summer/fall Chinook salmon and Okanogan River sockeye salmon stocks highest for use in the reintroduction program. These are the preferred stocks for use in P2IP efforts. Hardiman et al. (2017) identified other potential stocks that may be used for the P2IP efforts, depending on availability.
        - USFWS is currently providing up to 200,000 surplus summer Chinook eggs from Entiat National Fish Hatchery. Entiat National Fish Hatchery will continue to provide surplus summer Chinook eggs until such time that Chief Joseph Hatchery can take over the production to support P2IP. It is anticipated that Chief Joseph Hatchery may be able to support P2IP juvenile Chinook salmon production in the next five years.
        - Other sources of juvenile summer/fall Chinook salmon include Chelan Falls Hatchery, East Bank/Wenatchee River Hatchery Programs, Lake Roosevelt beach seining, Rocky Reach Juvenile Bypass Facility, Sanpoil Screw Trap, Tshimakain Creek Screw Trap, and Wells Hatchery (Hardiman et al. 2017). These sources may be used for P2IP studies as needed to supplement juvenile Chinook production from Entiat National Fish Hatchery and Chief Joseph Hatchery.
    - Potential sources of sockeye juveniles would include Columbia River beach seining downstream of Chief Joseph Hatchery, Lake Wenatchee, Okanogan River beach seining near the confluence with the Columbia River, Okanogan River Screw Trap, kɬ cp̓əlk̓ stim̓ (Penticton) Hatchery, Rocky Reach Juvenile Bypass Facility, and Sanpoil River Screw Trap, (Hardiman et al. 2017).
    - Natural-origin juvenile Chinook and sockeye salmon could be collected in rotary screw traps from streams throughout the blocked area, including the Sanpoil River and Tshimakain (Chamokane) Creek. Fish are passively captured in the spinning drum of the trap as they swim downstream and forced into a live well at the base of the trap. Traps are checked daily

while in operation. Fish are moved from the live well to a bucket filled with aerated river water and transported to a station for tagging and release back into blocked area habitats.[29]

- Fish obtained would be subject to biological sampling and potentially marked with transmitters if size criteria were met. Fish would be transferred to a tanker truck for transport following standard EPMs for artificial production facilities and in a manner consistent with transport permits obtained from Washington Department of Fish and Wildlife (WDFW).
- Seining is a technique to trap fish in shallow water environments; it is traditionally completed with nets in areas with large schools or groups of fish. Modern near-shore seine nets typically have weights on the bottom (lead line) and buoys on the top (float or cork line) to keep the net vertical when pulled through the water to entrap fish. A beach seine is typically set from the shore to encircle a school of fish and then is closed off to trap the fish against the shore. Beach and near-shore seining is an efficient method to capture salmonids in a variety of habitats (Hahn et al. in AFS Salmonid Field Protocol Handbook, Chapter 9.[30] Protocols for the reporting contacts with non-target species would be developed by the Project Proponents in coordination with the appropriate regulatory agencies.
- Fyke netting is a passive technique for capturing juvenile salmon in reservoir and backwater habitats. Fyke nets are typically large hoop nets with wings that guide fish into a trap. The nets are deployed near shore and left to capture fish for up to 24 hours.[31]

- Obtain adult hatchery- and natural-origin summer/fall Chinook and sockeye salmon.
  - Potential sources of adult hatchery-origin summer/fall Chinook salmon include surplus fish from Chief Joseph Hatchery, Entiat National Fish Hatchery, Priest Rapids Dam/Hatchery, Ringgold Springs Hatchery, and Wells Dam Hatchery.
  - Potential sources of natural-origin adult summer/fall Chinook include the Chief Joseph Hatchery ladder, the Columbia River near the mouth of the Okanagan River via purse seine or hook-and-line sampling[32], Priest Rapids Dam, and Wells Hatchery and Dam.
  - Potential sources of natural-origin sockeye salmon include Lake Wenatchee, Priest Rapids Dam, Wells Dam, Chief Joseph Hatchery Ladder, Tumwater Dam, Wells Hatchery, the Columbia River near the mouth of the Okanagan River via purse seine and hook-and-line sampling, the Okanogan adult salmon weir, and the proposed collection/sorting/passage facility in the Columbia River downstream Chief Joseph Dam.
- Mark juvenile hatchery- and natural-origin summer/fall Chinook and sockeye salmon. Approximately 50,000 to 250,000 juvenile salmon of each species would be marked and released annually to evaluate fish behavior, evaluate migratory survival below Chief Joseph Dam, provide smolt-to-adult return (SAR) rates and provide blocked area returning adults for active tag studies.
  - Coded wire tag (CWT) process: Hatchery-reared juvenile salmon to be released would be assigned a unique code that links to the release information, such as where and when fish

[29] https://www.monitoringresources.org/Document/Protocol/Details/2267
[30] https://www.monitoringresources.org/Document/Method/Details/888
[31] https://www.monitoringresources.org/Document/Method/Details/123
[32] Hook and line sampling would follow current WDFW fishing regulations and use barbless hooks. Non-target fish caught would not be removed from the water and released.

were released, how many were tagged, and all other associated rearing information. The salmon would be marked with small, coded wire tags with an injector. The lengths of wire would be coded with rows of numbers that identify that group of fish.

- Passive Integrated Transponder (PIT) tag process: Fish would be anesthetized with MS-222, aqui-s, or carbon-dioxide; fish biological information (size and weight) would be collected and recorded; tags would be injected into the fish by needle; a PIT tag reader would be used to identify the unique tag number; the number would be recorded; and then the fish would be placed in a tank for recovery.[33]
- Acoustic tag process: Fish would be anesthetized with MS-222, Aqui-S, clove oil, or carbon dioxide; fish biological data and tag number would be recorded; an acoustic tag would be surgically implanted in the fish via a small incision then stitched closed; and the fish would be returned to a tank or bucket for recovery.[34]
- Genetic marking process: Natural origin juvenile salmon would be sampled for genetic material in order to assess stock/spawner success in associated tributaries. A small clip of the caudal fin would be removed using surgical scissors, up to 0.5 cm, and placed in preserving solution or on a Whatman (sticky/glue) sheet.

- Mark adult hatchery and natural-origin summer/fall Chinook and sockeye salmon. Adult salmon destined for release into blocked area habitats would be marked with active transmitters (radio and/or acoustic), PIT tagged, and/or sampled for genetics. The adults targeted for release would include returning fish from blocked area juvenile releases and surplus naive adult salmon to be outplanted throughout the study area. Information from the marked adult salmon would inform survival and behavior studies and provide critical data on reservoir, streams, and near dam movement and behavior, effectiveness of donor stocks, transport methods, and adults returning per spawner (AR/S).

  - Active transmitter tagging process (acoustic and radio tags): Fish would be anesthetized with Aqui-S, clove oil, carbon dioxide or electroanesthesia; fish biological information (length and sex) would be collected; tags would be inserted gastrically or surgically into the body cavity or attached externally near the dorsal fin through the musculature of the adult salmon; then fish would be placed into a tank for recovery.[35] Electroanesthesia is the preferred method for anesthetizing adult salmon using low voltage DC current. The fish would be placed into a large plastic vessel with aerated water while a mild electrical current is incorporated into the holding vessel, enough to sedate the fish. Additionally, electric fish handling gloves would be used to temporarily sedate the fish. Smith-Root Electric Fish Handling Gloves are a lightweight, water-proof, and portable system designed to temporarily immobilize live fish for easier handling. Special purpose gloves are electrified to pass levels of manually adjustable electric current through the body of a fish. Recovery of motion occurs for the fish upon release. The equipment consists of a pair of conductive Electric Fish Handling Gloves, a pair of rubber Insulating gloves, control box, wire leads, four elastic bands, operator's manual, and battery charger. Rechargeable batteries are contained in the light-

[33] https://www.monitoringresources.org/Document/Method/Details/6583
[34] https://www.monitoringresources.org/Document/Method/Details/902
[35] https://www.monitoringresources.org/Document/Method/Details/902

weight waterproof control box that can be hooked on a belt, making the device fully portable during the fish handling process.
  - PIT tag process: See process described above for marking juvenile salmon.
  - Genetic sampling process: One punch of genetic material (approximately 0.5 centimeters in diameter) would be sampled from the caudal fin of each adult salmon. Samples would be stored in a sterilized container or on Whatman (sticky/glue) paper then sent to a genetics lab for cataloging and analysis.[36]

- Release of marked juvenile and adult fish. Release methods would be dependent on the release location and conditions.
  - Juvenile fish tagged with acoustic tags would be transported in buckets to release site with 3-4 fish per bucket. Either the buckets would be walked down the shoreline and fish would be released directly into the waterbody, or the buckets would be moved to a boat and fish would be released into the water body away from shore.
  - Juvenile PIT-tagged fish that are to be released at a boat ramp would be released directly from the tanker truck.
  - Juvenile PIT-tagged fish that are being reared in a net pen would be released directly from that rearing location.
  - If a boat release is used, fish that have acoustic tags and are already in a bucket would remain in the bucket during boat transport. Other non-acoustic tagged fish that are not already in a bucket would be netted from the tanker truck and transferred into a bucket and delivered to a live well on the transport boat. Oxygen and/or recirculated water would be supplied during transport. Generally, truck transport times are under 3 hours and boat transport times are under 0.5 hours.
  - Fish releases would occur at available boat ramps, by boat, from net pen rearing locations and/or by foot. Release locations throughout the study area include but are not limited to Kettle Falls/Sherman Creek, Lower Hangman Creek, Nine Mile Dam forebay and tailrace, Little Spokane River, Sanpoil River, Grand Coulee Dam forebay and tailrace, Long Lake Dam forebay and tailrace, Little Falls Dam forebay and tailrace, Keller Ferry (Lake Roosevelt), Rufus Woods Reservoir, and Chief Joseph Dam forebay and tailrace. No new facilities or motorized access routes are being proposed.
  - Juvenile tagging and release activities for both natural origin Chinook and sockeye would occur year-round. Tagging and release of natural-origin fish may occur year-round, with releases typically occurring between late March and early June, annually. Non-routine hatchery or land-based acclimation facility fish releases may occur at any time of year as necessary in response to environmental or biological anomalies, or due to artificial production facility emergencies (e.g. power loss, water loss, etc.).
  - Adult salmon transported into the blocked area would be released directly from trucks at developed river and reservoir access sites (boat ramps) or released by hand from shore using soft "boots" (rubber tire inner tubes) that keep fish contained and within water during transport where developed vehicle access is unavailable.

[36] https://www.monitoringresources.org/Document/Method/Details/1432

- Deploy receivers at locations throughout the study area and at dams. There are four basic configurations for receiver installation:
    - Anchored Submersible: Each receiver is self-contained and is powered by two to four internal D-cell batteries. Each receiver would be deployed using up to a 300-pound concrete anchor connected to a length of drag chain and a length of poly-coated stainless-steel cable 1.5 times the maximum water depth. The anchor size and cable length ensure no movement of the anchor across the riverbed. The cable is connected at the surface to a large, clearly labeled, and lighted can-buoy with sufficient buoyancy to suspend the cable weight. Receivers are suspended from the can on a second cable of approximately 3–10 meters, depending on expected depth at maximum low water level.
    - Shore-Based: Receivers are powered by 12-volt (V) 55-amp-hour (Ah) sealed lead acid batteries charged by solar panels. Batteries and receivers are housed either in a padlocked powder-coated job box or a structural foam job box. Solar panels are affixed to existing structures at the site (no ground penetration). The receiver housing box and panels are located along the shoreline above the ordinary high-water mark, and whenever possible, they are cabled and padlocked to an existing structure to reduce the probability of theft or vandalism. Wiring from the receiver to the hydrophone is run through a hole in the job box and draped along the ground and into the water to where it connects to the hydrophone. The hydrophone is affixed to a custom fabricated 50-pound steel mounting plate, which also acts as an anchor. The depth of the hydrophone/mounting plate and distance from the shoreline is dependent on site-specific access conditions.
    - Track and Trolley Shore-Based: Receivers are the same as used for the shore-based deployment and thus are powered by 12V, 55Ah sealed lead acid batteries charged by solar panels. Batteries and receivers are housed in a padlocked structural foam job box. Solar panels are affixed to existing structures at the site (no ground penetration) or the top of the job box. The job box and panels are set on the dam or existing structure at the site. The hydrophone is mounted onto a custom fabricated trolly that slides up and down the channel of a vertically mounted track. The track is bolted into the concrete of the dam, bridge piling, or other existing structure at the site. Depth of the hydrophone and trolly is set during deployment but can be adjusted per reservoir levels. Wiring from the job box to the hydrophone is set, according to depth, with excess coiled inside the job box.
    - Forebay Log Boom: Receivers are the same as used for the shore-based deployment and thus are powered by 12V, 55Ah sealed lead acid batteries charged by solar panels. Batteries and receivers are housed in a padlocked weather resistant case. The case and solar panels are attached to the large metal buoys (cans) that compose the log boom using cables, quick links, and turnbuckles. The hydrophone and hydrophone cable are zip-tied to stainless steel wire rope that is attached to a 10-pound downrigger ball and dangled approximately 10 feet below the surface.
- Operate and maintain acoustic and radio receivers to collect data from tagged fish as detected at each location. Data collection would be completed by one of the following methods:
    - Shore-based receivers: When cell service is present at the site, a modem would be used and data would be automatically sent to research offices via the internet, with no site visits. Sites with no internet connectivity would be visited approximately once per week to download the

data. Download would involve opening the weatherproof job box, attaching a USB-A cord or removing the SD card, and downloading the data to a field laptop.
    - Anchored submersible receivers: A boat would be deployed at a nearby boat launch and staff would retrieve the submersible receiver, connect it to a laptop, extract the data, then re-deploy the receiver.
- Compile, manage, and interpret data.
    - The results from survival studies would inform the sizes of subsequent juvenile releases and be used to update the life cycle model (LCM) to evaluate reintroduction feasibility.
    - Genetic sampling would be performed on returning adults to determine areas of origin and success of various spawning aggregates and release groups.
    - A tissue sample would be collected via a standard office hole punch of the caudal fin from all returning hatchery fish and all surplus hatchery fish that are transported to the blocked area, as well as a subsample of returning natural-origin fish (up to 2,000 per species). See description above for "Mark adult hatchery and natural-origin summer/fall Chinook and sockeye salmon" for additional information on this action.

A.2 Downstream Movement and Survival of Juvenile Summer/Fall Chinook in the Upper Columbia River Basin Studies

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Duration of Study: Studies are expected to continue at least through the year 2043. Acoustic studies are designed to be completed in phases over the next 20 years and likely would not occur every year. PIT tag studies are ongoing and would continue, annually.

Study Objective: This study is being undertaken to confirm juvenile summer/fall Chinook passage survival and behavior assumptions used in the LCM to estimate fish performance in the blocked area. Acoustic telemetry would be used to meet the study objectives of estimating survival and travel time for the following reaches:

- Mouth of the Sanpoil River to Grand Coulee Dam
- Kettle Falls to Grand Coulee Dam
- Little Falls Dam to Grand Coulee Dam
- Long Lake Dam to Grand Coulee Dam
- Nine Mile Dam to Grand Coulee Dam
- Mouth of Hangman Creek to Grand Coulee Dam
- Grand Coulee Dam to Chief Joseph Dam

Acoustic tagged juvenile salmon are also being evaluated for lingering time and travel routes in dam forebays, and passage routing across the dam. These data are intended to inform the fish passage design process.

Actions:

- Obtain juvenile Chinook salmon (yearlings and subyearlings). See **Section A.1** for description of this action.
    - Sources of hatchery juvenile Chinook for this study would include Chief Joseph Hatchery, Entiat National Fish Hatchery, and Wells Hatchery.
    - Sources of natural-origin juvenile Chinook for this study include production from the Sanpoil River, the transboundary reach of the Columbia River, tributaries of the Spokane River, and the mainstem of the Spokane River.
        - Natural-origin juvenile Chinook would be captured in screw traps near the mouth of the Sanpoil River and in Tshimakain (Chamokane) Creek. This action has existing compliance coverage through the existing Bonneville Fish and Wildlife Program.
        - Natural-origin juvenile Chinook would be captured using near-shore seines, beach seines, and fyke nets in the transboundary reach of the free-flowing Columbia River between the international border and the backwater of Lake Roosevelt, the Columbia River upstream of Rufus Woods Reservoir, the Spokane Arm of Lake Roosevelt, and the Spokane River between Little Falls Dam and Spokane Falls, Washington. This action has existing compliance coverage through the existing Bonneville Fish and Wildlife.
- Mark juvenile Chinook salmon. See Section A.1 for a description of this action. Fish would be marked with a PIT tag and/or acoustic tag as part of this action.
    - Hatchery fish would be marked at Chief Joseph Hatchery, Wells Hatchery, the Coeur d'Alene Tribal Hatchery in Plummer, sqweyu' Hatchery, Little Falls Acclimation Facility, Ford Hatchery, Little Spokane River (Glen Tana) acclimation site and the Sanpoil River acclimation site and net pens.
    - Natural-origin fish would be marked at the capture location, including the screw-trap sites on the Sanpoil River and Tshimakain (Chamokane) Creek, and throughout the seining and fyke netting locations in the Columbia River and Spokane River.
    - Natural origin juvenile salmon would be sampled for genetic material in order to assess stock/spawner success in associated tributaries. A small clip of the caudal fin would be removed using surgical scissors, up to 0.5 cm, and placed in preserving solution or on a Whatman sheet.
- Release acoustic-tagged juvenile Chinook salmon. Between 40 and 700 acoustic-tagged yearling Chinook salmon would be released at each release site annually. **See Section A.1** for a description of this action.
    - Fish may be released from shore, truck, and boat for this action. Release sites are included **in Section A.8**, **Table A-1**.
- Install receivers. Receiver sites are included in **Section A.8**, **Table A-1**.
- Operate and maintain receivers. See **Section A-1** for a description of this action.
- Collect data. Researchers would collect fish data from the receivers deployed through the study area. See **Section A.1** for a description of this process.

- Compile, manage, and interpret data.
    - Data collected throughout the season would be managed remotely by scientists. The data would be summarized weekly to track in-season fish movement. Upon completion of the season and after all fish with acoustic tags are no longer providing data in the study area, or the battery-life of the acoustic tags have expired, the data would be summarized for reporting to the Project Proponents.

A.3 Juvenile Sockeye Salmon Survival and Behavior through Lake Roosevelt, Grand Coulee Dam, Rufus Woods Lake, and Chief Joseph Dam Study

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Duration of Study: Studies are expected to continue at least through the year 2043. Acoustic studies are designed to be completed in phases over the next 20 years and likely would not occur every year. PIT tag studies are ongoing and would continue.

Study Objectives: This acoustic study would examine assumptions made in the LCM about sockeye survival during rearing and outmigration and inform fish passage behavior and passage routing through dams.

Actions:

- Obtain juvenile sockeye salmon. Juvenile sockeye salmon or fertilized eggs would be obtained from the following sources: kł cp̓ə̓lk̓ stim̓ (Penticton) Hatchery, Rocky Reach Juvenile Bypass, Okanagan River, Columbia River, blocked area rotary screw traps, or sockeye salmon brood stock.
    - Obtaining eggs or fish from the Okanagan Nation Alliance kł cp̓ə̓lk̓ stim̓ (Penticton) Hatchery – Animal importation permits would be obtained, and border crossing policies would be followed while transporting fish from the Okanagan Nation Alliance facility located in Penticton, British Columbia. All Canadian animal export permits would be obtained by the Okanagan Nation Alliance, and all U.S. federal and state permits would be obtained by P2IP proponents.
    - Actively migrating juvenile sockeye smolts would be intercepted from the Chelan Public Utility District Rocky Reach Juvenile Bypass (RRJ) located at Rocky Reach Dam during the spring outmigration season, typically observed between April 1 and the end of May.
        - Staff would work closely with Chelan Public Utility District staff to obtain juvenile sockeye smolts greater than 95 millimeters in fork-length after those fish have been sampled via the requirements of the RRJ operating procedures.
        - Sockeye smolts would then be transferred to portable tanks outside the RRJ where they would be held prior to marking and after marking for recovery and surveillance.

- A beach or near-shore seine or a fyke net would be used to collect actively migrating juvenile sockeye smolts from the Okanagan River or the mainstem Columbia River. See **Section A.1** for a description of this action.
- Subyearling sockeye would be collected from existing rotary screw traps in the Sanpoil River and Tshimakain (Chamokane) Creek. See **Section A.1** for a description of this activity.
- Adult sockeye salmon brood stock would be collected from the Columbia River using a purse seine and/or hook and line, or from the Wells Dam ladders and adult collection facility and the Chief Joseph Hatchery ladder. If hook and line are used to sample brood, then all sportfishing rules would be followed and any bycatch would be immediately released. The brood stock would be transported to a holding and spawning facility at the artificial production facility. The sockeye brood stock would be spawned at this location, and the resulting progeny would be reared at the same location. Proposed artificial production facilities that are to be used to hold, spawn, and/or rear sockeye salmon include the Sanpoil River facility; Ford Hatchery located near Ford, Washington; Pacific Northwest National Laboratory in Richland, Washington; Little Falls acclimation facility near Reardon, Washington, Little Spokane River (Glen Tana) acclimation site near Spokane, Washington, and the sqweyu' artificial production facility located in Spokane, Washington. Fertilized eggs from sockeye brood stock would also be transferred to the CDAT Hatchery in Plummer, Idaho.
- Methods to collect, hold, and transport fish from hatcheries would be done with the appropriate permitting and regulatory requirements, including but not limited to international transport permits and Washington State transport permits.

- Mark juvenile sockeye salmon. See **Section A.1** for a description.
  - Sockeye juvenile tagging activities may occur year-round. Tagging and release of blocked area-origin wild fish may occur year-round, while tagging of hatchery or land-based acclimation facility fish would likely occur annually between March and June. It is anticipated that the subyearlings would rear in Lake Roosevelt for up to 1 year before migrating as yearlings the following spring. A portion of implanted transmitters would be programmed with a delayed start to ensure that the transmitters are active at the time of outmigration from Lake Roosevelt between April and June in the year after implantation. This approach would provide the opportunity to estimate survival from release as subyearlings and as yearling migrants.
  - Sockeye juvenile tagging would occur at capture locations such as Rocky Reach Dam, the Okanagan River, the Columbia River, the Sanpoil River, and Tshimakain Creek. Tagging of locally reared hatchery and land-based acclimation facility juvenile sockeye would occur at the artificial production facility locations where they are being reared.
- Release marked juvenile sockeye salmon.
  - Between 15 and 2,000 juvenile sockeye salmon would be released at each site.
  - Fish would be released from shore, truck, and boat for this action. Release sites are included in **Section A.8**, **Table A-1**.
- Install receivers.
  - Receiver sites are included in **Section A.8**, **Table A-1**.

- Collect data.
  - Researchers would collect fish data from the receivers deployed through the study area using the same methods described in **Section A.2**.
- Compile, manage, and interpret fish data.
  - Researchers would use the same methods described in **Section A.2**.
- Adaptive Management. To determine if migration of sockeye subyearlings from Lake Roosevelt occurs, and to what extent, the PIT-tagged subyearling sockeye data would be evaluated. If subyearling migration is found to occur, a subset of the transmitters for future releases would be programmed to be actively transmitting at the time of release to capture the June-through-October period of the release year.
  - The monitoring would be used to evaluate the proportion of tags that are detected at Rocky Reach Juvenile bypass in year 1 (the year of release) compared with the proportion detected in year 2. Adjustments in the how the tags are programmed would occur based on the monitoring results. If monitoring shows that subyearlings migrate in year 1, then a subset of tags would be programmed to actively transmit from the time of release through October of that year.

A.4 Survival and Behavior of Blocked-Area Origin and Naïve Adult Anadromous Salmon in Blocked Area Habitats in the Upper Columbia River Study

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Duration of Study: Studies are expected to continue at least through the year 2043. Acoustic studies are designed to be completed in phases over the next 20 years and likely would not occur every year. PIT tag studies are ongoing and would continue, annually.

Study Objectives: This study would examine factors that influence adult return rates to the blocked area and inform planning and development of interim or permanent adult passage facilities at all five dams. This study plan, combined with those designed to evaluate juvenile survival in the blocked area, would provide much of the information necessary to evaluate the reintroduction effort and identify areas where more detailed studies are needed.

Actions:

- Obtain blocked area-origin adult Chinook and sockeye salmon.
  - Returning adults marked with CWT and PIT tags from the previous studies outlined above would provide the supply of known blocked area-origin adults for this study.
  - Adult salmon would be collected at Priest Rapids Dam, Wells Hatchery and Dam, the Chief Joseph Hatchery adult salmon ladder and holding facility, and the new proposed collection

and sorting facility constructed downstream of Chief Joseph Dam. Adult sockeye may also be collected at the Colville Tribes purse seine operation at the mouth of the Okanogan.

- Mark adult Chinook and sockeye salmon.
  - Up to 400 blocked area-origin adult salmon would be marked with acoustic and/or radio telemetry transmitters. If necessary, the fish would be anesthetized using MS-222, aqui-S, carbon dioxide, or electroanesthesia.
  - While the fish is sedated, a tag would be inserted gastrically into the salmon, ensuring the antenna (radio only) is extending out of the mouth. The tag would be held into place with a ¼-inch section of surgical tubing, which would prevent the tag from being swallowed or expelled. Alternatively, an external tag would be secured to the fish using wires through the dorsal musculature just below the dorsal fin.
- Deploy receivers.
  - Receiver locations are included in **Section A.8**, **Table A-1**. The acoustic receivers would be deployed with a 2008-N charge controller, and remote modem (where cellular service is available), would be housed within a lockable job box. A minimum of one solar panel, one or more radio antennas, and a communications antenna (where applicable) would be mounted to the job box. Additional antennas would be mounted to metal T-posts adjacent to the job box along the shore of the site, only where existing structures are unavailable for mounting antennas. The T-posts would be pounded into the ground using a T-post pounder. Up to three antennas would be installed on either side of the job box at 50-foot intervals, extending out 150 feet. In total, a single fixed radio telemetry site would have up to eight antennas and extend along 300 feet of shoreline. Existing and proposed locations of the radio telemetry sites are listed in **Section A.8**, **Table A-1**.
- Release adult salmon.
  - Adult salmon would be released in order to assess behavior through specific reaches within the blocked area based on where the fish originated. See **Section A.8**, **Table A-1**, for a summary of all release locations for adult salmon.
- Collect data.
  - Researchers would collect fish data from the receivers deployed through the study area using the same methods described in **Section A.2**.
  - Data would be collected from fixed radio telemetry sites in a manner similar to data collection for shore-based acoustic receivers. Where feasible, data would be downloaded remotely. Otherwise, data would be collected weekly by researchers by physically connecting to the receiver using a field laptop.
- Conduct spawning and kelt surveys.
  - Spawning success would be evaluated by visually identifying redds and/or spawning adults using a variety of methods.
    - Hiking surveys to locate evidence of successful spawning would be used in shallow rivers and streams, such as the Sanpoil River, and in tributaries of the Columbia and Spokane Rivers. Researchers would hike upstream in the designated watershed and record all

salmon spawning locations using a Global Positioning System (GPS) unit. Morphometrics and genetic material may also be collected from carcasses if they are encountered.

- Aerial surveys would be conducted using drone flights over difficult-to-walk areas of tributaries and larger water bodies where spawning is suspected to occur in less than 30 feet of water. This would take place in the Sanpoil River, the Kettle River, the Columbia River at Rufus Woods Reservoir, the transboundary reach of the Columbia River, the Spokane Arm of Lake Roosevelt, and the Spokane River. Aerial drones would be deployed in accordance with all laws and regulations.
- Deepwater surveys would be conducted in large rivers where spawning is suspected to occur in depths of over 30 feet and where aerial surveys are inadequate to identify redds. This would take place in the Columbia River at Rufus Woods Reservoir, the transboundary reach of the Columbia River, and the Spokane Arm of Lake Roosevelt. An underwater camera attached to a weighted torpedo would be lowered from the bow of a boat using a davit or small crane. Where conditions permit, an underwater remotely operated vehicle (ROV) may be used. For both deployment types, the camera would be connected to a live feed display onboard the boat. Researchers would identify redds and actively spawning salmon on the live feed. A remotely operated vehicle may also be used to identify redds in deep water where conditions are applicable.

- Compile, manage and interpret data.
  - Data collected throughout the season would be managed remotely by scientists. The data would be summarized weekly to track in-season fish movement. Upon completion of the season and after all fish with radio tags are no longer providing data in the study area, or the battery life of the radio tags have expired, the data would be summarized for reporting to the Project Proponents.
  - Researchers would record data on paper forms or field laptops/tablets. Data such as location, number of redds, spawners observed, and additional documentation would be transferred to and housed within a database.
  - Spawning data would be interpreted by researchers with results being incorporated into the P2IP adaptive management process.

A.5 Adult Recruits per Spawner Studies

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Duration of Study: Studies are expected to continue at least through the year 2043. Adult recruits per spawner (AR/S) values would be calculated annually.

Study Objectives: This study would monitor adult-to-adult return rates to the blocked area and inform planning and development of interim or permanent adult passage facilities at all five dams. This study plan, combined with those designed to evaluate juvenile survival in the blocked area, would provide much of the information necessary to evaluate the reintroduction effort and identify areas where more detailed studies are needed.

Actions:

- Obtain blocked area-origin adult Chinook and sockeye salmon.
  - Returning adults marked with PIT tags from the previous studies outlined above would provide the supply of known blocked area-origin adults for this study.
  - Marked adult salmon would be collected at Priest Rapids Dam, Wells Dam, the Chief Joseph Hatchery adult salmon ladder and holding facility, the new collection/sorting/passage facility proposed for construction downstream of Chief Joseph Dam, the Okanagan River adult weir, and/or the Columbia River below Chief Joseph Dam via purse seine and hook and line. Returning unmarked and natural adults resulting from blocked area production would be collected from Priest Rapids Dam, Wells Dam, the Chief Joseph Hatchery adult ladder, and the proposed upstream collection/sorting/passage facility located downstream of Chief Joseph Dam, the Okanagan River adult weir, and/or the Columbia River below Chief Joseph Dam via purse seine and hook and line.
- Obtain surplus naïve adult Chinook and sockeye salmon.
  - Naïve surplus adult Chinook and sockeye salmon would be collected at a subset of the following locations depending on availability of surplus fish, access, and in-season management goals: Priest Rapids Dam, Wells Hatchery and Dam, the Chief Joseph Hatchery adult salmon ladder, the Okanagan River adult weir, and/or the Columbia River below Chief Joseph Dam via purse seine and hook and line and the proposed collection facility.
- Mark adult Chinook and sockeye salmon.
  - A tissue sample would be taken from the caudal fin from all adult Chinook and sockeye salmon destined for blocked area habitats, whether they are blocked area-origin or naïve fish, to be used for genetic marking.
  - A tissue sample would be taken from the caudal fin from a subset of unmarked returning adults to be used for parentage analyses.
- Release adult salmon.
  - Marked blocked area-origin adult salmon would be released throughout the blocked area. Release locations for blocked area-origin fish would be based on where the fish originated as a juvenile or in other areas based on study objectives, such as releasing fish in forebays of dams to assess their upstream migration behavior.
  - Naïve adult salmon would be released in blocked area habitats where natural production has been determined to be important for informing the reintroduction process or in other areas throughout the blocked area to meet study objectives.
  - Unmarked natural-origin adult salmon collected at Priest Rapids Dam and Wells Dam would be released directly back into the river after tissue samples are taken.
  - A subset of unmarked natural-origin adult salmon collected at the Chief Joseph Hatchery ladder and the proposed upstream collection/sorting/passage facility downstream of Chief Joseph Dam would be released into blocked area habitats where natural production has been determined to be important for informing the reintroduction process.
  - See **Section A.8**, **Table A-1**, for a summary of all release locations for adult salmon.

- Compile, manage, and interpret data.
    - Genetic samples from released adult salmon would be sent to genetic labs for analysis and cataloging. The labs include existing facilities in Hagerman, Idaho, operated by the Columbia River Inter-Tribal Fish Commission; in Nampa, Idaho, operated by the State of Idaho; and in Olympia, Washington, operated by the State of Washington. Additional genetics labs would be considered in the future.
    - Subsequent returns of natural-origin adult salmon produced in the blocked area are expected as a result of salmon releases. A tissue sample would be taken from the caudal fin of these unmarked fish obtained from the locations described above for genetic analysis and parentage-based tagging/tracking. This would occur at the same locations described above.

A.6 Two-Dimensional and Three-Dimensional Tracking Studies of Juvenile Chinook and Sockeye Salmon at Dam Forebays

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Duration of Study: Studies are expected to begin in 2025 and continue at least through 2043.

Study Objectives: This study would monitor and assess fine-scale behavior of outmigrating juvenile salmon in the forebays of Grand Coulee Dam. Salmon behavior would be assessed both horizontally and vertically in the water column in order to determine travel routes, searching behavior, avoidance behavior, and downstream collection efficiency. Comparable multi-dimensional studies may also be performed at one or more additional dams in the study area. This would be determined based on the conclusions of the studies described previously. Configurations of receiver arrays at these dams would be determined once the need for a multi-dimensional study is known.

Actions:

- Obtain juvenile Chinook and sockeye salmon. See **Section A.1** for a description of this action.
- Mark juvenile salmon. See **Section A.1** for a description of this action. Acoustic tagging is the preferred marking strategy for this study.
- Release marked juvenile salmon. Between 40 and 2,000 acoustic-tagged juvenile salmon would be released from a release site annually. See **Section A.1** for a description of this action.
    - Fish may be released from shore, truck, and boat for this action. Release sites are included in **Section A.8**, **Table A-1**.
- Install receivers. Acoustic receivers would be installed as described in **Section A.1**. Receiver locations identified in **Section A.8**, **Table A-1**, would be used, along with additional sites proposed to be installed in a configuration as shown in **Section A.9**, **Figure A-1**.
    - Two-dimensional and three-dimensional tracking requires the use of additional hydrophones to be positioned on different planes (multiple elevations) throughout the study area. Previous studies of entrainment through the third powerhouse at Grand Coulee Dam (Perry

et al. 2003) used up to eight single receivers located 127 to 210 meters apart with hydrophones on the water surface and at a set depth of 54 meters.
    - This study would use a similar study design, although more receivers would likely be required to be installed throughout the third powerhouse cul-de-sac, on the face of Grand Coulee, and on the shoreline, at 120- to 200-meter intervals. These receivers would be installed with hydrophones at the surface and at multiple depths down to the bottom of the reservoir. A total of up to 150 additional receivers would be required to be installed to get total coverage of the Grand Coulee Dam forebay study area (**Section A.9**, **Figure A-1**).
    - Receiver installation types would follow the format identified in **Section A.1**, although a slight modification is anticipated for receivers placed on the bottom of the reservoir where the receiver is attached near the anchor rather than being suspended just below the buoy.
- Collect data.
    - Researchers would collect fish data from the receivers deployed through the study area using the same methods described in **Section A.2**.
- Compile, manage, and interpret fish data.
    - Researchers would use the same methods described in **Section A.2**.

A.7 Hydraulic Modeling

Implementing Parties: UCUT, CDAT, CTCR, and STOI

Duration of Study: Studies are expected to begin in 2025 and continue at least through 2043.

Study Objectives: This study would model water movement and fluid dynamics at the forebays and tailraces of Chief Joseph, Grand Coulee, Little Falls, Long Lake, and Nine Mile dams using existing data.

Actions:

- Compile available data at each project. Data include, but are not limited to, bathymetry, inflow, outflow, water velocities, dam operation (spill, bypass, turbine), dam configuration, forebay dimensions, tailrace dimensions, channel width, and reservoir elevations. Much of this data is thought to already exist and is summarized by the dam owners and operators at each respective dam in the study area. Currently, the Project Proponents do not expect to collect any additional data for this action. However, should the existing data be considered out-of-date or inadequate, new measurements may be required.
- Run computational models. Two- and three-dimensional models would be constructed at a spatial mesh that is consistent with the available data on the study area. The STAR-CCM+ modeling framework would be used to simulate results, which would be archived, with a summary provided to the fish passage engineering team.

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A.8 P2IP Summary of Activities Table

Table A-1 identifies the general location, water body, the alternative under which each P2IP activity would occur, and the earliest implementation year. Ongoing P2IP activities under the No Action Alternative are denoted using NAA followed by the earliest implementation year in the appropriate activity column. Similarly, the proposed P2IP activities are denoted using PA followed by the implementation year in the appropriate activity column. Locations identified in the table are general locations, and there may be adjustments to locations within the water body to allow for research flexibility. The table includes all P2IP activities, including those requiring additional environmental compliance processes.

Table A-1. P2IP Activities

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
01 Spring Canyon South	Lake Roosevelt	PA 2025												
02 Spring Canyon	Lake Roosevelt	PA 2025												
03 Spring Canyon	Lake Roosevelt	PA 2025												
04 Plum Point	Lake Roosevelt	PA 2025												
05 Plum Point	Lake Roosevelt	PA 2025												
06 Camel Rocks	Lake Roosevelt	PA 2025												
07 Camel Rocks	Lake Roosevelt	PA 2025												
08 Keller Ferry Boat Launch	Lake Roosevelt	PA 2025												
09 Keller Ferry East	Lake Roosevelt	PA 2025												
10 Hanson Harbor	Lake Roosevelt	PA 2025												
11 Whitestone Creek	Lake Roosevelt	PA 2025												
12 Whitestone Rock	Lake Roosevelt	PA 2025												
13 Halverson Canyon	Lake Roosevelt	PA 2025												
14 Burbot Creek	Lake Roosevelt	PA 2025												
15 Hawk Creek	Lake Roosevelt	PA 2025												
16 Seven Bays	Lake Roosevelt	PA 2025												
17 Castle Rock	Lake Roosevelt	PA 2025												
18 Wilmont Cove	Lake Roosevelt	PA 2025												
19 Hunters	Lake Roosevelt	PA 2025												
987 Keller West	Lake Roosevelt	PA 2025												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Additional Telemetry Receivers	As needed in Study Area above Beebe Bridge	PA TBD												
Alder Creek	Lake Roosevelt	PA 2025												
Bissell Island	Lake Roosevelt	PA 2025												
Black Sands Beach	Columbia River Transboundary Reach	PA 2025												
Bowl and Pitcher	Spokane River	PA 2026												
Bradbury Beach	Lake Roosevelt	PA 2025												
Bridgeport State Park	Lake Rufus Woods					NAA 2019								
Buckly Bar	Lake Rufus Woods	PA 2025												
CDAT nikwin' Hatchery/Plummer RAS	Plummer Creek				NAA 2023		NAA 2023							
Chalk Grade	Lake Roosevelt	PA 2025												
Chelan Falls Hatchery	Columbia River		PA 2026	PA 2026										
Chief Joseph Dam	Columbia River/Lake Rufus Woods					NAA 2023				PA 2025			PA 2027	PA 2032
Chief Joseph Dam #1	Lake Rufus Woods	PA 2025												
Chief Joseph Dam #2	Lake Rufus Woods	PA 2025												
Chief Joseph Dam #3	Lake Rufus Woods	PA 2025												
Chief Joseph Dam Forebay	Lake Rufus Woods	PA 2025												
Chief Joseph Dam Tailrace Left Bank	Columbia River	PA 2025												
Chief Joseph Dam Tailrace Right Bank	Columbia River	PA 2025												
Chief Joseph Hatchery	Columbia River		NAA 2024	NAA 2024	PA 2025		PA 2025				PA 2026	NAA 2024		
Chief Joseph Hatchery Ladder	Columbia River	PA 2025							PA 2025		PA 2026			
China Bend	Lake Roosevelt (Transboundary Reach)	PA 2025												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
China Bend Ramp	Lake Roosevelt (Transboundary Reach)	PA 2025												
China Bend Upper Log Boom	Lake Roosevelt (Transboundary Reach)	PA 2025												
China Bend Winery	Lake Roosevelt (Transboundary Reach)	PA 2025												
Columbia River Purse Seining, Beach Seining, or hook-and-line sampling	Columbia River		NAA 2024	NAA 2024										
Colville River Mouth	Lake Roosevelt	PA 2025												
Colville Tribe Trout Hatchery	Columbia River						PA 2026			PA 2026	PA 2027			
Crescent Bay Boat Ramp	Lake Roosevelt					NAA 2024								
Dart-Lo	Little Spokane River	PA 2026												
Downriver Park	Spokane River					NAA 2024								
East Bank/Wenatchee River Hatchery Program	Columbia River		PA 2025	PA 2025								PA 2025		
Elmer City Left Bank	Lake Rufus Woods	PA 2025												
Elmer City Right Bank	Lake Rufus Woods	PA 2025												
Entiat National Fish Hatchery	Entiat River		NAA 2024	NAA 2024			NAA 2021					PA 2025		
Evans Boat Ramp	Lake Roosevelt					NAA 2024								
Flat Creek Eddy	Lake Roosevelt (Transboundary Reach)	PA 2025												
Ford Hatchery	Tshimikain Creek (Chamokane Creek)					NAA	NAA 2021		PA 2025		PA 2026			
French Rocks	Lake Roosevelt	PA 2025												
Game Range Cove	Lake Roosevelt	PA 2025												
Geezer Beach	Lake Roosevelt					NAA 2020								
Gifford	Lake Roosevelt	PA 2026												
Gifford	Lake Roosevelt	PA 2025												
Glen Tana (Little Spokane)	Little Spokane River	PA 2026												
Glen Tana (Little Spokane)	Little Spokane River				PA 2027	PA 2023	PA 2027		PA 2025		PA 2027			

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Grand Coulee Dam	Lake Roosevelt/Lake Rufus Woods	NAA 2022				NAA 2022				PA 2026			PA 2029	PA 2028
Grand Coulee Dam #1	Lake Roosevelt	NAA 2020												
Grand Coulee Dam #2	Lake Roosevelt	NAA 2020												
Grand Coulee Dam #3	Lake Roosevelt	NAA 2020												
Grand Coulee Forebay	Lake Roosevelt	NAA 2022												
Grand Coulee Forebay 3D Study Receivers	Lake Roosevelt	PA 2026												
Grand Coulee Tailrace Left Bank	Lake Rufus Woods	PA 2025												
Grand Coulee Tailrace Right Bank	Lake Rufus Woods	PA 2025												
Hall Creek	Lake Roosevelt	PA 2025												
Hangman Creek Screw Trap	Hangman Creek		PA 2027		PA 2027									
Hanson Harbor	Lake Roosevelt	PA 2025												
Harvey Creek upstream	Lake Roosevelt	PA 2025												
Hunter Creek upstream	Lake Roosevelt	PA 2025												
Indian Painted Rocks	Little Spokane River	PA 2026												
Jones Bay	Lake Roosevelt	PA 2025												
Keller Ferry	Lake Roosevelt	PA 2026				NAA 2022								
Keller Ferry/Sanpoil Arm	Lake Roosevelt (Sanpoil Arm)					NAA 2019								
Kendall Yards/Spokane Falls	Spokane River	PA 2026												
Kettle Falls	Lake Roosevelt	PA 2026												
Kettle Falls Marina	Lake Roosevelt	PA 2025				NAA 2019								
Kettle River Screw Trap	Kettle River		PA 2027		PA 2027	PA 2027								
kɬ cp̓əlk̓ stiḿ (Penticton) Hatchery	Okanogan River (Canada)		PA 2025	PA 2025	PA 2025		PA 2025							
Lake Roosevelt Beach Seining and Fyke netting	Lake Roosevelt & Transboundary Reach		PA 2026		PA 2026									
Lake Rufus Wood (CTCR Boat Launch)	Lake Rufus Woods					NAA 2019								
Lake Spokane Campground	Spokane River (Lake Spokane)					PA 2027								
Lake Wenatchee	Lake Wenatchee		PA 2025	PA 2025										

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Lincoln V2	Lake Roosevelt	PA 2025												
Little Dalles Eddy	Lake Roosevelt & Transboundary Reach	PA 2025												
Little Falls Acclimation Facility	Spokane River				PA 2025	PAA 2020	NAA 2020				PA 2025			
Little Falls Dam	Spokane River					NAA 2022				PA 2028			PA 2030	PA 2032
Little Falls Dam Tailrace Left Bank	Spokane River	PA 2026												
Little Falls Dam Tailrace Right Bank	Spokane River	PA 2026												
Little Spokane River Screw Trap	Little Spokane River		PA 2027		PA 2027									
Long Lake Dam	Spokane River					NAA 2023				PA 2028			PA 2030	PA 2032
Long Lake Dam Tailrace Left Bank	Spokane River	PA 2026												
Long Lake Dam Tailrace Right Bank	Spokane River	PA 2026												
Lower Sanpoil River	Sanpoil River					NAA 2023								
Martha-Boardman Bridge	Tshimikain Creek					NAA 2020								
Meeker Mountain	Lake Roosevelt	PA 2025												
Middle Sanpoil River (30-Mile Bridge)	Sanpoil River	PA 2027				NAA 2020								
Milepost 110	Lake Roosevelt	PA 2025												
Milepost 120/Northport	Lake Roosevelt (Transboundary Reach)	PA 2025												
Mission Point	Lake Roosevelt	PA 2025												
Mitchell Point	Lake Roosevelt	PA 2025												
Modeled salmon habitat reaches and outplant areas	Throughout blocked areas							NAA 2020						
Nancy Creek	Lake Roosevelt	PA 2025												
Nespelem River Confluence #1	Lake Rufus Woods	PA 2025												
Nespelem River Confluence #2	Lake Rufus Woods	PA 2025												
Nine Mile Creek	Lake Roosevelt	PA 2025												
Nine Mile Dam	Spokane River					NAA 2023				PA 2028			PA 2030	PA 2032
Nine Mile Dam Tailrace Left Bank	Spokane River	PA 2026												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Nine Mile Dam Tailrace Right Bank	Spokane River	PA 2026												
North Gorge	Lake Roosevelt	PA 2025												
Northport	Lake Roosevelt (Transboundary Reach)	PA 2026												
Northport	Lake Roosevelt (Transboundary Reach)	PA 2025												
Northport, WA	Transboundary Reach					NAA 2020								
Okanogan River Beach Seining	Okanogan River		PA 2027		PA 2027									
Okanogan River Screw Trap	Okanogan River		PA 2027		PA 2027									
Okanogan River Weir	Okanogan River			PA 2027	PA 2027									
O-Ra-Pak-En Creek	Lake Roosevelt	PA 2025												
Pacific Aquaculture	Lake Rufus Woods	PA 2025				NAA 2022	NAA 2022							
Pacific Aquaculture #1	Lake Rufus Woods	PA 2025												
Pacific Aquaculture #2	Lake Rufus Woods	PA 2025												
Pacific Northwest National Laboratories	Columbia River					NAA 2025	NAA 2024							
Peaceful Valley	Spokane River					PA 2025								
Plese Flats	Spokane River	PA 2026				NAA 2024								
Priest Rapids Dam/Hatchery	Columbia River			PA 2025	PA 2025							PA 2025		
Purse Seine Okanogan River Confluence (Upstream Transport)	Okanogan River			NAA 2024	NAA 2024							NAA 2024		
Quillisascut/La Fleur Creeks	Lake Roosevelt	PA 2025												
Rice	Lake Roosevelt	PA 2025												
Rickey Point	Lake Roosevelt	PA 2025												
Ringold Springs Hatchery	Columbia River			PA 2026	PA 2026							PA 2026		
Rocky Reach Juvenile bypass	Columbia River		PA 2025	PA 2025	PA 2025							PA 2025		
Rufus Woods Nespelem East	Lake Rufus Woods	PA 2025												
Rufus Woods, boat launch	Lake Rufus Woods	PA 2025												
Sand Hills/Wynhoff Canyon	Lake Roosevelt	PA 2025												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Sanpoil Arm	Lake Roosevelt	PA 2025												
Sanpoil Arm 1 (Shore-based)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 10 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 2 (Shore-based)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 3 (Shore-based)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 4 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 5 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 6 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 202												
Sanpoil Arm 7 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 8 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 2024												
Sanpoil Arm 9 (Submersible)	Lake Roosevelt (Sanpoil Arm)	NAA 2027												
Sanpoil Arm Buoy B	Lake Roosevelt	PA 2025												
Sanpoil Arm Mouth middle	Lake Roosevelt	PA 2025												
Sanpoil Arm Net Pens	Lake Roosevelt (Sanpoil Arm)					PA 2026	PA 2025				PA 2025			
Sanpoil Buoy C	Lake Roosevelt	PA 2025												
Sanpoil Campground	Lake Roosevelt	PA 2025												
Sanpoil Middle	Lake Roosevelt	PA 2025												
Sanpoil Mouth Buoy A East	Lake Roosevelt	PA 2025												
Sanpoil Mouth Buoy A West	Lake Roosevelt	PA 2025												
Sanpoil River @ Louie Creek	Sanpoil River				PA 2027		PA 2027			PA 2025	PA 2027			
Lower Sanpoil River	Sanpoil River	PA 2027												
Sanpoil River Screw Trap	Sanpoil River		NAA 2021		NAA 2021	NAA 2021								
Screw Traps: Other Tributary of Lake Roosevelt	TBD		PA 2027		PA 2027									
Seatons Grove	Lake Rufus Woods	PA 2024												
Seatons Grove	Lake Rufus Woods					PA 2019								
Seven Bays	Lake Roosevelt	PA 2025												
Seven Devils	Lake Roosevelt	PA 2025												
Sheep Creek	Lake Roosevelt	PA 2025												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Sherman Creek/Kettle Falls Net Pens	Lake Roosevelt					NAA 2021	NAA 2021							
Sixmile Creek upstream	Lake Roosevelt	PA 2025												
Snag Cove	Lake Roosevelt	PA 2025												
SP Harker Canyon	Lake Roosevelt	PA 2025												
Spokane Community College	Spokane River	PA 2026												
Spokane House	Spokane River	PA 2026												
Spokane River (People's Park)	Spokane River					NAA 2022								
Spokane River Confluence V2	Lake Roosevelt	PA 2025												
Spokane Tribal Hatchery	Spokane River (Chamokane Creek)					NAA 2020	NAA 2019~~21~~							
SP-Tribal Boat Launch	Lake Roosevelt	PA 2025												
sqweyu' (Hangman Creek)	Hangman Creek	PA 2027			PA 2027	NAA 2022	PA 2027		PA 2025		PA 2027			
SR1 Fort Spokane	Lake Roosevelt	PA 2025												
SR2 McCoys Marina	Lake Roosevelt	PA 2025												
SR3 Upper Spokane River	Lake Roosevelt	PA 2025												
Star Boat Launch	Columbia River					PA 2025								
Sterling Point West	Lake Roosevelt	PA 2025												
Stray Dog Canyon upstream	Lake Roosevelt	PA 2025												
Swawilla PAasin central	Lake Roosevelt	PA 2025												
TBD	TBD	PA 2025												
Threemile Creek	Lake Roosevelt	PA 2025												
Tributary Streamside Incubation Boxes	Sanpoil River, Spokane River, Little Spokane River						PA 2025							
Tshimikain Creek Screw Trap	Tshimikain Creek		NAA 2024		NAA 2024									
Tumwater Dam	Wenatchee River			PA 2025								PA 2025		
Two Rivers Marina	Lake Roosevelt (Spokane Arm)	PA 2026												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
Two Rivers Marina Net Pens	Lake Roosevelt (Spokane Arm)					NAA 2022	NAA 2021							
UCT01 Nine Mile Dam Forebay	Spokane River	NAA 2022												
UCT02 Nine Mile Dam Forebay Backup	Spokane River	NAA 2022												
UCT03 Long Lake Dam Forebay	Spokane River	NAA 2022												
UCT04 Long Lake Dam Forebay Backup	Spokane River	NAA 2022												
UCT05 Little Falls Dam Forebay Backup	Spokane River	NAA 2022												
UCT06 Little Falls Dam Forebay Backup	Spokane River	NAA 2022												
UCT07 Fort Spokane downstream Backup	Spokane River	NAA 2022												
UCT08 Fort Spokane Upstream Backup	Spokane River	NAA 2022												
UCT11-GIFFORD RIGHT BANK	Lake Roosevelt	NAA 2022												
UCT12-GIFFORD MID CHANNEL	Lake Roosevelt	NAA 2022												
UCT13-GIFFORD LEFT BANK	Lake Roosevelt	NAA 2022												
UCT14-STOI STURGEON BUOY	Lake Roosevelt	NAA 2022												
UCT15-ABRAHAM COVE RIGHT BANK	Lake Roosevelt	NAA 2022												
UCT16-ABRAHAM COVE	Lake Roosevelt	NAA 2022												
UCT17-ABRAHAM COVE	Lake Roosevelt	NAA 2022												
UCT18-ABRAHAM COVE LEFT BANK	Lake Roosevelt	NAA 2022												
UCT19-KELLER RIGHT BANK	Lake Roosevelt	NAA 2022												
UCT20-KELLER MID CHANNEL	Lake Roosevelt	NAA 2022												
UCT21-KELLER LEFT BANK	Lake Roosevelt	NAA 2022												
UCT22-GRAND COULEE FOREBAY WEST	Lake Roosevelt	NAA 2022												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
UCT23-GRAND COULEE FOREBAY	Lake Roosevelt	NAA 2022												
UCT24-GRAND COULEE FOREBAY	Lake Roosevelt	NAA 2022												
UCT25-GRAND COULEE FOREBAY	Lake Roosevelt	NAA 2022												
UCT26-GRAND COULEE FOREBAY	Lake Roosevelt	NAA 2022												
UCT27-GRAND COULEE FOREBAY	Lake Roosevelt	NAA 2022												
UCT28-GRAND COULEE FOREBAY EAST	Lake Roosevelt	NAA 2022												
UCT29-GRAND COULEE DAM WPP NORTH	Lake Roosevelt	NAA 2022												
UCT30-GRAND COULEE DAM WPP SOUTH	Lake Roosevelt	NAA 2022												
UCT31-GRAND COULEE DAM RPH CORNER	Lake Roosevelt	NAA 2022												
UCT32-GRAND COULEE DAM RPH UNIT 18	Lake Roosevelt	NAA 2022												
UCT33-GRAND COULEE DAM SPILLWAY 11	Lake Roosevelt	NAA 2022												
UCT34-GRAND COULEE DAM SPILLWAY 8/9	Lake Roosevelt	NAA 2022												
UCT35-GRAND COULEE DAM SPILLWAY 5/6	Lake Roosevelt	NAA 2022												
UCT36-GRAND COULEE DAM SPILLWAY 2/3	Lake Roosevelt	NAA 2022												
UCT37-GRAND COULEE DAM SPILLWAY 1	Lake Roosevelt	NAA 2022												
UCT38-GRAND COULEE DAM LPH UNITS 4/5	Lake Roosevelt	NAA 2022												
UCT39-GRAND COULEE DAM LPH UNIT 1	Lake Roosevelt	NAA 2022												
UCT40-BANKS CANAL EAST	Banks Canal	NAA 2022												
UCT41-BANKS CANAL WEST	Banks Canal	NAA 2022												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
UCT42-SETONS GROVE RIGHT BANK	Lake Rufus Woods	NAA 2022												
UCT43-SEATONS GROVE LEFT BANK	Lake Rufus Woods	NAA 2027												
UCT44-RUFUS WOODS MID RES UPSTREAM	Lake Rufus Woods	NAA 2022												
UCT45-RUFUS WOODS MID RES DOWNSTREAM	Lake Rufus Woods	NAA 2022												
UCT46-CHIEF JOSEPH FOREBAY NORTH	Lake Rufus Woods	NAA 2022												
UCT47-CHIEF JOSEPH FOREBAY MIDDLE	Lake Rufus Woods	NAA 2022												
UCT48-CHIEF JOSEPH FOREBAY SOUTH	Lake Rufus Woods	NAA 2022												
UCT49-CHIEF JOSEPH DAM SPILLWAY NORTH	Lake Rufus Woods	NAA 2022												
UCT50-CHIEF JOSEPH DAM SPILLWAY SOUTH	Lake Rufus Woods	NAA 2022												
UCT51-CHIEF JOSEPH DAM UNIT 4/5	Lake Rufus Woods	NAA 2027												
UCT52-CHIEF JOSEPH DAM UNIT 11/12	Lake Rufus Woods	NAA 2022												
UCT53-CHIEF JOSEPH DAM UNIT 16/17	Lake Rufus Woods	NAA 2022												
UCT54-CHIEF JOSEPH DAM UNIT 23/24	Lake Rufus Woods	NAA 2022												
UCT55-CHIEF JOSEPH DAM TAIL RIGHT BANK US	Columbia River	NAA 2022												
UCT56-CHIEF JOSEPH DAM TAIL RIGHT BANK DS	Columbia River	NAA 2022												
UCT57-BEEBE BR RIGHT BANK PILING US	Columbia River	NAA 2022												

General Location	Waterbody	P2IP Activities (No Action Alternative (NAA) or Proposed Action (PA) and Earliest Implementation Year)												
		Telemetry Receivers	Juvenile Salmon Collection/Acquisition	Adult Salmon Collection/Acquisition	Marking Salmon	Salmon Release***	Salmon Rearing	Spawning & Carcass Surveys	Data Collection – Acclimation Design/ Existing Hatchery Upgrades	Data Collection Interim Passage	Construction of New Acclimation or Upgrading Existing Hatchery *	Interim Passage Trap and Transport	Construction & Testing Interim Upstream Passage*	Construction & Testing Interim Down-stream Passage*
UCT58-BEEBE BR RIGHT BANK PILING DS	Columbia River	NAA 2022												
UCT59-BEEBE BR LEFT BANK SHORE US	Columbia River	NAA 2022												
UCT60-BEEBE BR LEFT BANK SHORE DS	Columbia River	NAA 2022												
UCTXX-MARCUS FLATS LEFT BANK	Lake Roosevelt	NAA 2026												
UCTXX-MARCUS FLATS MID-CHANNEL	Lake Roosevelt	PA 2026												
UCTXX-Marcus Flats Right Bank	Lake Roosevelt	PA 2026												
Upper North Gorge Eddy	Lake Roosevelt	PA 2025												
Upper Sanpoil River	Sanpoil River					NAA 2020		NAA - 2020						
Upper Sanpoil River Acclimation Facility**	Sanpoil River						A 2029		PA 2027		PA 2029			
Waikiki Springs	Sanpoil River	PA 2026												
Wells Dam & Hatchery	Columbia River		NAA 2019	NAA 2019	NAA 2023		NAA 2022					NAA 2019		
Wilmont V2	Lake Roosevelt	PA 2025												

*Denotes P2IP Activities that would be evaluated under future environmental compliance processes.
** This site is only to be considered if Sanpoil River at Louie Creek site is determined to be unviable
*** Salmon may be released at any accessible site within the study area in addition to named sites.

A.9 Figures

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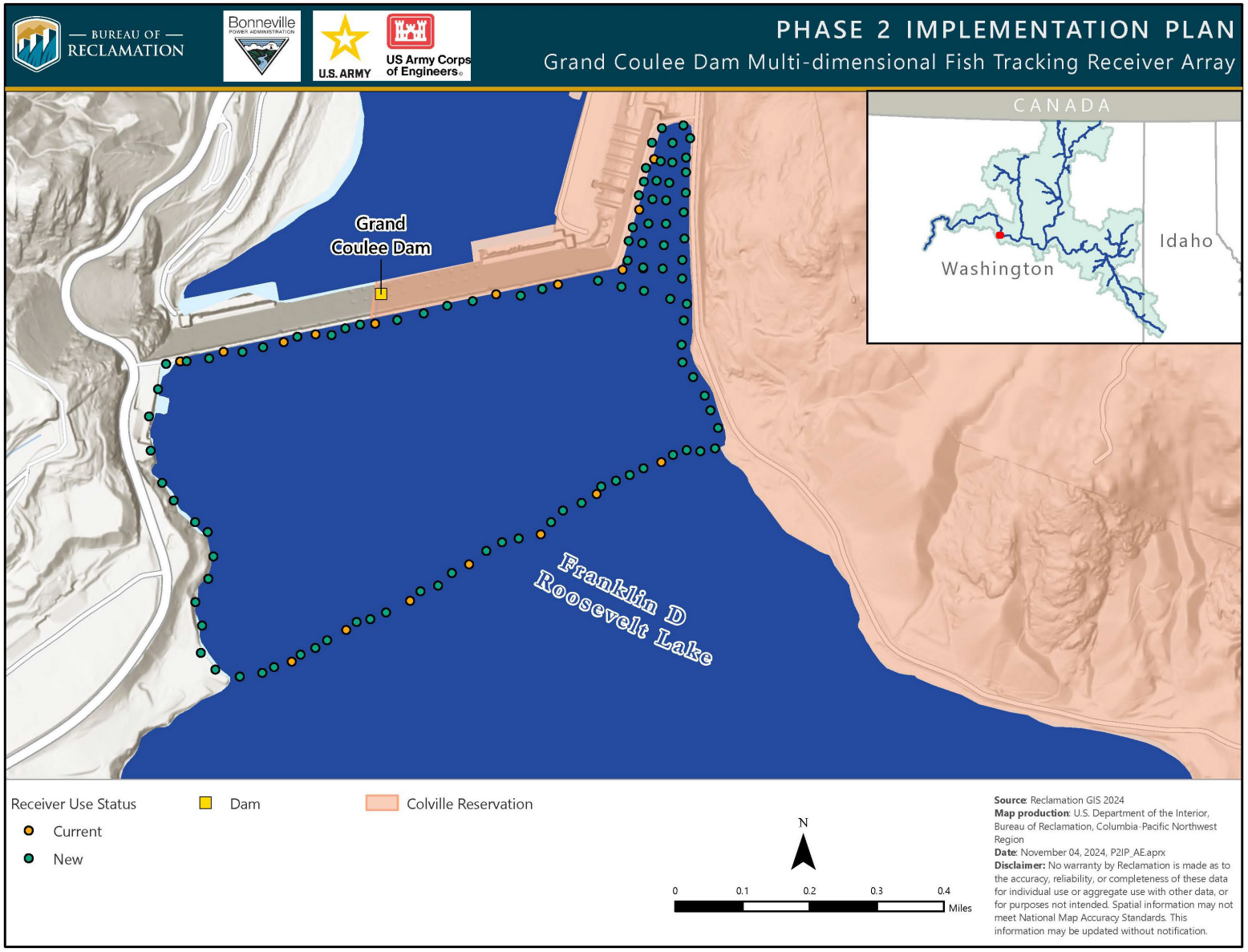

Figure A-1. Approximate layout of receiver array at Grand Coulee Dam forebay to accommodate multi-dimensional fish tracking.

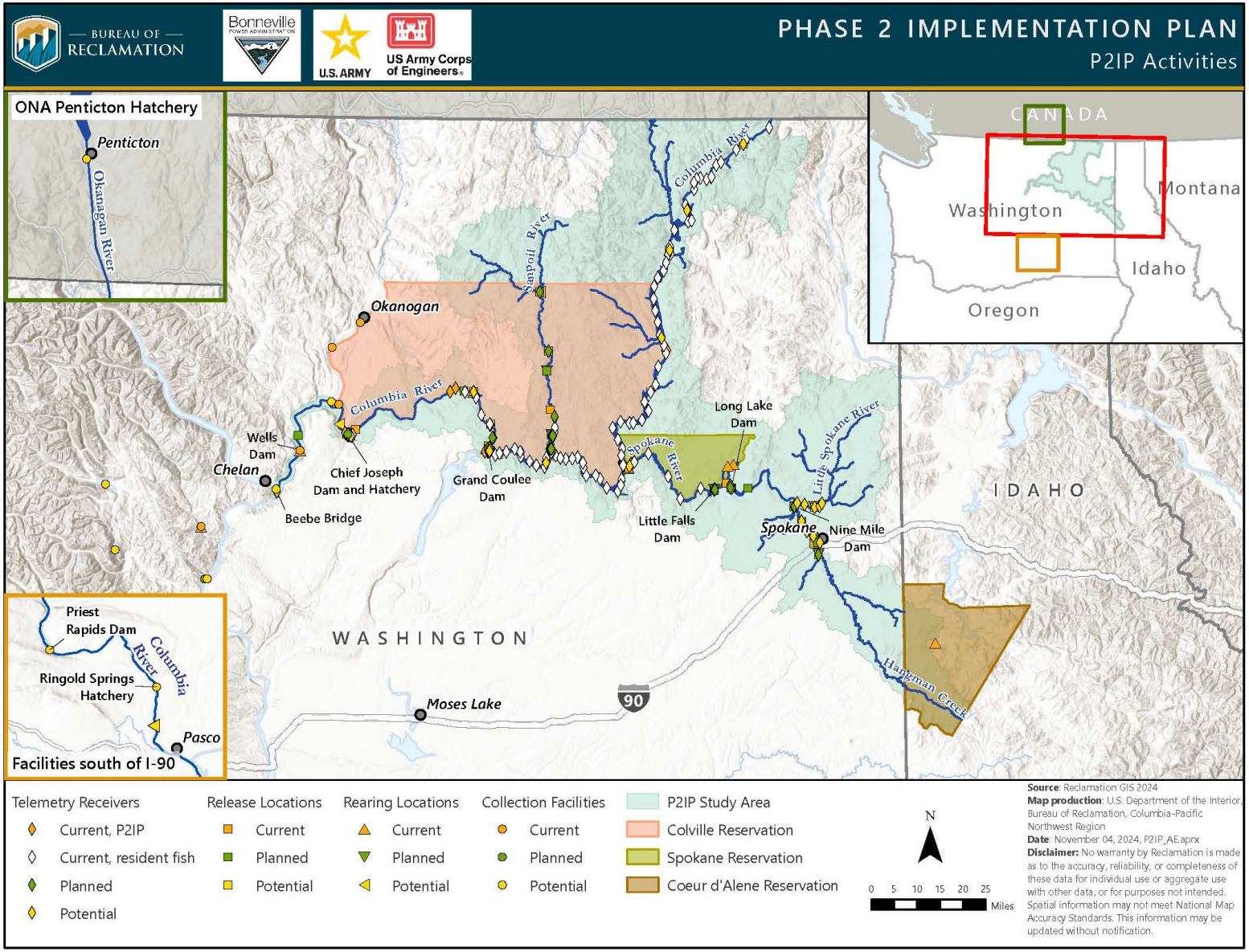

Figure A-2. Overview Map with research locations: receivers, salmon release, and rearing locations.

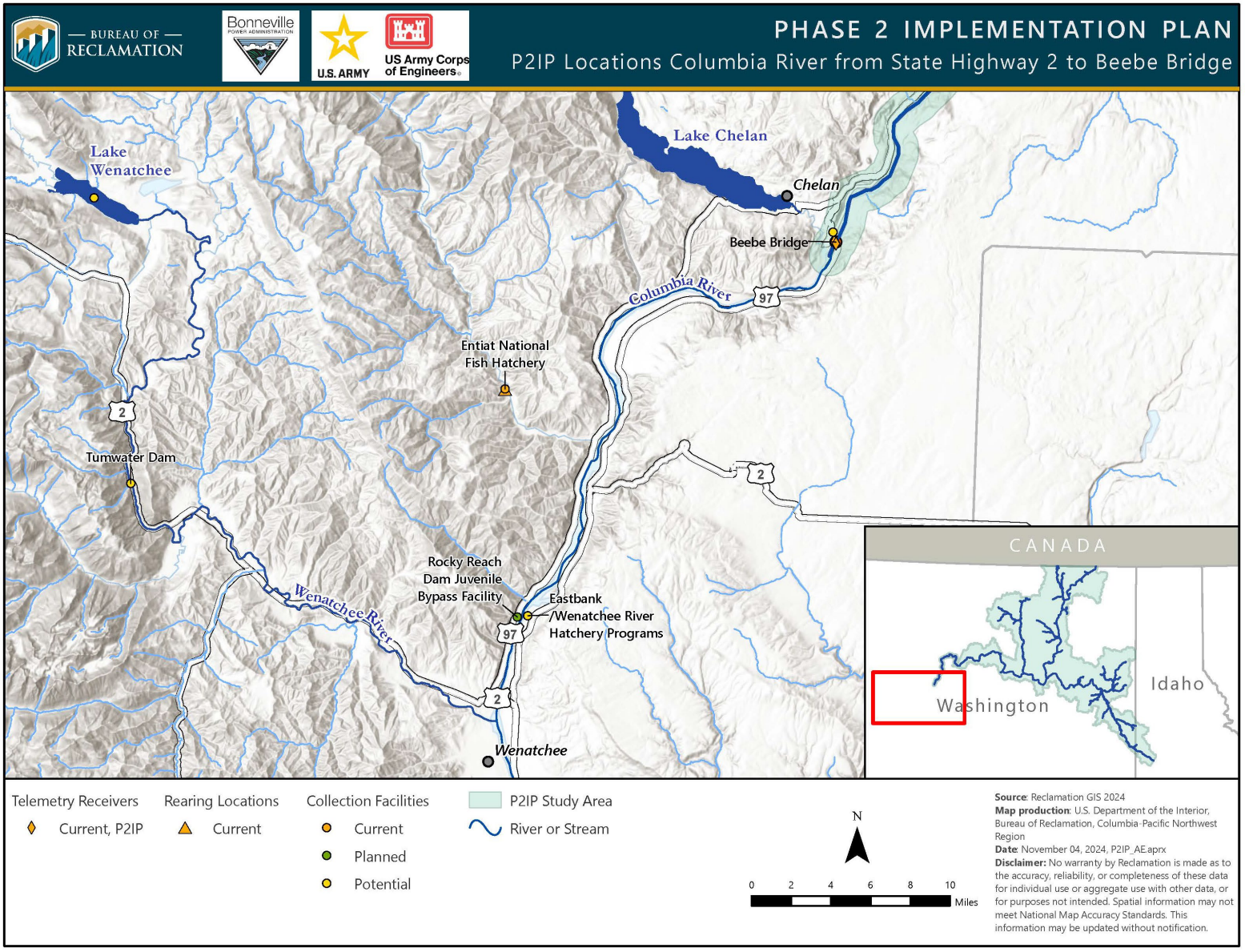

Figure A-3. P2IP Map for locations downstream of Beebe Bridge

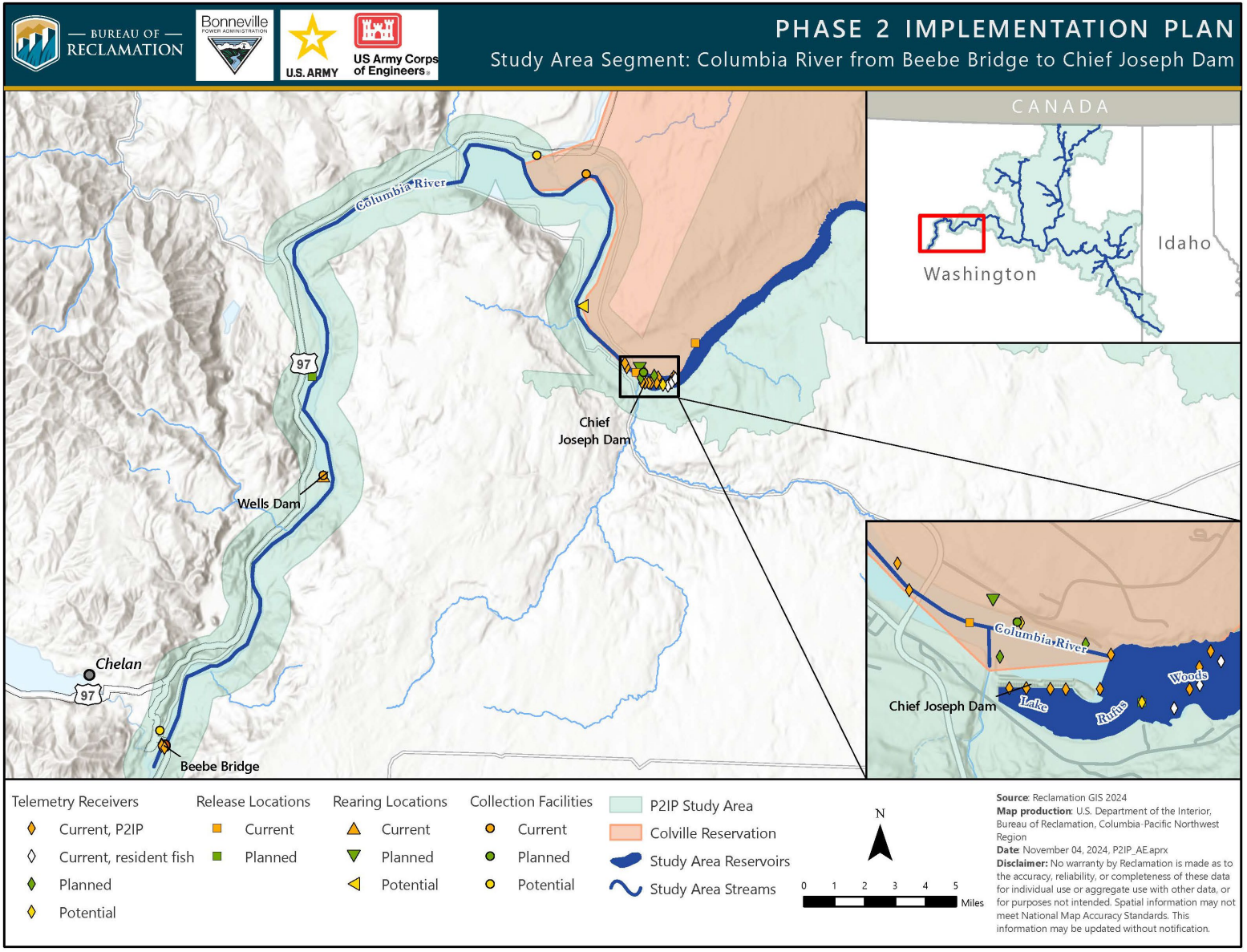

Figure A-4. Study Area Segment Map: Columbia River from Beebe Bridge to Chief Joseph Dam

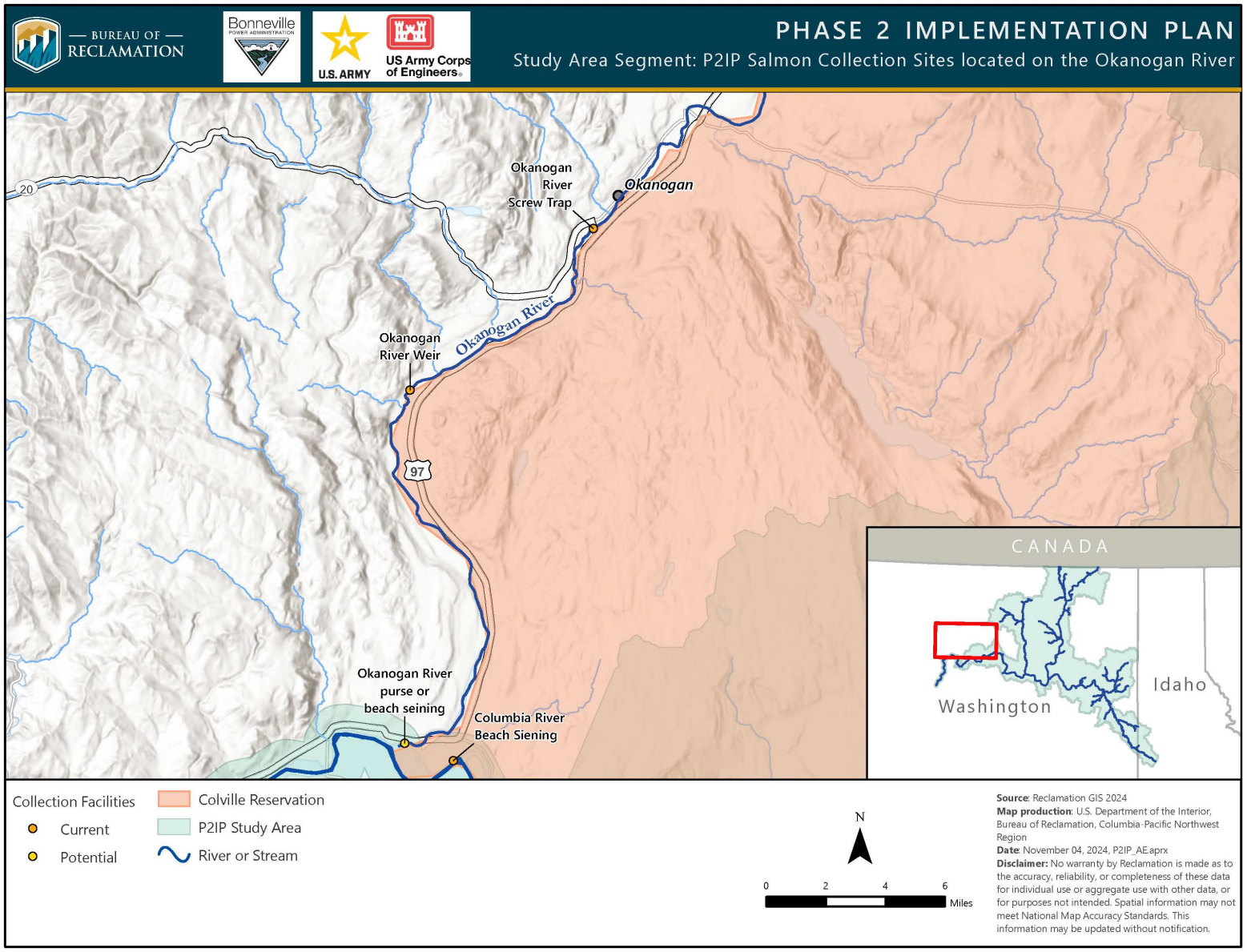

Figure A-5. Map of Salmon Collection Sites located on the Okanogan River

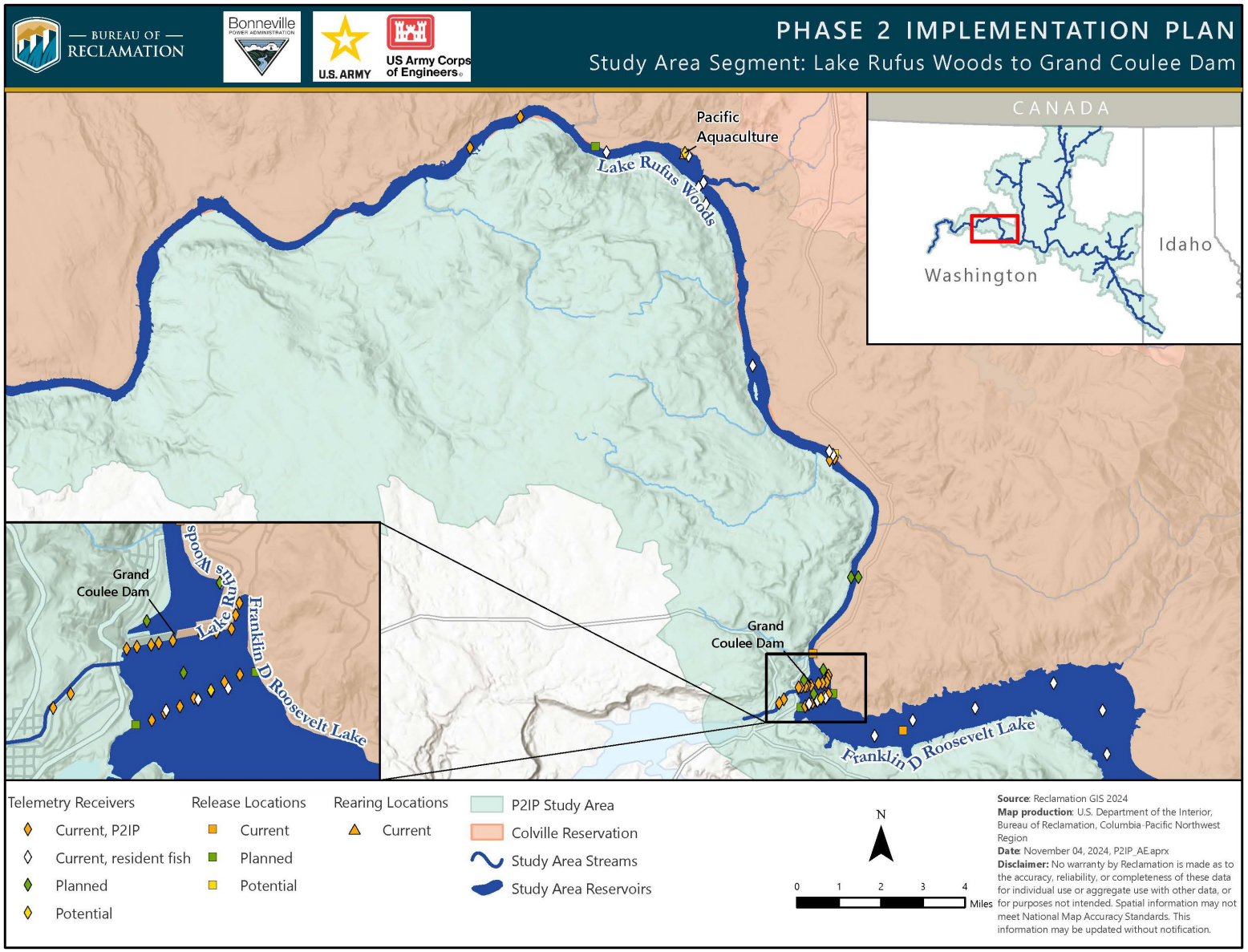

Figure A-6. Study Area Segment Map: Lake Rufus Woods to Grand Coulee Dam

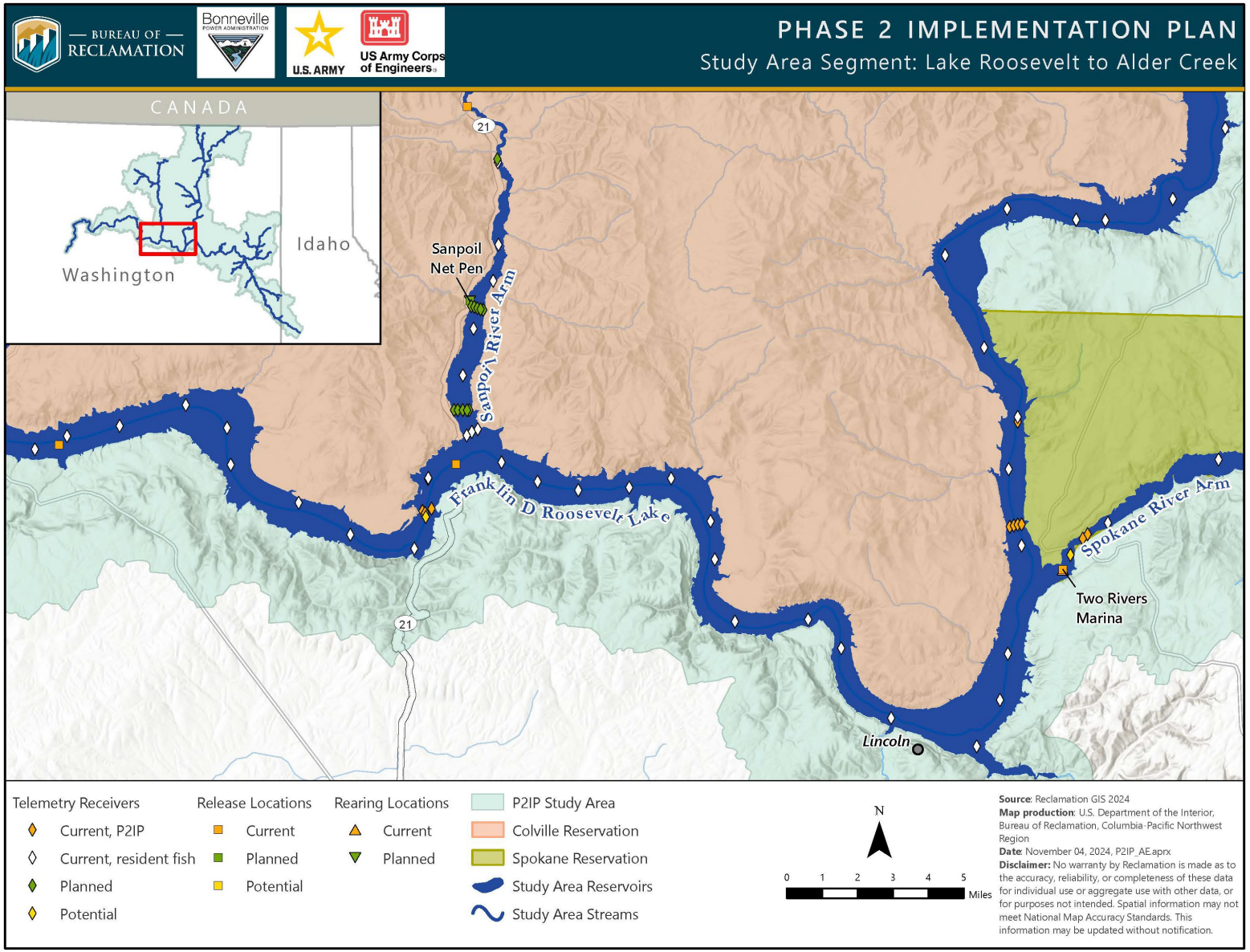

Figure A-7. Study Area Segment Map: Lake Roosevelt Upstream of Grand Coulee Dam to Alder Creek

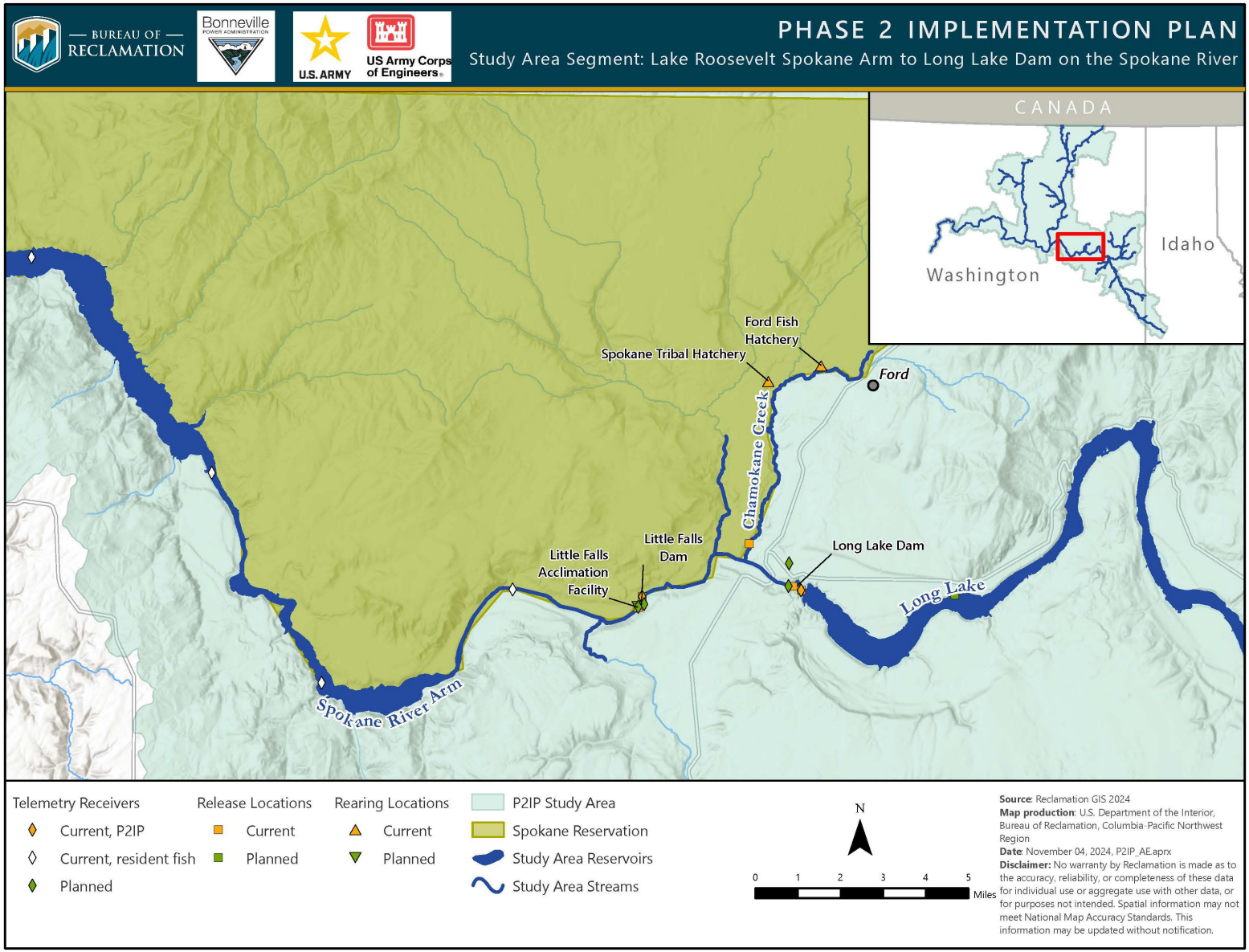

Figure A-8. Study Area Segment: Lake Roosevelt Spokane Arm to Long Lake Dam on the Spokane River

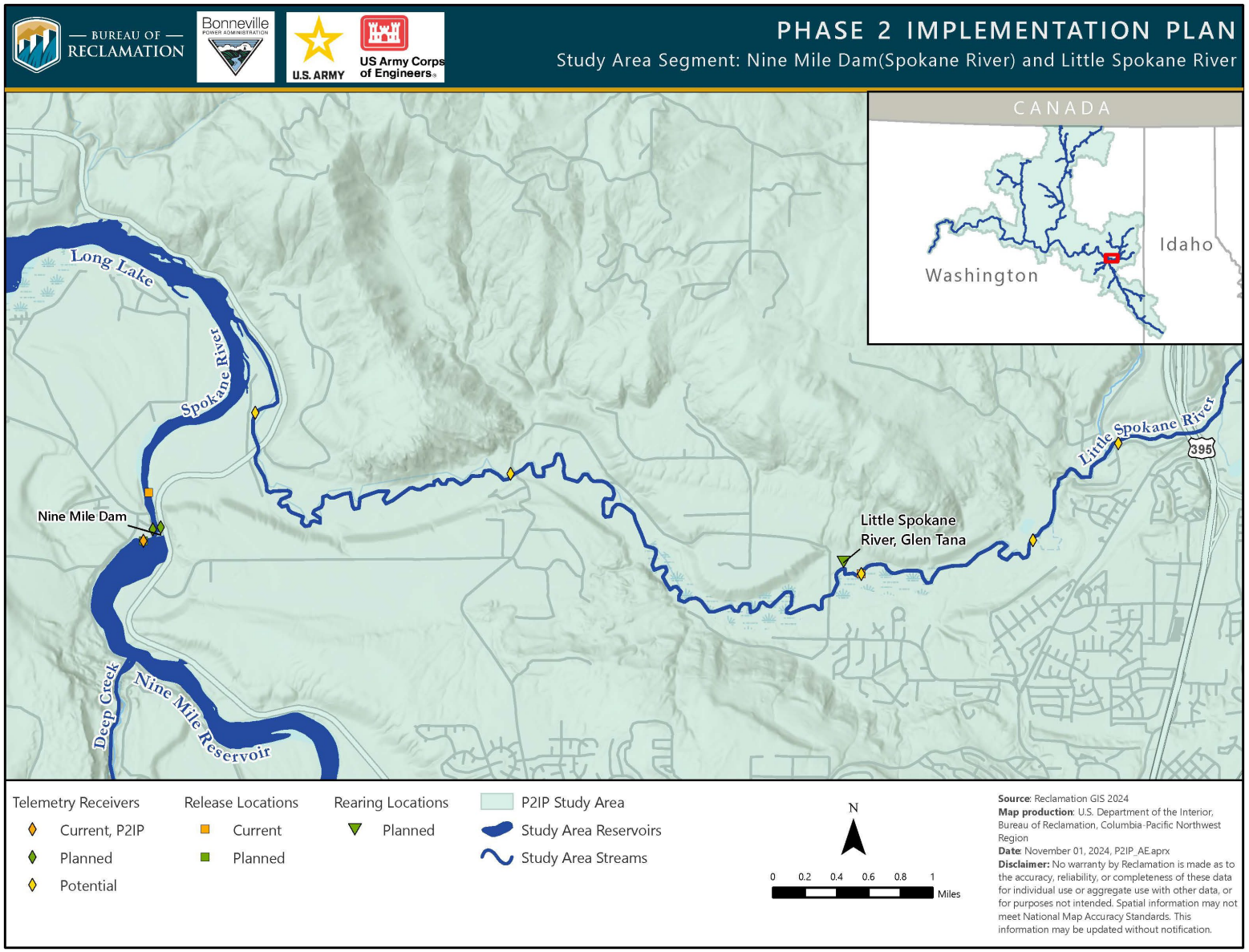

Figure A-9. Study Area Segment Nine Mile Dam (Spokane River) and Little Spokane River

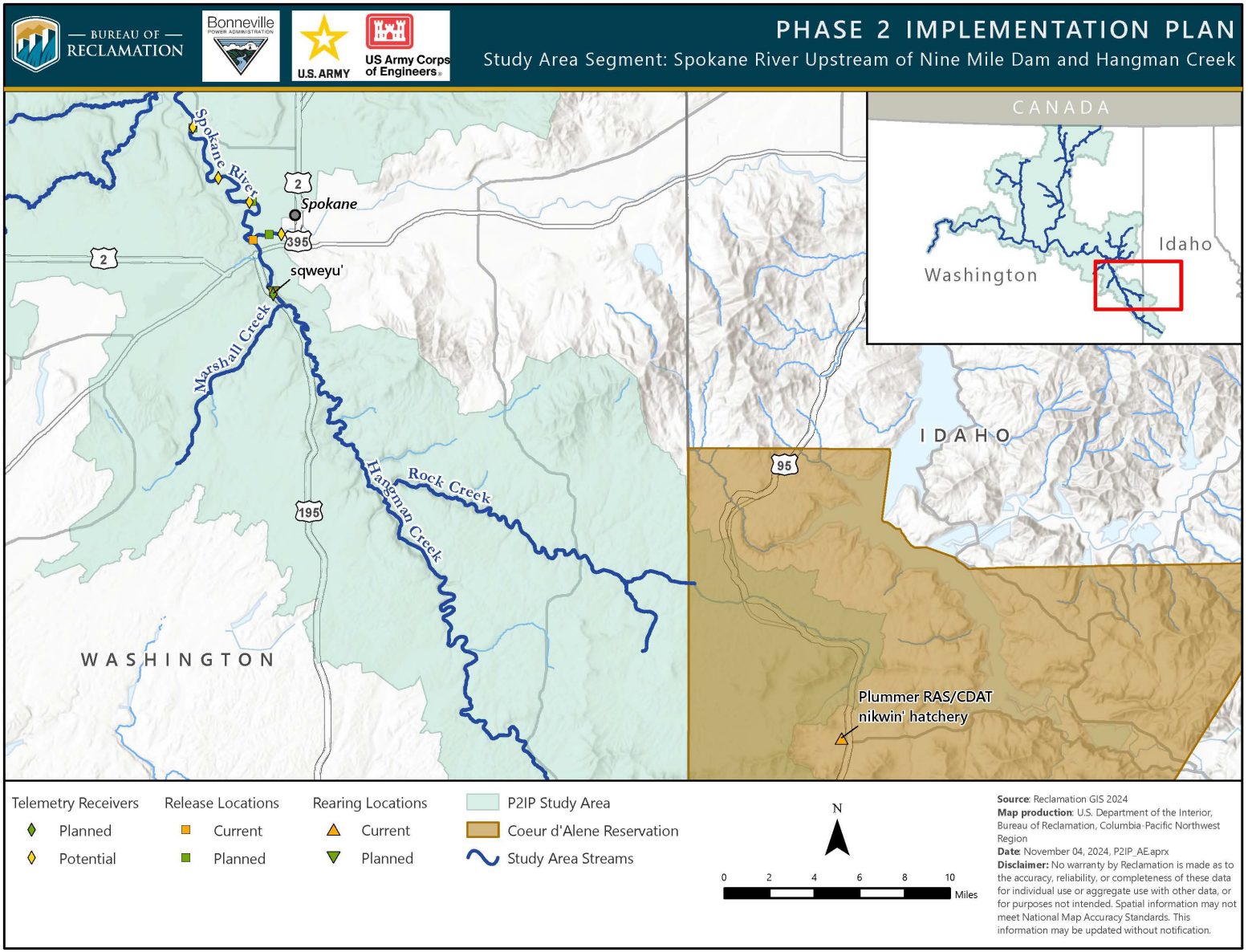

Figure A-10. Study Area Segment: Spokane River Upstream of Nine Mile Dam and Hangman Creek

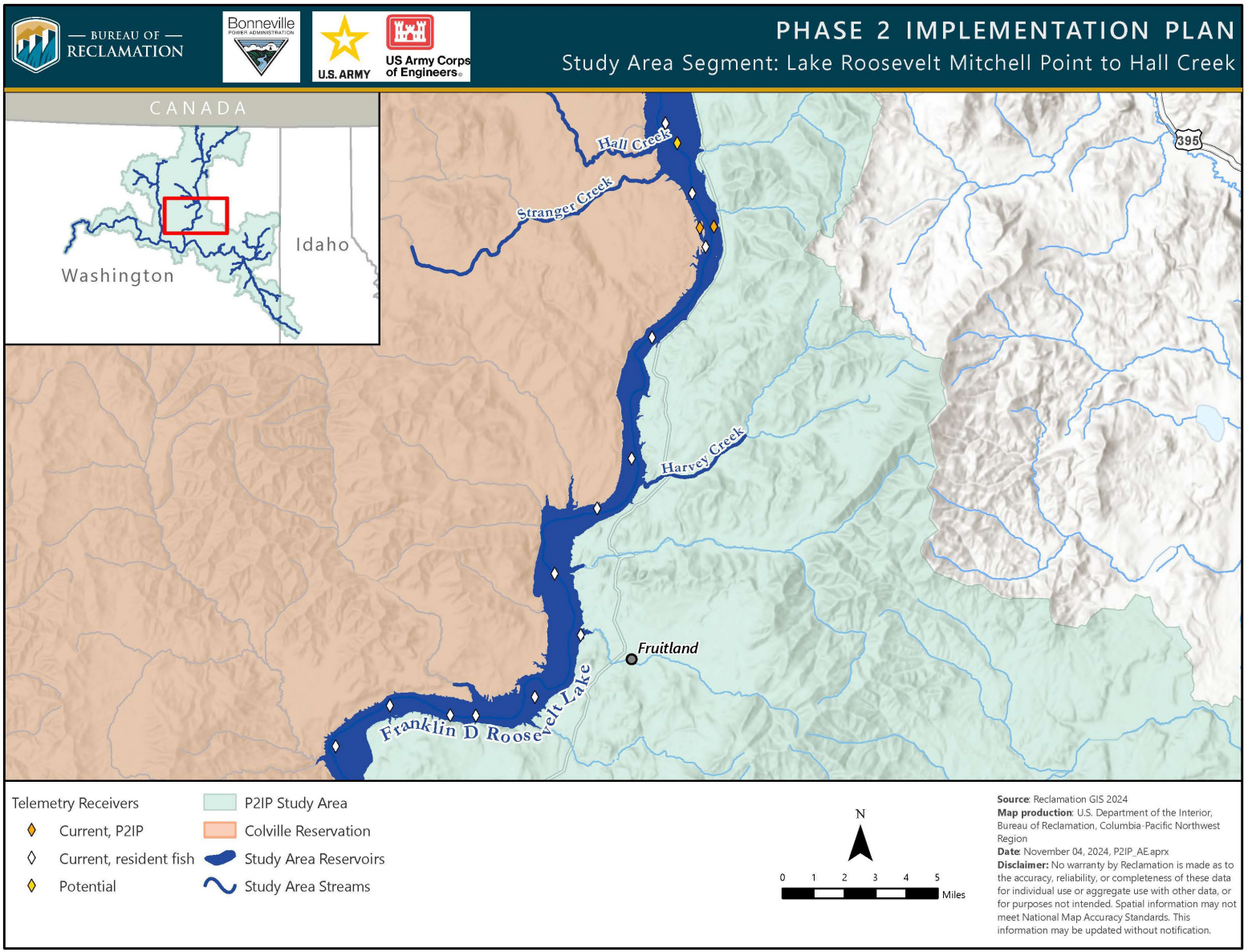

Figure A-11. Study Area Segment: Lake Roosevelt from Mitchell Point to Hall Creek

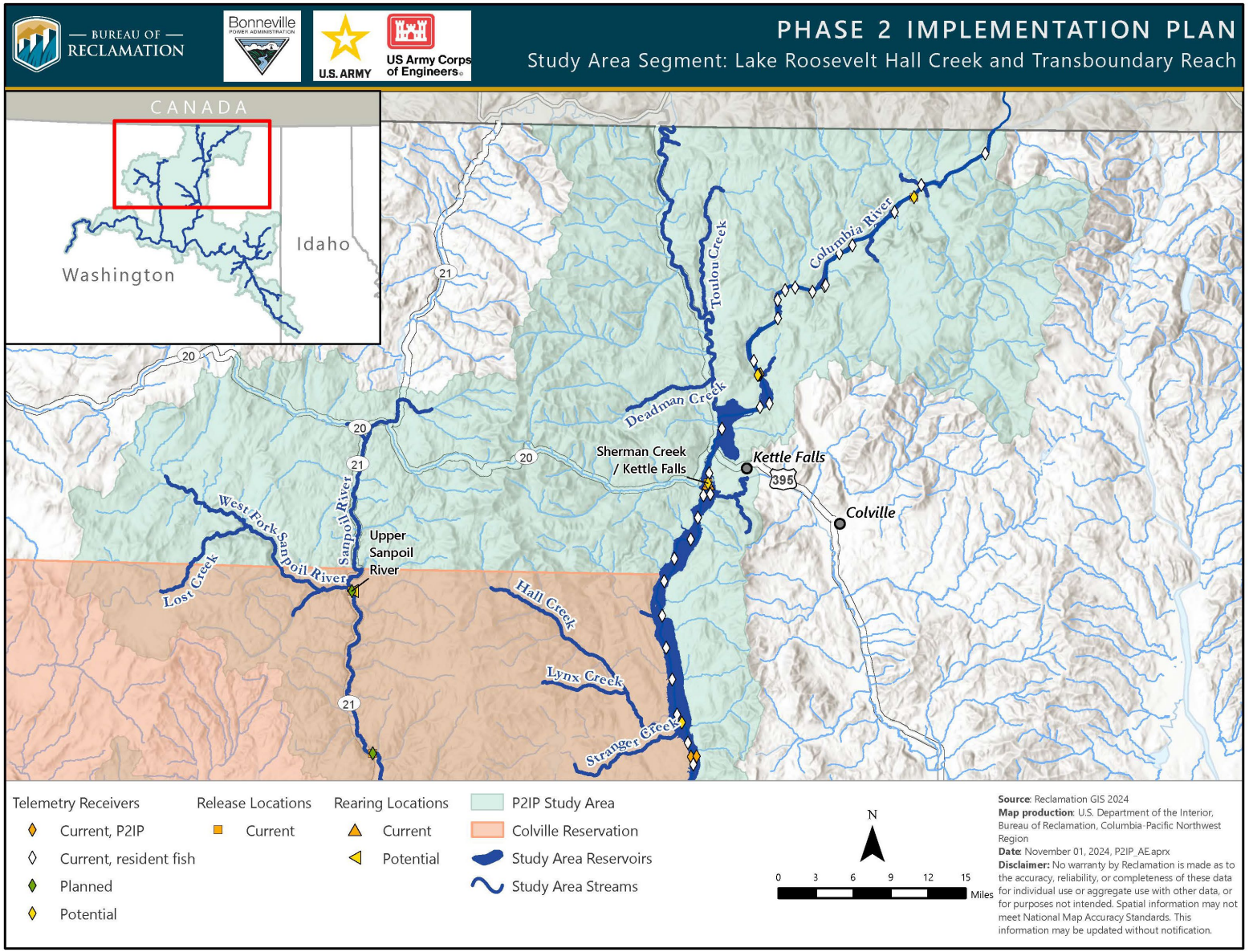

Figure A-12. Upper Sanpoil River, Lake Roosevelt Upstream of Hall Creek, and Columbia River Transboundary Reach

Appendix B

Fish Rearing Facilities

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Appendix B. Fish Rearing Facilities

P2IP requires sources of both summer/fall Chinook and sockeye to perform described studies. P2IP proposes to use existing artificial production facilities and net pens, upgrade existing facilities, and develop new net pen locations and land-based acclimation facilities (**Table A-1**).

B.1. Existing Artificial Production Facilities

Entiat National Fish Hatchery

Entiat National Fish Hatchery is owned and operated by the USFWS and located on the Entiat River near Chelan, Washington. This artificial production facility is currently being used to collect and hold surplus adult summer Chinook for a donor source of P2IP study subjects. The surplus adults are spawned at this facility, and the resulting fertilized eggs are held for incubation until transferred to a different artificial production facility. These uses would be expected to continue over the entire 20-year P2IP timeframe. No construction actions or modifications to existing infrastructure are planned at Entiat National Fish Hatchery to accommodate artificial production activities proposed for the P2IP.

Wells Hatchery

Wells Hatchery is owned and operated by Douglas County Public Utilities District and located at Wells Dam on the Columbia River. This artificial production facility is currently being used to rear juvenile Chinook salmon from fertilized egg up through fall subyearling life stages. This facility is also being used to mark juvenile summer Chinook salmon with PIT and coded wire tags. These uses would be expected to continue over the entire 20-year P2IP timeframe. No construction actions or modifications to existing infrastructure are planned at Wells Hatchery to accommodate artificial production activities proposed for the P2IP.

Coeur d'Alene Tribe nikwin' Hatchery

The nikwin' Hatchery is owned and operated by the Coeur d'Alene Tribe and located in Plummer, Idaho. This artificial production facility is currently being used to rear juvenile summer Chinook from fertilized egg through yearling life stages. This facility is also currently being used to mark juvenile summer Chinook salmon with PIT and acoustic transponders that are used for survival and behavior studies. These uses would be expected to continue over the entire 20-year P2IP timeframe. No construction actions or modifications to existing infrastructure are planned at the nikwin' Hatchery to accommodate artificial production activities proposed for the P2IP. Upgrades to this facility under P2IP would be limited to replacement of equipment at the end of its design life. Equipment replacement may include pumps, UV lamps, chillers, and filters and associated media.

Ford Hatchery

Ford Hatchery is owned and operated by the State of Washington and is located near Ford, Washington. It currently produces resident fish species: rainbow trout, brook trout, brown trout, and tiger trout. This artificial production facility has been used to rear juvenile summer Chinook salmon from fertilized egg through subyearling life stages. This facility may also be used in the future to rear juvenile Chinook and sockeye salmon from fertilized egg through subyearling life stages. Ford Hatchery may be used to hold adult summer Chinook and sockeye salmon broodstock which would be spawned at the facility. Adult Chinook and sockeye salmon may also be held here prior to releasing into blocked area habitats. The hatchery is expected to require improvements to accommodate these uses: improving efficiency of water collection and distribution, modification of holding vessels, and spawning facilities are currently known. These and additional improvements would be scoped and designed by consultants with relevant expertise. Data collection to design facility upgrades may include site characterization, resource-specific surveys and ground disturbing activities including, but not limited to, geotechnical boreholes and trenches. Facility upgrades would be evaluated in future environmental compliance processes once designs are complete.

Spokane Tribal Hatchery

Spokane Tribal Hatchery is owned and operated by the Spokane Tribe of Indians and is located near Ford, Washington. This facility is currently being used to hold adult summer Chinook salmon prior to release into blocked area habitats. These uses would be expected to continue over the entire 20-year P2IP timeframe. No construction actions or modifications to existing infrastructure are planned at the Spokane Tribal Hatchery to accommodate artificial production activities proposed for the P2IP.

Kettle Falls/Sherman Creek Net Pen Artificial Production Program

The net pen program at Kettle Falls and Sherman Creek is owned and operated by the State of Washington and is located on Lake Roosevelt near Kettle Falls, Washington. This facility is currently being used to acclimate juvenile Chinook salmon from fall subyearling through yearling life stages. Four new 20-foot by 20-foot net pens and the associated floating docks have been attached to the existing net pen array at this location to accommodate the P2IP acclimation program above and beyond the current rainbow trout hatchery program. These net pens were installed in September 2022. The uses at this facility would be expected to continue over the entire 20-year P2IP timeframe. Up to 15,000 subyearling Chinook (fall parr[37], size target 30 fish per pound) would be transferred to each of the four net pens in October or November and released from the net pens in March, April, or May at a targeted size of 15 fish per pound. Transfer dates, release dates and fish sizes may vary depending on water temperatures, fish health, infrastructure failure or maintenance and adaptive management based on results of the initial studies. No additional construction actions or modifications to existing infrastructure are planned at the Kettle Falls/Sherman Creek Net Pen Artificial Production Program to accommodate artificial production activities proposed for the P2IP.

[37] Parr are salmon between the fry and smolt stage. They are named for the vertical marks on their sides called "parr" marks. Parr markings vary between different salmon species.

Two Rivers Net Pen Artificial Production Program

The net pen program at Two Rivers Marina is owned and operated by the Spokane Tribe and through a volunteer program. These net pens are located on the Spokane Reservation in Lake Roosevelt at Two Rivers near the mouth of the Spokane River. This facility is currently being used to acclimate juvenile Chinook salmon from subyearling through yearling life stages. Two new 20-foot by 20-foot net pens and the associated floating docks have been added to this program to accommodate the P2IP acclimation program above and beyond the current rainbow trout hatchery program. These net pens were installed in September 2023. The uses at this facility would be expected to continue over the entire 20-year P2IP timeframe. Up to 15,000 subyearling Chinook (fall parr, size target 30 fish per pound) would be transferred to each net pen in October or November and released from the net pens in March, April, or May at a targeted size of 15 fish per pound. Transfer dates, release dates and fish sizes may vary depending on water temperatures, fish health, infrastructure failure or maintenance and adaptive management based on results of the initial studies. No additional construction actions or modifications to existing infrastructure are planned at the Two Rivers Net Pen Artificial Production Program to accommodate artificial production activities proposed for the P2IP.

Pacific Aquaculture Net Pen Program

A commercial net pen program within Rufus Woods Reservoir is owned and operated by Pacific Aquaculture. It is located on the Colville Reservation near Nespelem, Washington. Pacific Aquaculture is partnering with the Colville Tribes to expand this facility to acclimate juvenile Chinook salmon from fall subyearling through spring yearling life stages. Two new 20-foot by 20-foot net pens have been attached to the existing net pen array at this location to accommodate the P2IP acclimation program above and beyond the current rainbow trout hatchery program. These net pens were installed in September 2022. The uses at this facility would be expected to continue over the entire 20-year P2IP timeframe. Up to 15,000 subyearling Chinook (fall parr, size target 30 fish per pound) would be transferred to each net pen in October or November and released from the net pens in March, April, or May at a targeted size of 15 fish per pound. Transfer dates, release dates and fish sizes may vary depending on water temperatures, fish health, infrastructure failure or maintenance and adaptive management based on results of the initial studies. Two additional pens may be added to the Pacific Aquaculture Net Pen Program to accommodate future artificial production activities proposed for the P2IP.

Chief Joseph Hatchery

Chief Joseph Hatchery (CJH) is owned and operated by the Confederated Tribes of the Colville Reservation and is located near Bridgeport, Washington. All activities at CJH have already been evaluated for environmental impacts via the Chief Joseph Hatchery Program Environmental Impact Statement (Record of Decision signed in March 2010) and subsequent analyses (**CJFH 2010**). Ongoing artificial production actions at CJH such as collection and holding of adult Chinook, spawning, incubation of fertilized eggs, rearing, tagging and transport to acclimation facilities in the Okanogan River Basin were evaluated in the Final EIS for the Chief Joseph Hatchery Programs, completed in March 2010. No additional evaluation or coverage is needed to assess the effects of ongoing activities at CJH that are consistent with existing hatchery management plan and hatchery operations. Any new activities or actions at CJH would be evaluated for environmental compliance through an environmental compliance process with Bonneville and are not evaluated under this

Programmatic EA. Only the distribution of fish to release sites and acclimation facilities in the blocked area should be considered a new hatchery action that needs analysis and coverage under this PEA.

The juvenile fish from the CJH summer Chinook salmon program would be used under P2IP experimental releases in the blocked area. CJH juvenile summer Chinook would be tagged between June and August and transported to release and acclimation sites between September and November at a size of 30-40 fish per pound. CJH juvenile summer Chinook would be released from the net pens between March and May at a targeted size of 15 fish per pound. Transfer dates, release dates, and fish sizes may vary depending on water temperatures, fish health, infrastructure failure or maintenance and adaptive management based on results of the initial studies. CJH facilities and CJH fish may be used to support the P2IP in various ways; the following examples are all activities that would be used to support the P2IP and are already covered under the existing EIS for CJH.

- Using a portion of the CJH summer Chinook production to provide juvenile Chinook for P2IP experimental releases in the blocked area. CJH fish destined for the blocked area would be held separate from other CJH production after tagging. This strategy would be preferred when CJH is at or near full production.
- Using available rearing space at CJH to incubate, rear and tag summer Chinook that originate from other hatchery programs (e.g., Entiat or Wells). In this case the eggs/parr would be held separate from other CJH production for the duration of their rearing. Additional rearing vessels may be needed to hold the fish separate from the existing CJH production. The sum of both programs would not exceed the currently permitted overall program size of CJH. This strategy would be preferred when CJH is not at or near full production.
- Collection of surplus adult hatchery fish and returning adult P2IP fish in the ladder and trap to support the translocation of adult salmon to the blocked area for the P2IP. These fish may also be transported to a different facility for broodstock that can be spawned and used to support the P2IP. The CJH adult salmon ladder, trap, and broodstock holding area would require infrastructure upgrades and modification to support the P2IP. Modifications may include the addition of above-ground vessels and associated equipment needed to sample, hold and distribute broodstock to trucks for transport. Additional upgrades to the vehicle access may be required to accommodate the loading and maneuvering of the P2IP transport vehicles. Upgrades may include excavation, material placement, paving, and fencing. A site assessment and design for the CJH ladder and vehicle access upgrades have not yet been completed but will be completed prior to additional environmental compliance processes are undertaken.

Colville Tribal Hatchery

The Colville Tribal Hatchery is owned and operated by the Confederated Tribes of the Colville Reservation and is located near Bridgeport, Washington. Potential artificial production activities for the P2IP at the Colville Tribal Hatchery include rearing of juvenile summer Chinook and sockeye salmon from egg through the subyearling life stages and would occur year-round. However, no commitments to use this facility have been made to date. Modifications to the facility may be required to accommodate the proposed actions, which would include the addition of new circular and/or rectangular fiberglass rearing vessels with the associated intake and effluent plumbing. Site

assessment and design for the Colville Tribal Hatchery upgrades have not been completed and would be necessary before moving forward with this facility. Data collection to design facility upgrades may include site characterization, resource-specific surveys, and ground-disturbing activities including, but not limited to, geotechnical boreholes and trenches. Facility upgrades would be evaluated in future environmental compliance if federal funds would be used for upgrades.

Little Falls Acclimation Facility

The Little Falls Acclimation Facility is owned and operated by the Spokane Tribe of Indians and is located near Rearden, Washington, directly below Little Falls Hydroelectric Dam. Proposed artificial production activities for the P2IP at the Little Falls Acclimation Facility include over-winter acclimation of juvenile summer Chinook salmon from subyearling through yearling life stages and would occur from October through May of each year. Modifications to this facility to accommodate the proposed actions may include construction of a new water intake system, insulation, the inclusion of a 24-hour monitoring system, and additional improvements needed for over-winter operation. A site assessment and design for the Little Falls Acclimation Facility upgrades have not been completed. Data collection to design facility upgrades may include site characterization, resource-specific surveys and ground-disturbing activities including, but not limited to, geotechnical boreholes and trenches. Facility upgrades would be evaluated through future environmental compliance once designs are completed.

kɬ cp̓əlk̓ stim̓ (Penticton) Hatchery (Canada)

The kɬ cp̓əlk̓ stim̓ (Penticton) Hatchery is operated by the Okanagan National Alliance (ONA) in the Upper Columbia River basin near Westbank, British Columbia in Canada. The artificial production facility is partially funded by the Grant and Chelan Public Utility Districts. This facility would provide incubation and early rearing of sockeye salmon through the typical operations. Sockeye salmon at the subyearling life stage may be used for P2IP research activities with agreements between Project Proponents and ONA with proper transport permits. Subyearling sockeye salmon would be transported to acclimation facilities within the P2IP study area.

Pacific Northwest National Laboratories

Pacific Northwest National laboratory (PNNL) is in Richland, Washington, near the Columbia River. PNNL was established in 1965 and is operated by Battelle for the Department of Energy's Office of Science. PNNL has a long-distinguished research history in chemistry, earth sciences, biology, and data science. PNNL's existing indoor artificial production facilities would be used to hold broodstock of sockeye salmon, spawning, and rearing of juveniles from egg through subyearling life stages. Salmon would be transported to acclimation facilities within the blocked area at the subyearling life stage.

B.2 Net Pen Operations and Proposed Net Pens

The P2IP would test the feasibility and effectiveness of rearing juvenile Chinook at net pens in the blocked area. New net pens are proposed at the Sanpoil Arm of Lake Roosevelt and at the Spokane River Reservoir. To date, the proponents have implemented expansion to eight net pens located at Sherman Creek/Kettle Falls and Two Rivers in Lake Roosevelt, and Pacific Artificial production

facilities in Lake Rufus Woods to rear Chinook salmon from fall parr to yearling smolts (for net pen expansion specifications, see **Section B.1**).

Net pen operations and maintenance include the following unless otherwise noted for specific net pens:

- **Fish transfers from early rearing facilities:** Fish would be transported from early rearing facilities to net pen locations. Fish would be subject to pre-transfer health checks by certified aquatic fish health professionals and transport permits issued by the Washington Department of Fish and Wildlife, if transferred via off-reservation public roadways. Generally, salmon would be loaded into the pens from a hatchery truck at a nearby boat launch and towed (very slowly) in the net pen to the dock location. As a backup option, tribally owned vessels with fish tanks that include re-circulating pumps and oxygen would transport fish from a boat ramp to the net pens. In some cases, such as at Pacific Artificial production in Lake Rufus Woods, a barge would ferry the hatchery truck to the net pen for offloading the fish.
- Fall parr would be transported and put in the net pens when the near surface reservoir temperatures are less than 60 degrees F (typically late October). Up to 15,000 fish would be put into each pen, depending on fish size and availability and research objectives for the year. Salmon would be kept in net pens from October until release the following spring.
- **Releases:** Releases would occur between March and May based on the management and research objectives for the given year. Fish releases may occur directly from the net pens or transported downstream before release.
- **Feeding:** Fish feeding frequency and volume would vary depending on fish size at transfer, temperature and management targets for release size and date. Fish feeding would be completed by hand or by automatic feeder.
- **Fish safety:** Staff inspections of the pens would occur at least three days per week from shore, to ensure the pens are in place and functioning.
- **Fish health:** Staff would inspect the fish at least once per week and remove mortalities from the pens and recover PIT tags. Fish health checks would be conducted by an artificial production veterinarian if there are any signs of disease or increased observations of mortalities during routine feeding and inspection activities. Fish may be released early if fish health or safety (net/pen frame integrity) are compromised, and the veterinarian and artificial production staff determine the fish are better off being released than held in the pen until their targeted release date.
- **Responding to reservoir operations:** Staff would adjust the cable lengths as needed (up to daily) when reservoir levels are changing rapidly during drawdown or refill. If holes or tears are observed then staff would repair the net as needed to complete the rearing cycle, or if necessary, staff would replace the entire net.

Sanpoil Arm Net Pens

New net pens are proposed for the Sanpoil Arm of Lake Roosevelt. Up to four net pens would be used for overwinter acclimation of salmon. Although the primary near-term need is for Chinook, net pens could also be used for sockeye in this location at some point during P2IP implementation.

Fish from this net pen may be released directly from the net pens, transported downstream some distance before release, or removed from the pen and transported up into the Sanpoil River for release (a technique which adds additional acclimation to a particular tributary, but comes with some mortality tradeoffs due to extra handing and additional exposure to predation). The net pen set-up used at Kettle Falls is a good representation of what is planned in the Sanpoil Arm (**Figure B-1**). The primary area targeted for deploying the net pens is the log landing area near where French Johns Lake meets the Sanpoil Arm of Lake Roosevelt, approximately 6 miles south of the town of Keller, Washington (**Figure B-2**).

The net pen frames are 20-feet square and made of 12-inch IPS SDR26 High Density Polyethylene (HDPE) pipe (basically a large heavy-duty PVC pipe) with a walkway and elevated rail (**Figure B-3**). The nets may be knotless nylon or similar material, including a new material the program is testing out called "Dyneema," which is supposed to be chew-proof to keep ducks and otters from ripping holes in the net. The nets would be 16 feet deep, and a top net would be strung across the top of the pen to keep birds out of the pen.

The net pen frames would be secured to a dock that would be 6 feet by 46 feet, also made of HDPE, with a deck made of fiberglass with 1.5-inch square grating and a non-slip textured surface (**Figure B-4**). The dock and net pen frames would be deployed at a nearby boat launch and towed to the net pen site via boat. The dock would have a solar-powered flashing light so nighttime boaters can see it and it would be tied off to a buoy, which would be attached to a 400- to 800-pound concrete anchor (partial/custom ecology block) via ½- to 5/8-inch stainless wire-rope with swiveling buckles. The concrete anchor would be deployed from a large boat via methods already permitted and employed on Lake Roosevelt by CTCR staff implementing resident fish projects funded by Bonneville Power Administration.

The other end of the dock would be secured in place one of two ways.

1. Primary/preferred option: A lighter drag anchor is deployed from the other end of the dock using 3/8- to ½-inch wire rope. In this configuration there is no attachment point on shore and the lighter drag anchor allows for the dock (and attached pens) to shift and rotate as the current and winds change. (**Figure B-1**)
2. Secondary option: If the drag anchor option is not feasible or practical, or is deemed unacceptable, then the shoreward end of the dock would be secured to either:
    a. An existing or added I-bolt in the concrete of the log landing structures
    b. An ecology block (or partial block) placed at the log landing site via a flatbed truck.

Both options would require a winch to let cable in or out on both ends of the dock to adjust for fluctuation in reservoir water levels (**Figure B-1**). The primary anchor would be set at an elevation

of 60-100 feet below full pool (elevation 1290 feet). Once the exact secondary anchor deployment method is selected, then the depth and associated distance from shore would be determined. If the dock and pens end up at below 1190 feet, they would not be operable at the maximum drawdown depth of Lake Roosevelt. If deep drawdown occurs, the fish would have to be released before the lake depth is less than 5 feet from the bottom of the net. This would not be a major issue since maximum drawdown is generally in late April and release targets for blocked area Chinook are currently between early April and late May.

The most likely placement of the dock and pens would be straight out from the upper log landing (**Figure B-5** and **Figure B-6**). This area offers several key features that make it the first choice, including water depth, Colville Tribal land on nearby shore, infrastructure to secure cables to if a shore-based anchor is deployed, and a slight embayment that shelters the area from a south wind. However, it is important to maintain some flexibility for the deployment area and the net pens may need to be located anywhere within, or adjacent to, the polygon seen in **Figure B-5**. Deployment in the area nearshore at the lower log landing (**Figure B-4**) is a secondary option, as it is more exposed to a long fetch and strong winds but would be maintained as a possibility in order to maintain flexible operations.

Figure B-1. Example four-pen configuration with single dock similar to the proposed at the Sanpoil Arm of Lake Roosevelt Net pen location. Photo: Kettle Falls rainbow trout program net pen.

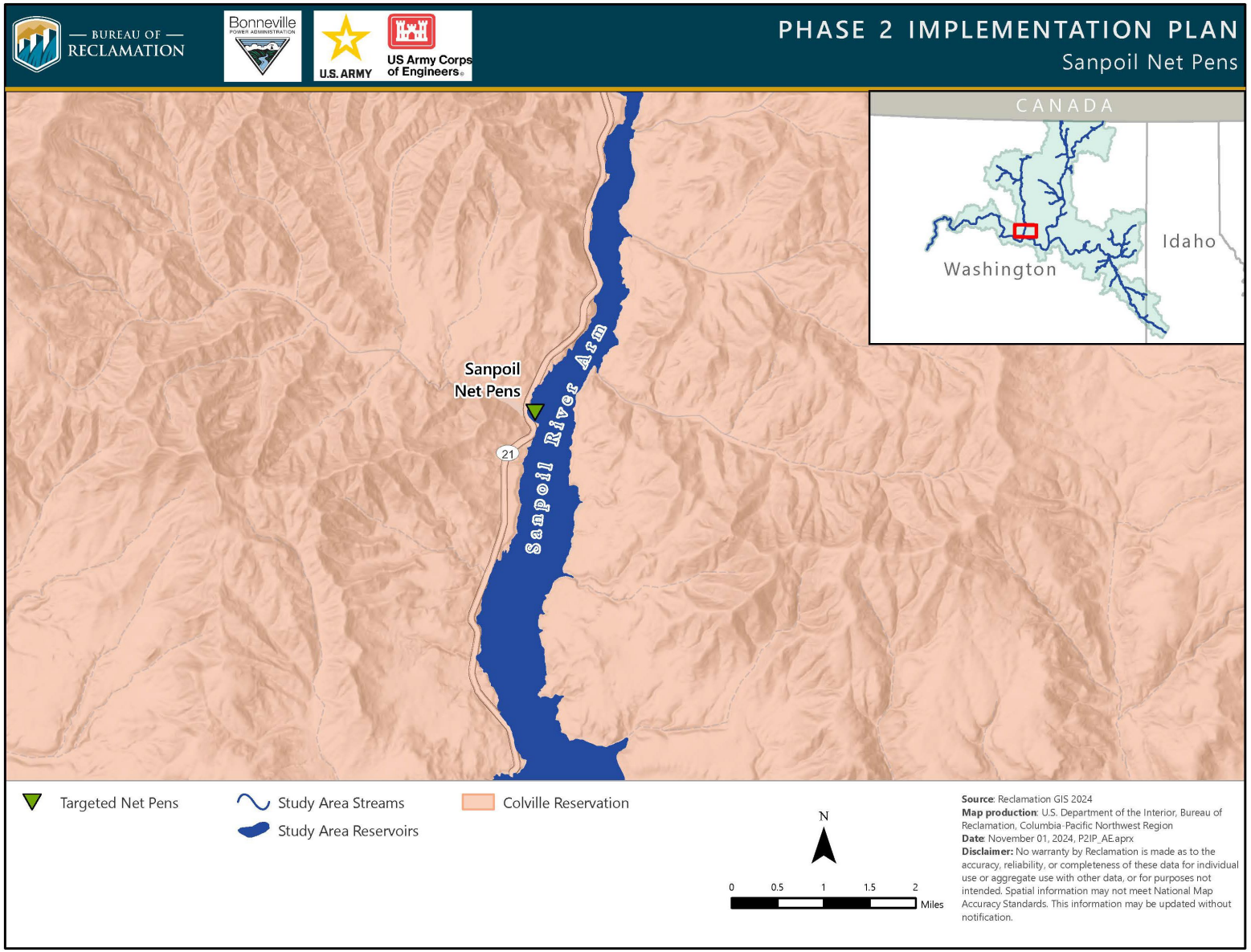

Figure B-2. Sanpoil Arm with approximate location of targeted deployment of net pens.

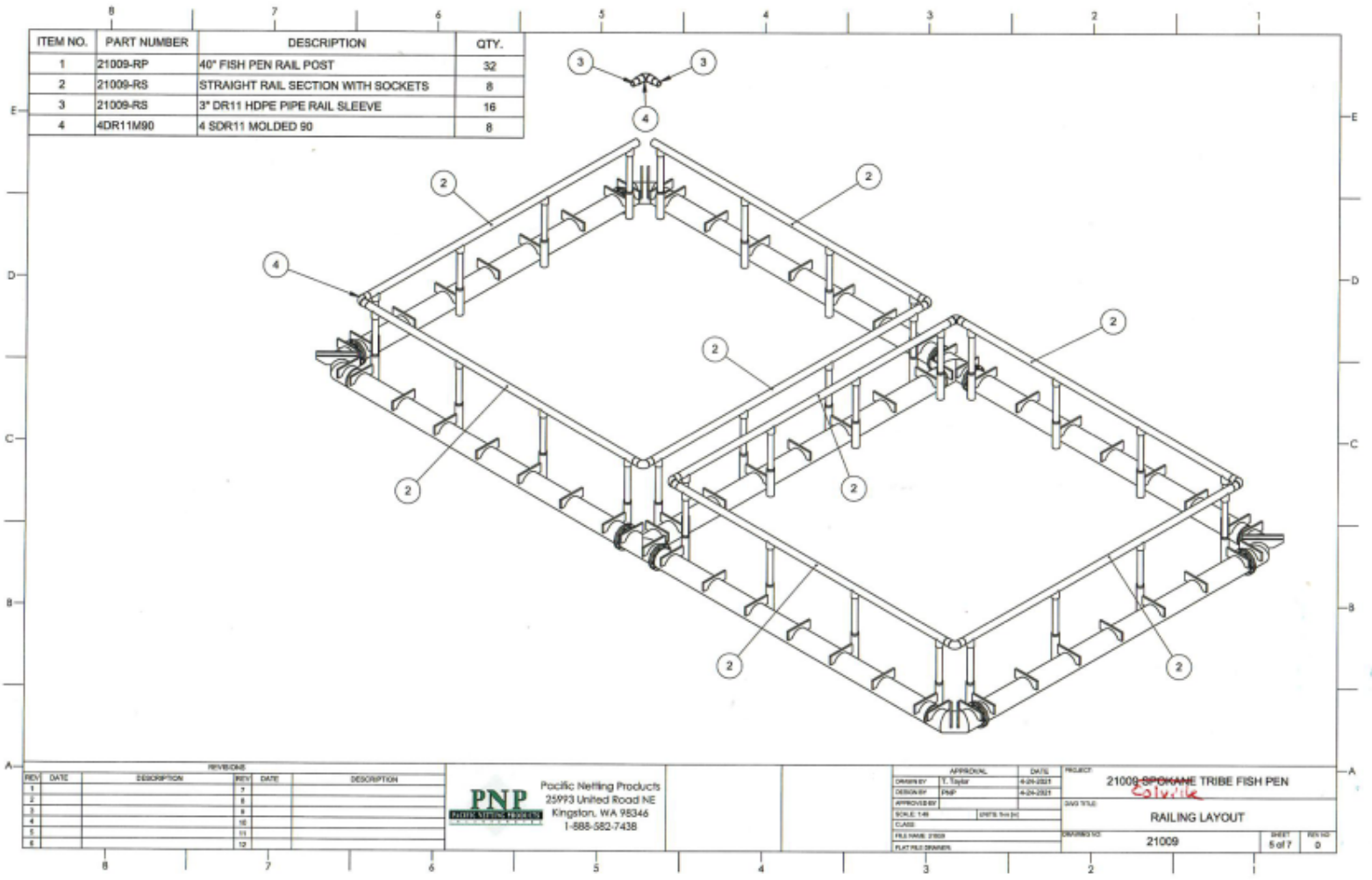

Figure B-3. Overhead schematic of the net pen frame.

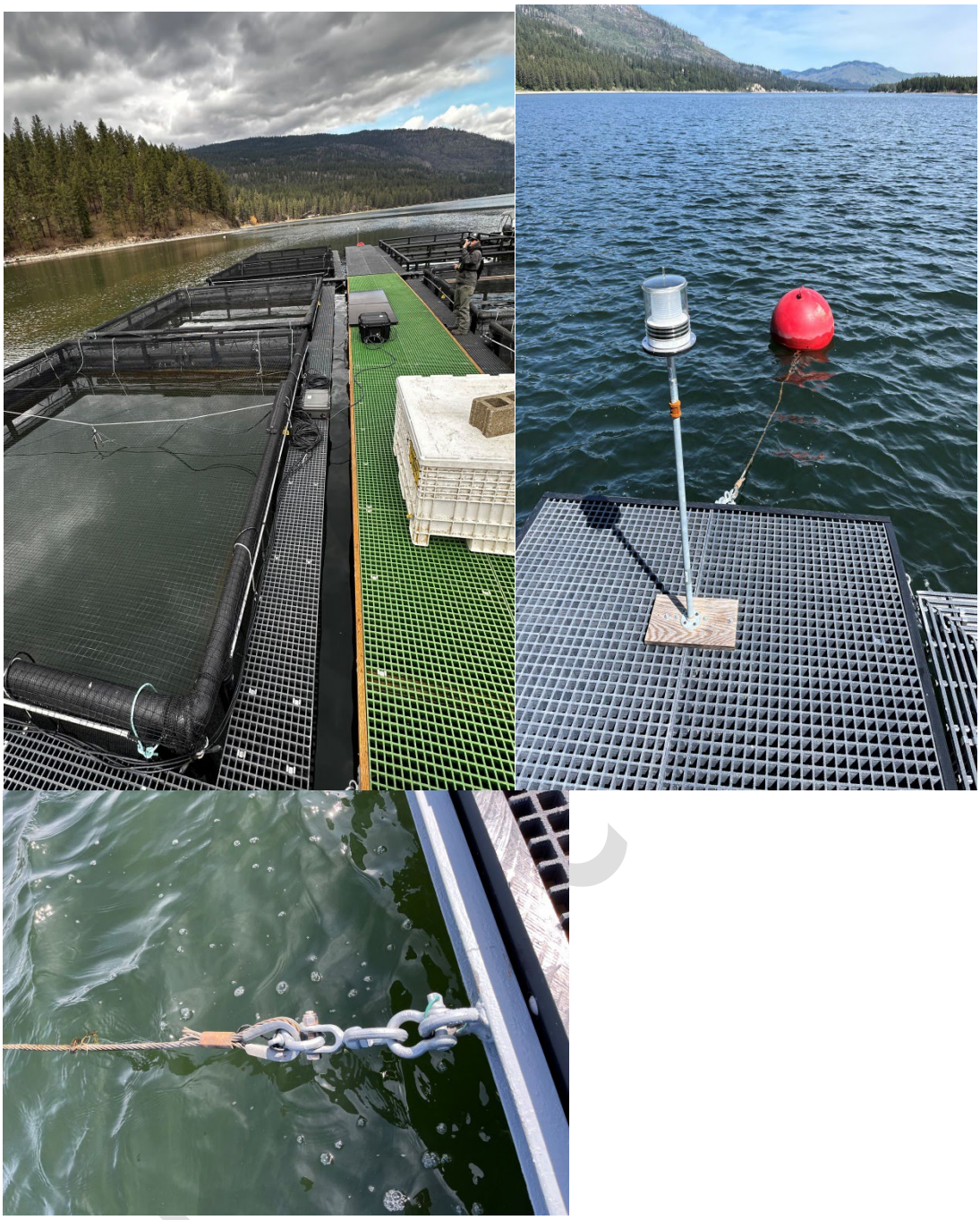

Figure B-4. Photos of a net pen deployment at Sherman Creek with a dock, anchor buoy, solar light, and wire rope cable with swiveling attachments. The dock and pen materials are similar to what is proposed for the Sanpoil Arm of Lake Roosevelt. Note that the photo of the deployment at Sherman Creek is a 2-dock, 8-pen set up, which is twice as large as what is being proposed for the Sanpoil Arm.

Figure B-5. Photo of the upper log landing, which is on Colville Tribal government-owned land on the Colville Reservation. The close-up side view shows an existing I-bolt with cable. The existing I-bolt may be usable as an attachment point if a shore-based anchor deployment is used at this site. A new I-bolt could also be attached to the concrete to serve as a new attachment point.

Figure B-6. Photo of the lower log landing, which is on Colville Tribal Government-owned land on the Colville Reservation.

B.3 New Land-based Acclimation in Tributaries

Several important salmon production areas would not provide adequate acclimation via the existing and proposed net pen sites. Therefore, satellite land-based acclimation facilities are necessary. Property identification and acquisition may be required by Project Proponents for land-based acclimation facilities. Data collection to inform siting and design is required at all new land-based acclimation facilities. Construction of land-based acclimation sites would be evaluated through future environmental compliance processes once designs are complete.

Louie Creek Acclimation Site

The Louie Creek Acclimation Site is owned by the Confederated Tribes of the Colville Reservation and is located adjacent to the Sanpoil River near Keller, Washington. The possible activities for the P2IP at the proposed Louie Creek Acclimation Site range from short-term acclimation (approximately 6 weeks in late winter and early spring), to overwinter rearing (generally October to April), to rearing fish from egg incubation to yearling release (year-round).

A preliminary site assessment has been completed for several options for rearing Chinook salmon at Louie Creek (Four Peaks Environmental Science and Data Solutions, 2023). The Colville Fish and Wildlife Program has not yet selected a preferred scenario to move forward for siting and design. Data collection may include, but is not limited to, additional resource-specific surveys and ground-disturbing activities, such as geotechnical boreholes and trenches and groundwater well drilling. A priority for data collection at this site is drilling of a pilot production-scale groundwater well and conducting testing to determine water yield. The well would be drilled within the data collection boundary established for Louie Creek (**Figure B-7**). If federal P2IP funding is applied to the well drilling project, it would be subject to future environmental compliance analysis. The project proponent would notify the Co-lead Agencies once the location of well drilling operations is identified. Alternatively, State and Tribal funding could be used for the pilot well drilling activities.

The site assessment was conducted for Chinook rearing; if artificial production of sockeye is implemented at Louie Creek, then a similar assessment would be needed.

sqweyu' Artificial Production and Acclimation Site

The sqweyu' Artificial Production and Acclimation Site is owned by the Coeur d'Alene Tribe and is located adjacent to Hangman Creek in Spokane, Washington. Proposed activities for the P2IP at the sqweyu' Artificial Production and Acclimation Site include rearing of juvenile summer Chinook salmon from egg through yearling life stages and juvenile sockeye salmon from egg through subyearling life stages. Adult summer Chinook and sockeye holding and spawning may also occur at this location. These activities, or some combination of them, would occur year-round.

Groundwater wells have already been constructed on site to supply the required water to the proposed artificial production facility. Data collection for siting and design would occur within the boundary established for this activity (**Figure B-8**). Data collection may include, but is not limited to, site characterization, resource-specific surveys, and ground-disturbing activities, such as geotechnical boreholes and trenches and groundwater well drilling. Proposed construction and operations of this artificial production facility site would be evaluated in future environmental compliance processes once detailed designs are completed. Construction activities at this site may include site preparation, water system construction, circular tank installation, and electrical power supply development.

Upper Sanpoil Acclimation Site

The Project Proponents would evaluate the Upper Sanpoil Acclimation Site if the Louie Creek site is not a viable location for overwintering or short-term acclimation in the Sanpoil River drainage. The CTCR would work with local landowners and contractors to locate, purchase, and assess the feasibility of other sites for Chinook and sockeye salmon acclimation. The CTCR and contractors would conduct initial feasibility studies using remote sensing software or accessing publicly available data. Additionally, non-ground-disturbing site characterization activities would be performed, such as walking through the riparian areas, taking physical or biological measurements from the river, or obtaining data on nearby wells. Ground-disturbing data collection, including but not limited to geotechnical exploration and well drilling, may occur in the future to aid in siting and design if it is determined that this site is needed. As needed, the Co-lead Agencies and Project Proponents would undertake future environmental compliance analysis for data collection and construction activities at the Upper Sanpoil acclimation site.

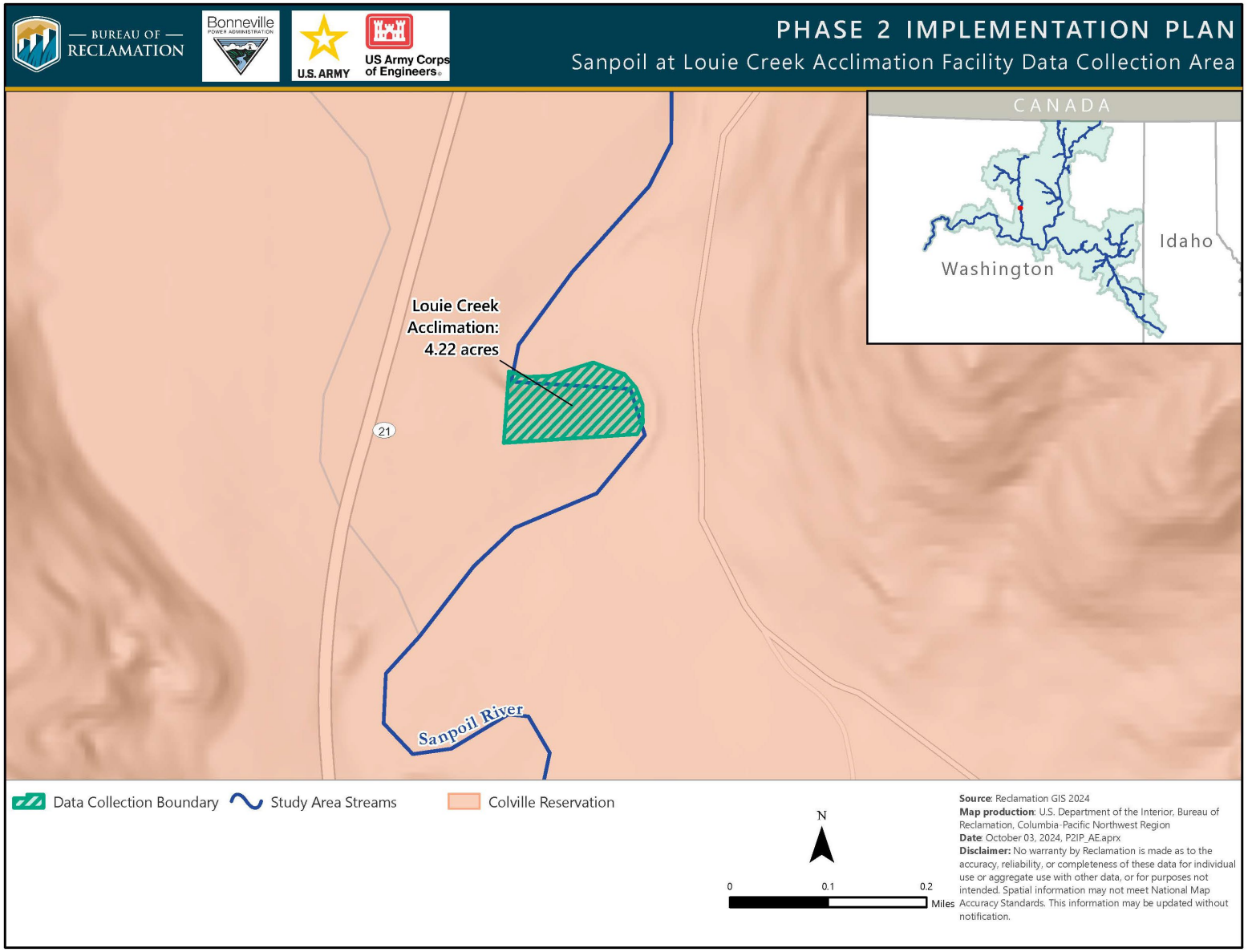

Figure B-7. Sanpoil at Louie Creek Acclimation Facility Data Collection Area

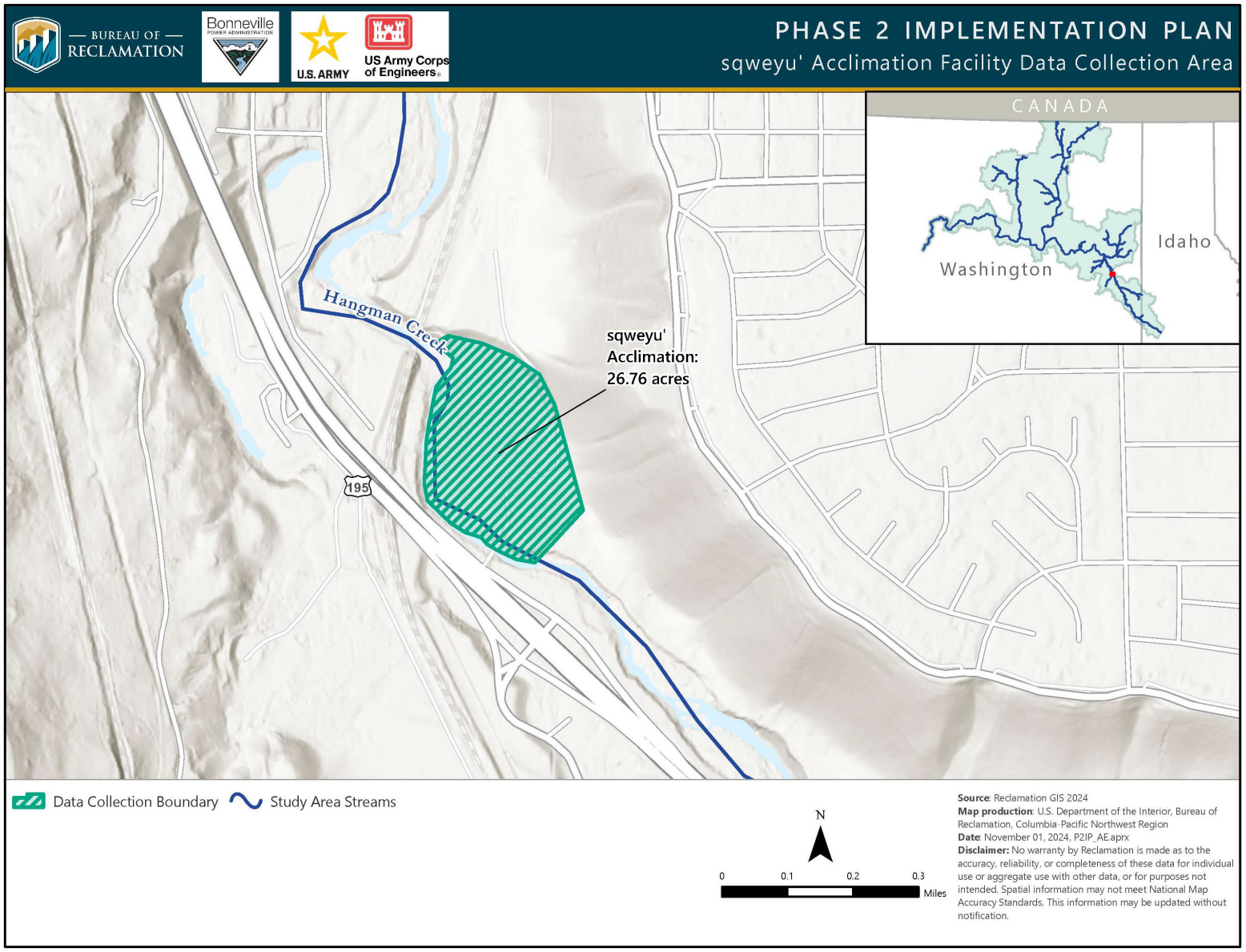

Figure B-8. sqweyu' Acclimation Facility Data Collection Area

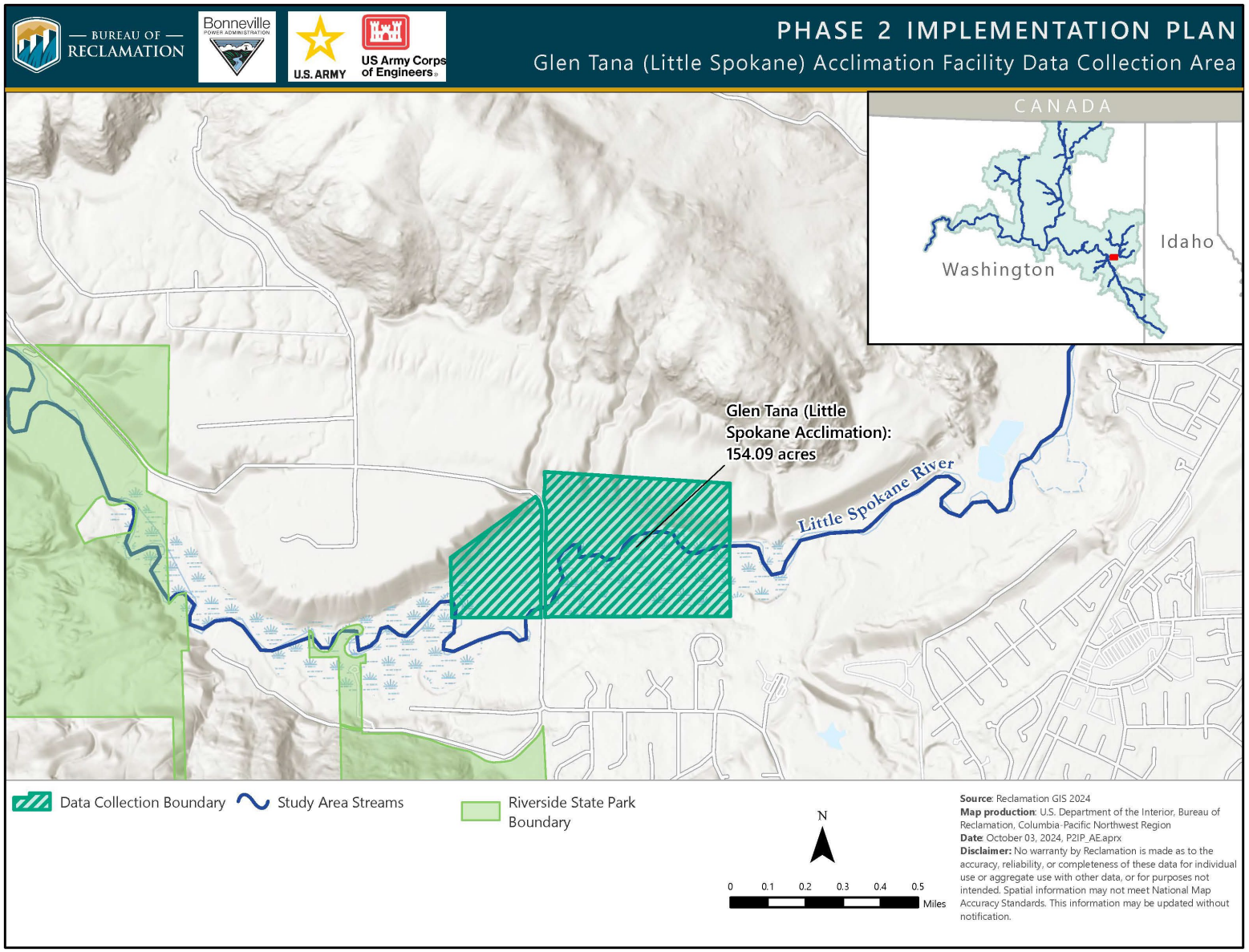

Figure B-9. Glen Tana Acclimation Facility Data Collection Area

Glen Tana (Little Spokane River) Acclimation Site

The Glen Tana Acclimation Site is a property owned by the Spokane Tribe of Indians and is located adjacent to the Little Spokane River north of Spokane, Washington. Proposed activities for the P2IP at Glen Tana include data collection, design, construction and operations of an acclimation facility. This acclimation facility would rear of juvenile summer Chinook salmon from egg through yearling life stages and juvenile sockeye salmon from egg through subyearling life stages, or a variation therein depending on research and management objectives. Data collection for siting and design of acclimation facilities would occur within the boundary established for this activity (Figure B-9). Data collection may include, but is not limited to, site characterization, resource-specific surveys, and ground-disturbing activities, such as geotechnical boreholes and trenches and groundwater well drilling. Proposed construction and operations of this artificial production facility site would be evaluated in future environmental compliance processes once detailed designs are completed. Construction activities at this site may include demolition of existing dilapidated structures, site preparation, water system construction, circular tank installation, and electrical power supply development. Data collection for siting and design would occur within the boundary established for this activity (**Figure B-9**). Data collection may include but is not limited to site characterization, resource-specific surveys, and ground disturbing activities, such as geotechnical boreholes and trenches and ground water well drilling. Designs for the facility would consider fish production needs of the P2IP as well as physical constraints such as water quantity, water quality, and topography. Construction activities may include establishing a water source, site preparation, installation of rearing vessels, and development of other facilities to support artificial production facility needs.

B.4 Direct Release Locations and Other Strategies

Most subyearlings would be transferred to net pen or acclimation sites described in this appendix; however, some subyearlings may be released directly into the Sanpoil River, Spokane River, and the Transboundary Reach of the Columbia River. Direct release locations must be readily accessible areas, including boat ramps, existing road crossings, or bridges where hatchery trucks can get within 20-30 feet of the water, and fish can be released directly from the truck or via 4- to 6-inch hoses or 4-inch PVC pipes extending from the truck to the water body. Additionally, direct releases may occur in side channels or floodplain ponds that are hydraulically connected to the main river channels. If truck and hose access is not feasible in more remote areas, then 5-gallon buckets or backpacks may be used to move the fish from the hatchery trucks to the release sites. Additionally, direct releases may be necessary if the number of fish exceeds the net pen-rearing space available, to test the feasibility of this rearing and release strategy compared to overwinter net pen, or until land-based acclimation sites can be developed.

Streamside egg incubation boxes could potentially be used to rear and release sockeye fry in tributaries (i.e., Sanpoil, Spokane, and Little Spokane Rivers). Currently, kokanee eggs are being reared using this method in the Sanpoil River drainage. However, the P2IP studies may evaluate this method by using sockeye eggs in addition to the kokanee eggs. This method involves a small, screened pump to deliver water to eggs placed in boxes in the gravels along the stream margin. This method has no ground disturbance or consumptive water use.

Appendix C

Interim Fish Passage

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Appendix C. Interim Fish Passage

Interim fish passage actions would focus on the study, design, installation, and testing of upstream and downstream fish passage systems. These actions could occur at each of the five dams in the study area over the next 20 years.

Interim fish passage under P2IP may include any structure or apparatus designed to guide, collect, or transport fish to test the feasibility of salmon reintroduction to blocked area of the Upper Columbia River Basin. These facilities would be used from the time of construction through the duration of the P2IP studies. The interim facilities would be constructed for concept testing and used until permanent solutions can replace or improve their function. Interim fish passage facilities would have two purposes:

- Allow for collection of adults and juveniles to conduct necessary fish survival and behavior studies.
- Act as fish passage systems to evaluate the success of the reintroduction effort and inform Phase 3 decision-making and long-term passage strategies.

The interim fish passage facility development would follow a collaborative design process with the dam owners/operators. Fish passage design, installation, operation, and testing efforts have been prioritized for the study area dams as follows; however, the Project Proponents may adjust the sequence based on research study results.

1. Chief Joseph Upstream Passage
2. Grand Coulee Downstream Passage
3. Grand Coulee Upstream Passage
4. Spokane River dams Upstream Passage
5. Chief Joseph Downstream Passage
6. Spokane River dams Downstream Passage

C.1 Fish Passage Design Process

The Project Proponents are developing a study plan for fish passage facilities. Two nationally recognized consulting firms have partnered with the UCUT organization and member Tribes to develop concepts and feasibility-level designs for upstream and downstream fish passage solutions at each of the five dams in the P2IP. This Upper Columbia Salmon Passage (UCSP) workgroup, in close coordination with the Co-lead Agencies, dam owners and operators (USACE, Reclamation, and Avista), federal regulating agencies (NMFS and USFWS), WDFW, the UCUT organization, and

member Tribes, would perform activities within the study plan. Anticipated activities include gathering operational, biological, structural, and hydrologic data; conducting site reconnaissance visits; recommending additional research, developing fish passage concepts and designs, and evaluating their feasibility; addressing permitting needs; and proposing interim facilities.

Interim fish passage concepts, designs, and construction plans would be submitted to relevant agencies for review, site-specific (and, as necessary, supplemental) environmental compliance, and other regulatory steps needed for finalization and approval. Feasibility-level designs are anticipated to be completed by the end of 2026 for Chief Joseph and Grand Coulee dams and in 2028 for Little Falls, Long Lake, and Nine Mile dams.

C.2 Data Collection for Siting and Design of Interim Fish Passage Facilities

Data collection would be completed for the siting and design of upstream and downstream passage facilities at each dam. Ground-disturbing data collection may include, but would not be limited to, geotechnical boreholes or trenches and wetlands surveys. Additional research or data collection to inform design may include site-specific biological and resource-specific surveying, characterization, and hydrologic modeling (**Section A.7**). A data collection area has been identified for each dam (**Table A-1**). See data collection area Maps in **Appendix C, Figures C-1 through C-5).**

C.3 Interim Upstream Fish Passage

Interim upstream passage facilities would be required at one or more of the five blocked area dams. The P2IP describes several upstream fish passage technologies, including an additional fish collection facility immediately below Chief Joseph Dam, as well as infrastructure upgrades to the Chief Joseph Hatchery. Additional data from research studies are needed to develop interim upstream adult fish passage concepts for each dam.

Development of upstream fish passage facilities at these five dams would be performed by the UCSP, following its process. Site-specific fish behavior studies have been performed to date, including juvenile Chinook survival and behavior at and between dams. The gathered information would be used by the UCSP when producing fish passage concepts and more refined alternatives as additional data become available. For more information on this process, see **Section C.1**.

C.3.1 Existing Upstream Passage Operations

Continuing and expanding upstream fish passage operations and facilities are necessary to advance the P2IP studies. P2IP upstream adult Chinook and sockeye salmon fish passage consists of the existing upstream trap and transport activities and proposed expansion to the upstream trap and transport activities. The upstream trap and transport of adult salmon would continue until interim passage solutions are developed and tested for each of the five dams, as necessary. Upstream transport activities would facilitate upstream translocation into the Upper Columbia blocked area of naïve and local-origin salmon, a foundational activity of the P2IP. Naïve salmon are surplus

Chinook or sockeye from hatcheries or populations downstream of Chief Joseph Dam. Local-origin fish are defined as salmon released upstream of Chief Joseph Dam as juveniles or naturally produced progeny of translocated adults—that is, adult fish originating from the Upper Columbia River Basin blocked area. Local-origin fish have tremendous value to the fish passage design process.

A trap and transport program for collection, transport, and release of adult summer Chinook and sockeye salmon is currently underway and would continue until other passage solutions are operational. Existing trap and transport efforts include the collection of naïve surplus adult Chinook salmon at Wells Hatchery, Entiat National Fish Hatchery, and Chief Joseph Hatchery, then their transport and release at various locations within the blocked area. Existing trap and transport of naïve sockeye salmon occurs during purse-seine operations in the Columbia River near the mouth of the Okanogan River, and their transport and release at various locations within the blocked area. See Collection Facility and Release Location Maps, **Appendix A**.

Existing trap and transport activities would be expanded to include additional stocks and collection facilities. Collection facilities and activities being pursued for this trap and transport program are listed in **Table A-1**. These facilities would be used to collect naïve and local origin salmon for trap and transport efforts until effective upstream passage solutions dedicated to the reintroduction effort are in place. Local-origin Chinook and sockeye encountered at these facilities would be used in specific behavior studies being planned for the fish passage design process.

Release Locations

The Project Proponents have established release locations associated with ongoing trap and transport activities. Additional release sites are proposed for adult Chinook and sockeye salmon to further research studies. Release methods would include direct release from hatchery trucks or from the shore. Future releases may occur at any accessible boat launch or access site in the blocked area. See locations of adult releases maps, **Appendix A**.

C.4 Interim Downstream Fish Passage

Interim downstream fish passage facilities may be required at one or more of the five blocked area dams. The P2IP describes several fish passage technologies, including portable floating fish collection systems, Merwin traps, floating or fixed louver systems, corner collectors, and spill or bypass with or without guidance nets, that may be appropriate at these facilities. Additional data from research studies is needed to develop interim downstream juvenile fish passage concepts for each dam, as described in **Section C.1**.

Development of downstream fish passage facilities at these five dams would be performed by the UCSP, following its process. Some site-specific fish behavior studies have been performed to date, including juvenile Chinook survival and dam passage routing studies. The gathered information would be used by the UCSP when producing fish passage concepts and more refined alternatives as additional data become available. For more information on this process, see **Section C.1**.

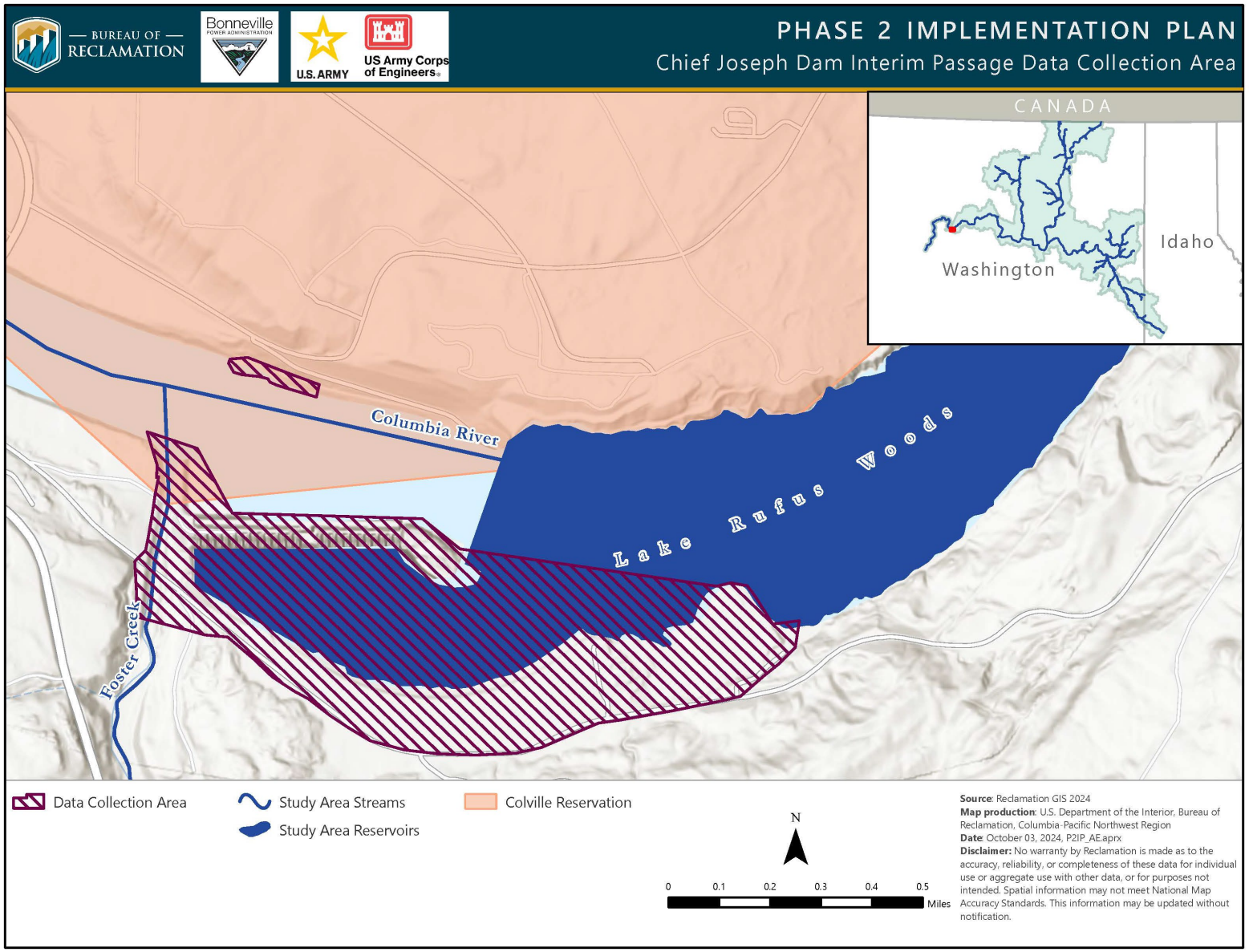

Figure C-1. Chief Joseph Dam Interim Passage Data Collection Area

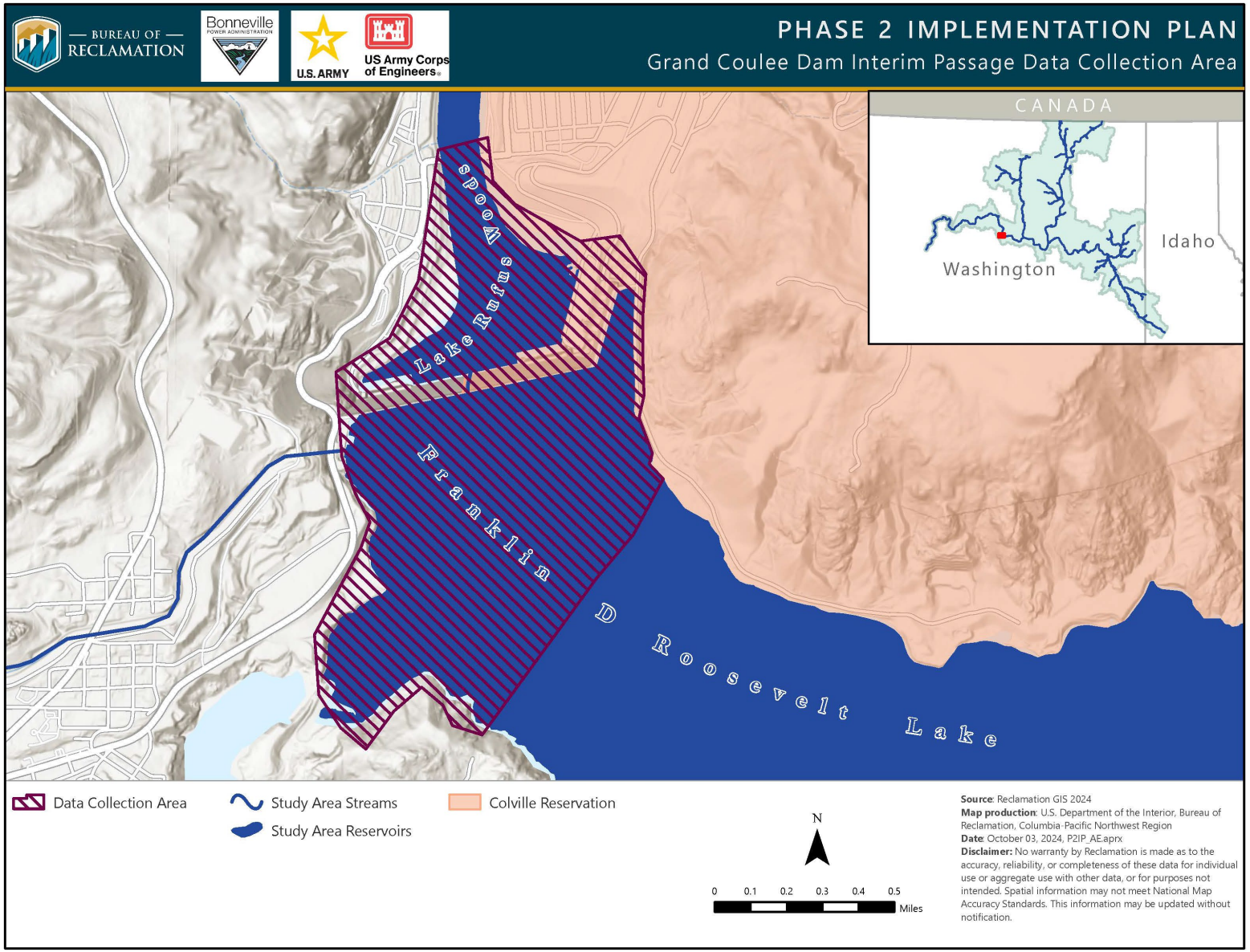

Figure C-2. Grand Coulee Dam Interim Passage Dam Collection Area

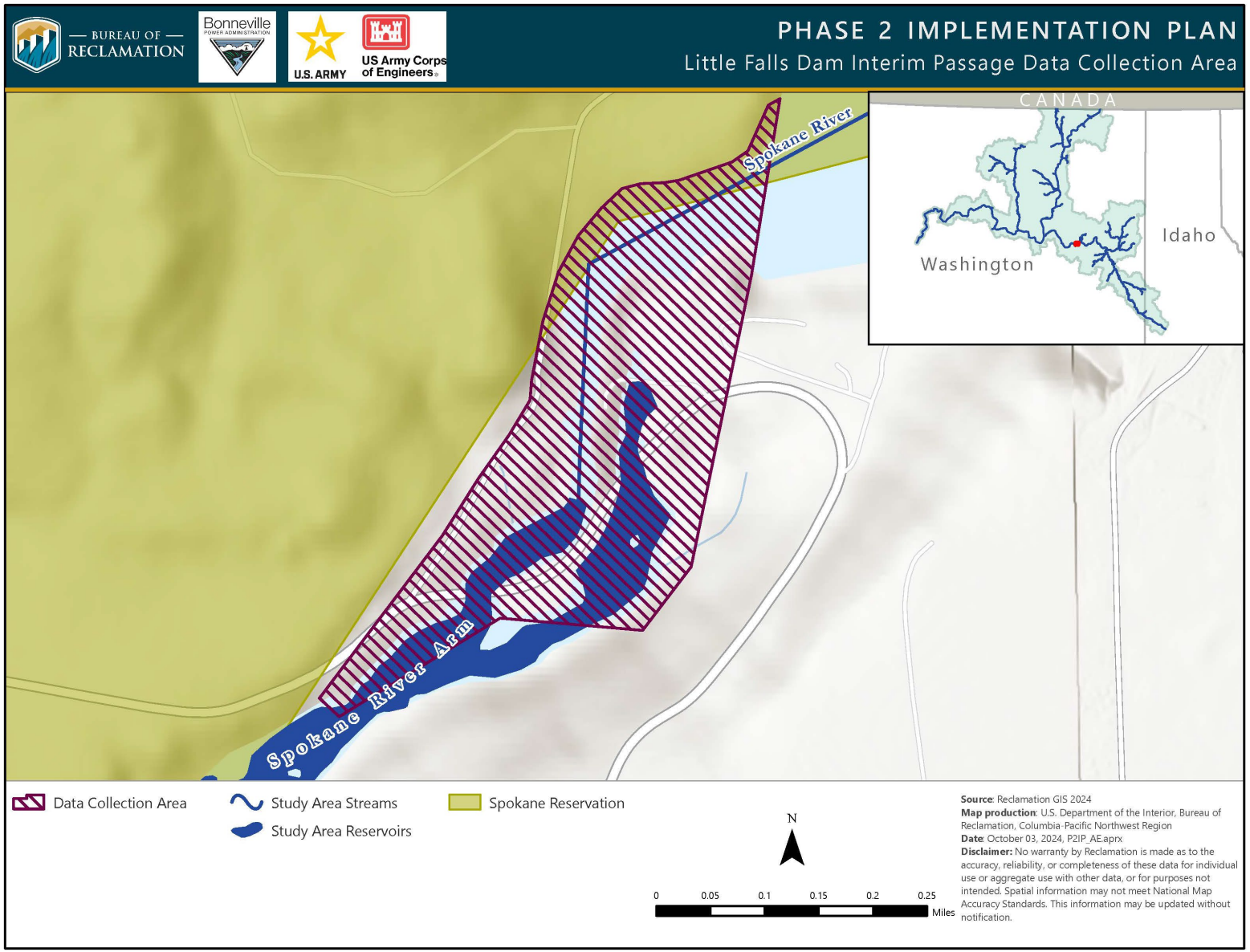

Figure C-3. Little Falls Dam Interim Passage Data Collection Area

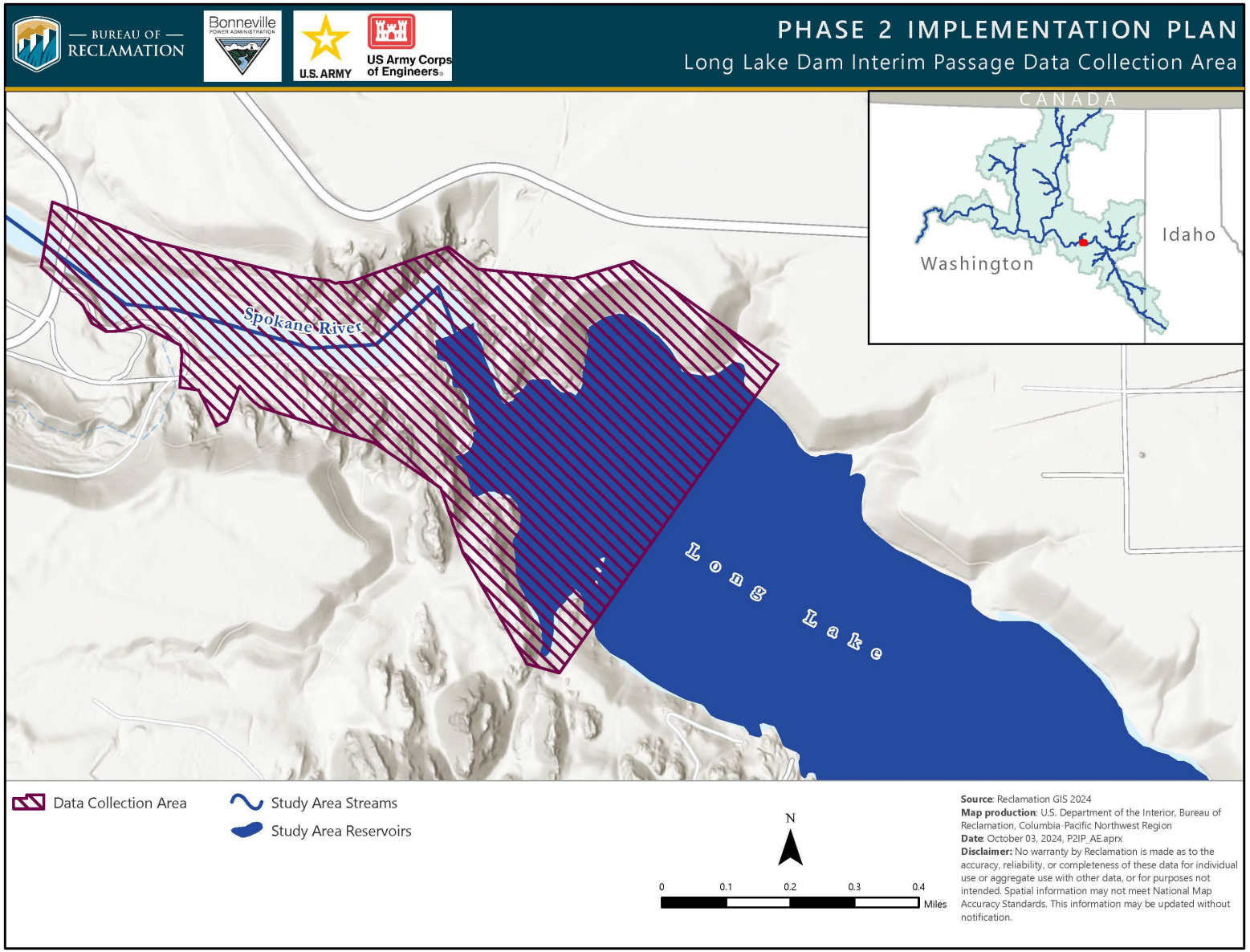

Figure C-4. Long Lake Dam Interim Passage Data Collection Area

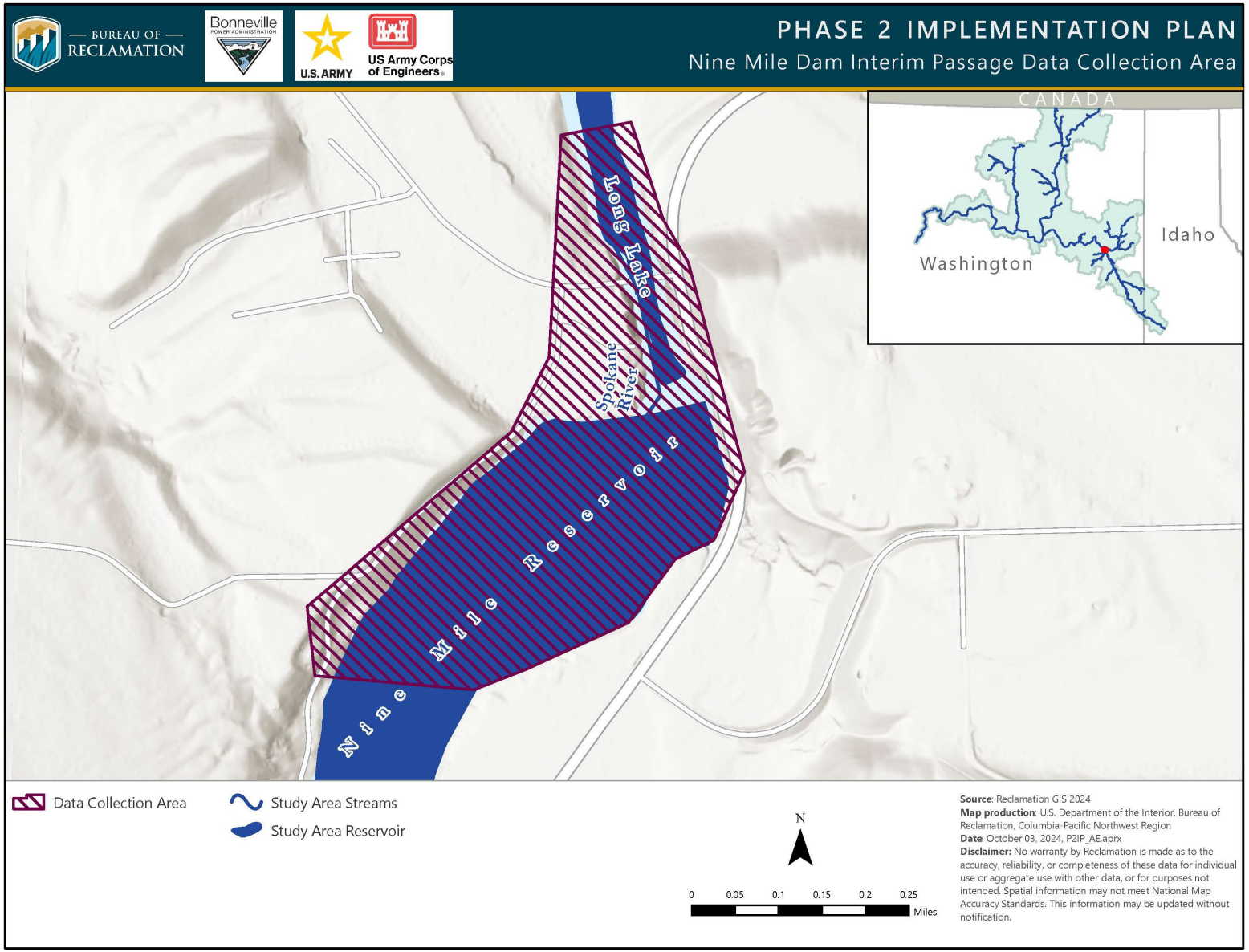

Figure C-5. Nine Mile Dam Interim Passage Data Collection Area

Appendix D

Regulatory Compliance

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Appendix D. Regulatory Compliance

The following are key laws, executive orders, and secretarial orders that apply to the proposed action, and compliance with their requirements is documented in this Programmatic Environmental Assessment (PEA):

- **The National Environmental Policy Act (NEPA)** of 1969, as amended, requires that the lead agency use a public disclosure process to determine whether there are any significant environmental impacts associated with proposed federal actions. NEPA requires preparation of an Environmental Impact Statement (EIS) for major Federal actions significantly affecting the quality of the human environment. Co-lead Agencies prepared this PEA to determine if the Proposed Action would create any significant environmental impacts that would warrant preparing an EIS, or if a Finding of No Significant Impact is warranted. This PEA was prepared in compliance with NEPA and its implementing regulations at 40 CFR 1500-1508.
- **The Endangered Species Act (ESA.)** of 1973, as amended, requires all federal agencies to ensure their actions do not jeopardize the continued existence of listed species, or destroy or adversely modify their critical habitat. As part of the ESA's Section 7 process, an agency must coordinate with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) on whether threatened and endangered species exist within or near the P2IP Activity Area and evaluate the impacts on the species, if present (see **Section 4.1.3**, Endangered Species Act Consultation). Consultation with NMFS and USFWS for the proposed action in the PEA is currently underway and a biological assessment is being developed (P2IP Biological Assessment, Reclamation, 2024d). In addition, upon implementation of future actions, individual consultations under ESA would be conducted for site-specific projects as necessary.
- **The Fish and Wildlife Coordination Act (FWCA)** acknowledges the historical focus of fish and wildlife conservation programs on recreationally and commercially important species, without provisions for the conservation and management of nongame fish and wildlife. This act encourages all Federal departments and agencies to use their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and to promote conservation of nongame fish and wildlife and their habitats through the implementation of conservation plans and programs for nongame fish and wildlife. Federal agencies must consult with USFWS and the state agency responsible for fish and wildlife resources. Co-lead agencies analyzed for the effects of the proposed action on fish and wildlife and coordinated with WDFW and Idaho Office of Species Conservation. regarding the proposed action, as applicable (see **Section 3.6** and P2IP Biological Assessment, Reclamation, 2024d). In addition, upon implementation of future actions, individual consultations under FWCA would be conducted for site-specific projects as necessary.
- **The National Historic Preservation Act (NHPA)** of 1966, as amended**, Section 106**, requires federal agencies to consider the effects of their undertakings on historic properties eligible for or listed on the National Register of Historic Places (NRHP). Federal agencies must

determine whether there are historic properties in the study area, the effects of the project on those properties, and the appropriate mitigation for adverse effects. In making these determinations, federal agencies are required to consult with the State Historic Preservation Officer (SHPO), Native American Tribes with traditional or culturally significant religious interest in the study area, and the interested public (see **Section 4.1.2**, Consultation Under Section 106 of the National Historic Preservation Act). The Co-lead Agencies would be initiating consultations with the State of Washington Department of Archaeology and Historic Preservation, State Historic Preservation Officer, and Tribal Historic Preservation Officers with the CTCR, CDAT, and STOI on individual P2IP activities or groups of P2IP activities. Consultations under Section 106 of the NHPA, as amended, would be completed before implementation of any of the proposed activities.

- **The National Historic Preservation Act (NHPA)** of 1966, as amended**, Section 110** is as follows: (1) The heads of all Federal agencies shall assume responsibility for the preservation of historic properties which are owned or controlled by such agency. Prior to acquiring, constructing, or leasing buildings for purposes of carrying out agency responsibilities, each Federal agency shall use, to the maximum extent feasible, historic properties available to the agency. Each agency shall undertake, consistent with the preservation of such properties and the mission of the agency and the professional standards established pursuant to section 101(g), any preservation, as may be necessary to carry out this section. (2) Each Federal agency shall establish (unless exempted pursuant to section 214), in consultation with the Secretary, a preservation program for the identification, evaluation, and nomination to the National Register of Historic Places, and protection of historic properties. Such program shall ensure (a) that historic properties under the jurisdiction or control of the agency are identified, evaluated, and nominated to the National Register; (b) that such properties under the jurisdiction or control of the agency as are listed in or may be eligible for the National Register are managed and maintained in a way that considers the preservation of their historic, archaeological, architectural, and cultural values in compliance with Section 106 and gives special consideration to the preservation of such values in the case of properties designated as having National significance.
- **Native American Graves Protection and Repatriation Act (NAGPRA)** requires Federal agencies and institutions that receive Federal funds (including museums, universities, state agencies, and local governments) to repatriate or transfer Native American human remains and other cultural items to the appropriate parties by consulting with lineal descendants, Indian Tribes, and Native Hawaiian organizations on Native American human remains and other cultural items; protecting and planning for Native American human remains and other cultural items that may be removed from Federal or Tribal lands; identifying and reporting all Native American human remains and other cultural items in inventories and summaries of holdings or collections; and giving notice prior to repatriating or transferring human remains and other cultural items.
- **Paleontological Resources Protection Act (PRPA)** of 2009 directs the DOI to manage and protect paleontological resources on Federal land using scientific principles and expertise. The Secretary shall develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources, in accordance with applicable agency laws, regulations, and policies. These plans shall emphasize interagency coordination and

collaborative efforts where possible with non-Federal partners, the scientific community, and the general public.

- **The Clean Water Act (CWA)** of 1972 requires federal agencies to consider the impact of proposed actions on water quality, particularly the potential pollution of surface waters. Co-lead agencies analyzed the effects of the proposed action in relation to water quality standards in the study area, as described in **Section 3.5**, Water Quality.
    - Clean Water Act Section 401 - A federal permit to conduct an activity that causes discharges into navigable waters is issued only after any affected states or authorized Tribes certify that existing water quality standards would not be violated if the permit were issued. The appropriate state or Tribal agencies would act upon a request for 401 certification from the issuer of the federal permit and review the action's Section 402 or 404 permit applications for compliance with relevant state and authorized Tribal water quality standards and grant certification if the permits comply with these standards.
    - Clean Water Act Section 402 - This section authorizes National Pollutant Discharge Elimination System (NPDES) permits for the discharge of pollutants, such as stormwater and hatchery effluent. A hatchery NPDES permit would be issued for hatchery facility production greater than 20,000 pounds. Existing hatcheries have current NPDES effluent permits and P2IP actions considered in this EA would fit within existing hatchery NPDES permit levels or result in the production of less than 20,000 pounds at any of the acclimation sites (see **Section 3.5.2**, Water Quality). General permits for stormwater discharges are required for certain construction activities. If applicable to a project, project sponsors would issue a Notice of Intent to obtain coverage under the applicable general permits from the applicable permitting agency and would prepare a Stormwater Pollution Prevention Plan to address stabilization practices, structural practices, stormwater management, and other controls.
    - Clean Water Act Section 404 - Authorization from the U.S. Army Corps of Engineers is required in accordance with the provisions of Section 404 of the Clean Water Act when dredged or fill material is discharged into waters of the United States. All project sponsors with construction actions proposed here would coordinate with the Corps to obtain a Section 404 permit for any fill placed in wetlands or non-wetland waters and work with the appropriate state or Tribal agencies to obtain Section 401 water quality certification prior to implementation.
- **Clean Air Act (CAA)** of 1970, as amended, directs federal agencies to address air quality and emissions of hazardous pollutants from proposed activities. The federal Clean Air Act, as amended (42 U.S.C. 7401 et seq.), requires the EPA and individual states to carry out a wide range of regulatory programs intended to assure attainment of the National Ambient Air Quality Standards. Air quality impacts from this action would include limited temporary fugitive dust and vehicle emissions from construction, and negligible effects from operation. Co-lead Agencies evaluated the effects of the proposed action against the National Ambient Air Quality Standards (NAAQS) in the CAA, as described in **Section 3.4**, Climate and Air Quality.
- **Migratory Bird Treaty Act (MBTA)** of 1918 prohibits the take (killing, capturing, selling, trading, or transport) of protected migratory bird species without prior authorization from the

USFWS. Birds protected under the MBTA and ESA were considered in the biological assessment prepared by Co-lead agencies (see P2IP Biological Assessment, Reclamation 2024d).

- **Executive Order 11990**, *Protection of Wetlands*, dated May 24, 1977, requires federal agencies to avoid, to the extent possible, long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid new construction in wetlands. In addition, as part of the NEPA review, U.S. Department of Energy NEPA regulations require that impacts on floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12). Siting of proposed P2IP activities considers the presence of jurisdictionally delineated wetlands to avoid impacts. Therefore, the evaluation in this PEA determined that the Proposed Action would not result in long-term adverse impacts to wetlands.
- **Executive Order 11988**, *Floodplain Management*, dated May 24, 1977, as part of the NEPA review, U.S. Department of Energy NEPA regulations require that impacts on floodplains and wetlands be assessed and alternatives for protection of these resources be evaluated in accordance with Compliance with Floodplain/Wetlands Environmental Review Requirements (10 CFR 1022.12). Evaluation of impacts of the Proposed Action on floodplains is discussed in **Table 3-1** of this PEA. The evaluation determined that the Proposed Action would not result in long-term adverse impacts to floodplains. Wetland and waterway management, regulation, and protection are addressed in several sections of the Clean Water Act, including Sections 401, 402, and 404.
- **EO 13007,** *Indian Sacred Sites,* dated May 24, 1996, instructs federal agencies to promote the accommodation of access to and protect the physical integrity of American Indian sacred sites. An Indian Tribe or an Indian individual determined to be an appropriately authoritative representative must identify a site as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion. Reclamation evaluated the potential for the proposed action to affect Indian sacred sites in **Section 3.7.3**, Impacts on Cultural Resources – Sacred Sites.
- **EO 12898**, *Environmental Justice*, dated February 11, 1994, instructs federal agencies, to the greatest extent practicable and permitted by law, to make achieving environmental justice part of their mission by addressing, as appropriate, disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. Its purpose is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities. Co-lead agencies disclosed potential impacts on communities with environmental justice concerns in **Section 3.9**, Socioeconomics and Environmental Justice.
- **EO 13175**, *Consultation and Coordination with Tribal Governments,* dated November 6, 2000. The U.S. has a unique legal relationship with Indian Tribal governments as set forth in the Constitution of the United States, treaties, statutes, executive orders, and court decisions. This order directs federal agencies to formulate and establish "regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian Tribes, and to reduce the imposition of unfunded mandates upon Indian Tribes." This

consultation is meant to work toward a mutual consensus and is intended to begin at the earliest planning stages, before decisions are made and actions are taken.

- **EO 14008** *Tackling the Climate Crisis at Home and Abroad,* dated January 27, 2021, requires all agencies to use the power of federal procurement and management of real property to support robust climate action and lead by example; submit a Climate Action Plan that identifies agency climate vulnerabilities and steps to bolster adaptation and increase climate resilience of facilities; and adhere to the requirements of the Made in America Laws in making clean energy, energy efficiency, and clean energy procurement decisions. Co-lead agencies analyzed the effects of the proposed action on climate change and disclosed those in **Section 3.4**, Climate and Air Quality.

- **EO 14096** *Revitalizing our Nation's Commitment to Environmental Justice for All,* dated April 21, 2023, was established to pursue a whole-of-government approach to environmental justice by investing in and supporting culturally vibrant, sustainable, and resilient communities in which every person has safe, clean, and affordable options for housing, energy, and transport. This order also supplements the foundational efforts of Executive Order 12898. Co-lead agencies disclosed potential impacts on communities with environmental justice concerns in **Section 3.9**, Socioeconomics and Environmental Justice.

- **Secretarial Order 3175** Department[38] Responsibilities for Indian Trust Assets (ITAs), dated November 8, 1993, identifies ITAs as legal interests in property held in trust by the United States (with the Secretary of the Interior acting as trustee) for Indian Tribes or Indian individuals. Examples of ITAs are lands, minerals, hunting and fishing rights, and water rights. In many cases, ITAs are on a reservation; however, they may also be found off the reservation. Reclamation disclosed potential impacts on ITAs in **Section 3.11**, Indian Trust Assets.

[38] Department of Interior

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Appendix E

Reasonably Foreseeable Future Actions

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Appendix E. Reasonably Foreseeable Future Actions

Table E-1, below, lists the reasonably foreseeable future federal and nonfederal actions considered in the analysis. Impacts from past and present actions are considered part of existing conditions as described in the affected environment sections for each resource in **Chapter 3**. Past actions in the Study Area include dam building, hydropower generation, mining, agriculture, forest management, construction of hatchery facilities, transportation projects, wildfire mitigation and firefighting, well drilling, recreation, utility development, livestock grazing, and others. Present actions include operation and maintenance of hatchery facilities; wildfire mitigation and firefighting; operation and maintenance of dam facilities, utility infrastructure, and water delivery infrastructure; hydropower generation; transportation system management; agriculture; forest management; recreation; livestock grazing, and others.

Table E-1. Reasonably Foreseeable Future Actions

Project Name	Description of the Action	Location	Status
	Reasonably Foreseeable Activities		
Columbia River Treaty	On July 11th, 2024, U.S. President Biden and Canadian Prime Minister Trudeau announced the two countries reached agreement in principle on the key elements to modernize the Columbia River Treaty regime. The term "agreement in principles" refers to a milestone in negotiations, meaning the two countries reached a meeting of the minds on core issues and have a roadmap for drafting text of a treaty amendment and related arrangements. Among other things, the modernized Treaty regime is intended to include 3.6 million acre-feet of pre-planned flood risk management space in Canada, balanced power coordination and compensation, reliable operations for ecosystem purposes, and formation of an indigenous advisory group. Modernization would result in operations similar to today in most years. In some years Grand Coulee and other U.S. projects will be relied upon more for flood risk management operations.	Columbia River - Canadian operations impact flows at the border. The U.S. may respond at Grand Coulee and other U.S. projects, both Federal and non-Federal, by providing more storage space in some moderately wet years to offset the decrease in pre-planned FRM space in Canada. In very wet years the U.S. can continue to access additional space in Canada, if needed.	Operations during the interim period and future operations under a modernized treaty should be similar to today in most years. In some moderately wet years Grand Coulee will have to provide more space for flood risk management in the spring under the modernized Treaty regime than today. These operations will start in water year 2025.

Project Name	Description of the Action	Location	Status
	These operations will be within normal operating ranges but deeper drafts in moderately wet years are likely. Flows below Grand Coulee will be similar to today in most years, but Canada will also have more flexibility that could possibly change flow timing. During the interim period before a modernized treaty enters into force, the USACE and Reclamation have been preparing for Post-2024 Operations. These operations should look similar to today in most years with interim arrangements with Canada.		
Colville Confederated Tribes NTIA 2.5GHZ Wireless, Middle Mile and Fiber to the Home Project	This project would include 171.8 miles of new fiber cable, 1 mile of new aerial electrical distribution, 2.5 miles of buried electrical distribution, 3 new 195-foot towers, 3.4 miles of new road development to provide access to the 195-foot tower sites, 50 new poles, temporary connection to an existing cell-on-wheels site, and a hardware upgrade at an existing 195-foot tower site.	118°59'57''W, 47°57'24''N (Grand Coulee power switchyard) and 118°57'43''W, 47°58'40''N (Lone Pine substation)	Anticipated to start October 2025
Town of Coulee Dam Feeders 1, 3, and 4 Upgrade and Replacement	This project would replace and/or upgrade feeder lines 1, 3, and 4in order to ensure continuous, reliable electrical service from Reclamation's Grand Coulee Dam switchyard to the Town of Coulee Dam. The system changes would protect power line infrastructure from wildfires and prevent a fault on any line from causing an outage in the entire system. Following completion of this project, ownership of Feeders 1, 3, and 4 and their supporting infrastructure would be transferred to the Town of Coulee Dam to allow for more timely operations and maintenance.	118°19'54''W, 47° 54'22''N	Started 2015, Construction anticipated in 2025

Project Name	Description of the Action	Location	Status
Bonneville Chief Joseph Hatchery Activities			
Chief Joseph Hatchery	Improvements at the Chief Joseph Hatchery fish ladder would be necessary to accommodate increased numbers of naïve salmon transported to the blocked area and for intercepting local origin adults needed for tailrace behavior studies. Design work would need to be completed. Improvements may include: installation of PIT antennas within the ladders, fish diversion systems, adult salmon holding vessels, and facilities to accommodate sampling. Improvements at the ladder would benefit the purposes of CJH beyond the P2IP program and can be covered under an update to the CJH EIS. Tribal Resource Management Plan (TRMP) has a 4(d) exemption under ESA.	Chief Joseph Hatchery	Ongoing 2024
USBR Grand Coulee Dam Projects			
Geotechnical Field Exploration, Spokane Indian Reservation	Reclamation is conducting geotechnical field exploration using borehole (drilling) methods to gather data in and around a landslide area at the Two Rivers Marina.	118°19'54''W 47°54'22''N	Started June 2024, ongoing
Grand Coulee Dam Visitor Center Park	Five-year permit for the Grand Coulee Dam Area Chamber of Commerce to use land for a vendor fair and launch fireworks from the dam the week of July 4.	118°59'7"W 47°57'37"N	Started 2024, ongoing
North Dam Monitoring Instruments	Install automated flow monitoring equipment as per the Safety of Dams recommendation from the 2021 Comprehensive Review.	119°0'57"W 47°56'29"N (Approximately 400 yards southeast of North Dam)	Started 2021, ongoing
Construction Engineering Group Parking Lot Sinkhole	Cause of a sinkhole in parking lot needs to be determined and repairs need to be made.	118°58'29"W 47°57'56"N (Grand Coulee, WA)	Started 2024, ongoing

Project Name	Description of the Action	Location	Status
Gaging Station Tram Car Shelter Removal or Modification	Remove or modify building to prevent public access.	118°59'3"W 47°57'43"N	Started 2024, ongoing
Concrete Accessibility Ramp and Parking Space Repair	Repair ramp and parking space for Architectural Barriers Act/Americans with Disabilities Act compliance.	118°59'23"W 47°56'58"N (Security Response Force building)	Started 2024, ongoing
Install Lock and BMS Sensor on Construction Adit Tunnel Entrance Door	Install a lock and a door sensor to increase security.	Grand Coulee Dam	Projected for 2025
Install Warning Signage Downstream of Dam at Boating Security Zone	Replace old signage downstream of Grand Coulee Dam.	118°58'57"W 47°57'56"N (Grand Coulee, WA)	Started 2024, ongoing
Coulee Area Parks and Recreation District Management Agreement Renewal	Renew Coulee Area Parks and Recreation District management agreement (Banks Lake Park).	119°1'6"W 47°56'15"N	Anticipated to start in 2025
Enhance Security at 11.95-Kilovolt (kV) Switchyard	Install fencing and access controls to increase security.	118°59'38"W 47°57'16"N	Anticipated to start in 2025
Hidden Beach Accessibility Rework	Extend stairs to beach level and repair accessibility ramp.	118°59'38"W 47°57'16"N	Anticipated to start in 2025

Project Name	Description of the Action	Location	Status
Boise Cove Roadway	Reroute current road due to erosion and sloughing. Reclamation and surrounding community need access to the areas historically provided by the existing road.	118°7'12"W 48°36'51"N (Stevens County, WA)	Anticipated to start in 2025
Industrial Area Service Air Pipeline Repair	Repair a leak that was detected in the main pipeline of the Grand Coulee Power Office (GCPO) service air system.	118°59'27"W 47°56'59"N	Anticipated to start in 2024
SRF Upgrades at Brett Pit	Replace targets that have reached the end of their service life with an upgraded target system. This would likely warrant an EA.	118°57'25"W 47°58'25"N	Started 2023, ongoing
Fire Protection Modernization	Modernize current infrastructure.	Locations TBD	Anticipated to start in 2025
GCPO Museum Property Storage	Designate building to store GCPO museum property.	GCPO	Started 2024, ongoing
Heritage Tour Program	Conduct public indoor and outdoor tours.	GCPO	Started 2024, ongoing
USACE Chief Joseph Dam Reasonably Foreseeable Operations and Maintenance Projects			
Chief Joseph Dam Exciter Replacement	Replace Chief Joseph Dam Excitation Units 1-16 with state-of-the-art equipment.	Chief Joseph Dam	Projected to be completed in 2025
Chief Joseph Dam Powerhouse Sump Pumps and Controls	Replace vertical pumps with the same as existing rated capacity, replace all gate valves, replace all suction piping, and replace the entire dry sump drainage system.	Chief Joseph Dam	Projected to be completed in 2025
Chief Joseph Dam Electric and Hydraulic Elevators	Replace both powerhouse electric and hydraulic elevators.	Chief Joseph Dam	Projected to be completed in 2025

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Appendix F

Environmental Protection Measures

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Appendix F. Environmental Protection Measures

Below is a preliminary list of environmental protection measures that may be employed for the P2IP PEA activities and future environmental compliance processes, as required, to reduce or eliminate environmental impacts during the P2IP project.

Air Quality (AQ) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity (NEPA Phase)	Responsible Party
AQ-1	To control dust or air pollution, work sites and gravel areas would be treated with a dust retardant, such as water or magnesium chloride. Water supply locations would be identified prior to construction to minimize impacts on soil, water quality, fisheries, wetlands, and vegetation resources. When pumping water from a reservoir or streams for dust abatement, intake hoses shall be screened with the appropriate mesh size (generally 3/32 inch) or as described through consultation with the NMFS or USFWS, or both.	CAA CWA ESA	Data collection (PEA and future environment compliance) Construction (future environmental compliance)	Project Proponents Contractors
AQ-2	Disturbed areas would have temporary ground covers, such as mulching, temporary grasses, erosion blankets, or similar methods of dust control and wind erosion control, applied to protect exposed soil surfaces and reduce fugitive dust.	CAA	Data collection (PEA and future environment compliance) Construction (future environmental compliance)	Project Proponents Contractors

EPM #	EPM Description	Ensure Compliance with	Project Activity (NEPA Phase)	Responsible Party
AQ-3	A fugitive dust control plan would be developed with specific dust control measures and procedures for construction contractors.	CAA	Data collection (PEA and future environment compliance) Construction (future environment compliance)	Project Proponents Contractors

Cultural Resources Management (CRM) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
CRM-1	Adverse effects to historic properties will be avoided, minimized, or mitigated to the maximum extent practicable.	NHPA	Data collection (PEA and future environment compliance) Construction (future environment compliance)	Project Proponents Co-lead Agencies Contractors
CRM-2	In the event of a post-review discovery of previously unknown or un-recorded cultural resources, materials, or sites, ground-disturbing activities in the immediate vicinity would cease until a Secretary of the Interior qualified archaeologist and historian, State Historic Preservation Officer, and potentially affected Indian Tribes are consulted.	NHPA	All activities (PEA and future environment compliance)	Project Proponents Co-lead Agencies Contractors
CRM-3	In the event of a discovery of human remains, ground-disturbing activities in the immediate vicinity would cease until a Secretary of the Interior qualified archaeologist and historian, and potentially affected Indian Tribes are consulted. Ground disturbing activities will not re-commence until after the creation and implementation of a NAGPRA Plan of Action.	NAGPRA	All activities (PEA and future environment compliance)	Project Proponents Co-lead Agencies Contractors

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
CRM-4	Historic Property avoidance, minimization, or mitigation measures may be marked as avoidance areas on implementation drawings and flagged under direction of agency approved archaeologists as no-work areas in the field prior to ground disturbance.	NHPA	All activities (PEA and future environment compliance)	Co-lead Agencies
CRM-5	When identified as needed, a cultural resources monitor would be present on-site during ground-disturbing activities that would take place near identified avoidance areas.	NHPA	All activities (PEA and future environment compliance)	Co-lead Agencies
CRM-6	Post-review discovery plans would be developed for activities involving ground disturbance.	NHPA	All activities (PEA and future environment compliance)	Co-lead Agencies

Fisheries Resources (FR) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
FR-1	All existing fish hatchery program operations would continue to be implemented during the P2IP research.	ESA Hatchery Management Plans	Existing hatchery activities (PEA)	Facility Owner/Operators
FR-2	Live-capture, selective fishing gear would be developed to collect Chinook brood stock that would allow release of non-target species promptly and safely. Gear would be used when and where incidental take of Upper Columbia River spring-run Chinook and bull trout could occur. Capture of Upper Columbia River steelhead would be expected during the August through November brood stock collection. Particular attention would be taken to release protected spring-run Chinook, bull trout, and steelhead unharmed with little or no handling. This measure is subject to modification by the USFWS and NMFS, pending consultation.	ESA	Fish collection (PEA)	Project Proponents
FR-3	During salmon collection operations, the Project Proponents would apply measures that minimize the risk of harm to listed bull trout, salmon, and steelhead. These measures include, but are not limited to, limits on the duration (hourly, daily, and weekly) of collection activities, limits on the duration of holding listed fish, and allowance for free passage of listed fish migrating through collection sites in main stem and tributary river locations when those sites are not being actively operated.	ESA	Fish collection (PEA)	Project Proponents or Facility Owner/Operators

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
FR-4	Any listed bull trout, salmon, or steelhead that might enter the hatchery ladder and adult holding facilities would be sorted, tallied and promptly released unharmed back into the Columbia River.	ESA	Fish collection (PEA)	Project Proponents/Facility Owner/Operators
FR-5	Project Proponents would continue to implement the Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State (NWIFC and WDFW 1998) and Pacific Northwest Fish Health Protection Committee (PNFHPC 2007) guidelines to minimize the risk of fish disease amplification or transfer and to ensure that artificially propagated fish are released in good health.	Salmonid Disease Control Policy	Fish health checks (PEA)	Project Proponents
FR-6	• During purse and beach seine, fyke net, and hook and line operations, any non-target ESA listed fish would be released immediately. This measure is subject to modification by the USFWS and NMFS, pending consultation. o Fyke Nets: Nets would be checked daily. o Hook and Line: Barbless hooks would be used for hook and line capture. Non-target ESA species captured would not be removed from the water, hook removed and released immediately. • Fish would be sorted by hand or by use of a knotless dip net. All fish would be sorted or released, or both, prior to removing the entire seine from the water. Dry sorting would not occur. • Sorting time would not exceed 75 minutes. o For beach seine operations, the sorting time is defined as the elapsed time from when the	ESA	Seining, Fyke Netting, and Hook and Line operations (PEA)	Project Proponents

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
	outer towed end of the net first contacts the shore or block until the net is emptied of fish. o For purse seine operations, the sorting time is defined as the elapsed time from when all rings are pursed and out of the water until the net is emptied of fish.			
FR-7	Net pens would be checked for mortalities at least once per week. Mortalities would be removed, and the PIT tags would be recovered, if possible.	N/A	Net pen operations (PEA)	Project Proponents
FR-8	Disturbance of riparian vegetation would be limited to the minimum necessary to achieve investigation objectives, which would minimize habitat alteration and the effects of erosion and sedimentation.	CWA ESA	Geotechnical investigations (PEA and future environment compliance)	Project Proponents
FR-9	Live Fish Transport Pre-Trip Procedures: It would be the responsibility of the transport truck driver and accompanying staff to make sure all necessary equipment is present and in satisfactory working condition. An inspection of the transport truck and all equipment would be performed both pre- and post-trip. If the condition or function of the vehicle and equipment is questionable, any repairs should be made prior to transporting fish; if this is not possible, an alternative vehicle or equipment should be procured. • Truck Inspection: The truck and its equipment would be inspected prior to arriving at the fish-loading facility. It would be confirmed that all necessary supportive equipment and materials are packed with the vehicle. For all transport activities, the truck would be fueled to full prior to fish loading the fish.	N/A	Live fish transport (PEA and future environment compliance)	Project Proponents

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
	• Tank Inspection: The transport tank would be inspected utilizing the Fish Transport Tank Inspection Form. • Oxygen Support System: Oxygen tanks must contain enough supply for the transport event and unplanned delays. The plan would be to use 1 liter per minute per 100 pounds of fish and adjust from there. • Equipment Decontamination: If water has been sourced from a non-pathogen-free location, the tank and supporting equipment should be air dried and then disinfected with 200 parts per million (ppm) chlorine or polyvinylpyrrolidone iodine for a minimum of 1 hour. To neutralize the chlorine and iodine, the tank and equipment would be rinsed with sodium thiosulfate at 1 liter of 200 ppm chlorine and iodine to 1.5 grams of sodium thiosulfate.			

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
FR-10	Live Fish Transport Water Temperature: Depending on the time of year, temperatures between collection and release waters may differ significantly. At a minimum, the collection and release sites' water temperatures would be retrieved and recorded 2 days before the event to allow for proper planning and tempering. • Temperature Threshold: No transport of fish would occur if either the loading or receiving water temperatures are greater than 21 degrees Celsius (°C). At release, the temperature difference between the receiving water and the tank shall be within 4°C; if greater, the tank water would be tempered at a rate of 0.5°C per 15 minutes. The tempering rate shall be recorded in the fish transport monitoring log.	N/A	Live fish transport (PEA and future environment compliance)	Project Proponents
FR-11	Live Fish Transport Collection Site: • The transport tank would be filled with water to the recommended level, and the tank would be treated. Air stones would be turned on to ensure they are working. Once fish are loaded, the tank would be filled to the recommended maximum level, and aerators would be turned on. The fish transport monitoring log would be filled out with all relevant information, including the water treatment methods and products, water temperature, oxygen data, carrying capacity, and fish health-check data. • Oxygen: Instances of dissolved oxygen levels above 100 percent would be minimized and should not drop below 7 ppm or 7 milligrams per liter. The oxygen tank regulator would be set to an output of	N/A	Live fish transport (PEA and future environment compliance)	Project Proponents

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
	1 liter per minute for every 100 pounds of fish. It would be adjusted, as necessary, to remain within the criteria. • Carrying Capacity: Water temperatures influence the carrying capacity of a tank. Warmer temperatures increase oxygen consumption, thus reducing the carrying capacity. If loading temperatures are above 11°C, for every 1°C above or below 11°C, the carrying capacity of the tank should be reduced by 2.5 percent. • Fish Health Checks: To reduce holding times and minimize stress, the driving time would be estimated before the event. A fish health check would be conducted at the first 30-minute mark and then once per hour thereafter. The tank temperature and percent dissolved oxygen would be recorded. Fish behavior would be noted, looking for signs of stress and mortality. All mortalities would be removed and noted.			

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
FR-12	Live Fish Transport Release: The location for release would be identified prior to the transport activity. The release location would accommodate the transport truck and provide access to water. Releases should occur as early in the morning as possible. The fish monitoring log would be filled out with tempering information and release data. • Tempering: Temperature differences between the receiving water and tank shall be within 4°C; if greater, the tank water would be tempered at a rate of 0.5°C per 15 minutes. • Release: The fish release hose would be secured to the opening of the truck, and there would be support for the hose as necessary. The water pumped from the receiving water would be used to the transport tank to aid in flushing fish from the tank. Once the tank and hose are cleared of fish, the liberation of fish would be complete.			

Geology and Soils (GEO) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
GEO-1	Applicable to Federal Land managed by DOI or USDA: Project action activities with the potential to adversely impact paleontological resources would be identified, and steps would be taken to avoid, minimize, or mitigate such effects.	PRPA	All activities (PEA and future environment compliance)	Co-lead Agencies

Invasive Species (IS) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
IS-1	The construction areas would be surveyed for data collection and invasive plant species prior to use. Areas with invasive weed infestations would be avoided, where possible; if avoidance is not possible, the area would be pretreated using an appropriate treatment to prevent the spread of invasive plant species.		All activities (PEA, future environment compliance)	Project Proponents Contractors
IS-2	All equipment that is planned to be on-site would be inspected for invasive species (plant and animal) using properly trained staff, prior to entering the site. To avoid or reduce the introduction of weed seeds and propagules to the Study Area, all contracts would include provisions to ensure all vehicles, earth disturbance, construction, and road maintenance equipment are cleaned and inspected prior to entering the Study Area. All contractors must ensure all equipment is free of soil, seeds, vegetative matter, or other debris that could contain seeds.		All activities (PEA, future environment compliance)	Project Proponents Contractors Co-lead Agencies
IS-3	All in-water equipment, including boats and equipment for water drafting and dust abatement, and personal gear would be inspected and sanitized to prevent aquatic invasive species transmission and establishment. Sanitation is required if equipment or gear has been used in an area known to be contaminated with aquatic invasive species. Boats or barges found to have aquatic invasive species present are not allowed to launch until they have been treated and cleared for use.		All activities (PEA, future environment compliance)	Project Proponents Contractors Co-lead Agencies

Health and Safety (HS) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
HS-1	The net pens must have flotation buoys and safety reflective devices to alert reservoir users and to provide a safe distance around the facilities.		Net pens (PEA, future environment compliance)	Project Proponents Contractors
HS-2	All buildings must have fire extinguishers surface-mounted on walls and located per International Building Codes and local fire protection requirements.		New acclimation facilities (future environment compliance)	Project Proponents Contractors
HS-3	Interior signage must be installed in all buildings to meet applicable code requirements at exits.		New acclimation facilities (future environment compliance)	Project Proponents Contractors
HS-4	Building roofs must be sloped away from primary access doors so that snow sloughing off the roof does not pose any danger to facility workers and personnel. Snow guards or similar systems would be installed at the low roof side of the building.		New acclimation facilities (future environment compliance)	Project Proponents

Recreation Resources (RR) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
RR-1	A request would be posted on recreational site kiosks with the current WDFW sport fishing guidelines for notification of a tag retrieved while cleaning a caught fish.	N/A	Research studies (PEA)	Project Proponents

Utility Services (US) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
US-1	Prior to ground-disturbing data collection and construction activities, utilities in construction areas would be surveyed; appropriate measures would be taken to minimize conflicts with any identified utilities and to restore service, if needed, for utilities disrupted by construction. If utility service disruption is necessary to complete construction activities, impacted parties would be notified prior to service disruption.	N/A	Data collection (PEA, future environment compliance) Construction (future environment compliance)	Project Proponents Contractors

Vegetation and Wetlands (VW) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
VW-1	Disturbed areas would be revegetated to conditions similar to prework conditions by spreading stockpiled native materials (such as spoils, vegetation, rock, and woody debris), seeding, and/or planting with certified, weed-free seed mixes or native cultivars.	N/A	Data collection (PEA, future environment compliance) Construction (future environment compliance)	Project Proponents Contractors
VW-2	Mapped wetlands would be avoided during construction activities to the maximum extent practicable. Where practicable, no ground-disturbing activities would occur within a 50-foot buffer area of mapped wetlands.	N/A	Construction (future environment compliance)	Project Proponents Contractors

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
VW-3	Known Ute-Ladies-Tresses populations would be excluded from new telemetry receiver installations.	ESA	Telemetry Receiver Installations (PEA)	Project Proponent Contractor Co-lead Agencies

Visual Resources (VR) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
VR-1	Designs, materials, and colors that blend with or complement the surrounding landscape would be selected.	N/A	All activities installing new equipment or constructing new facilities (PEA, future environmental compliance)	Project Proponents Contractors

Water Quality (WQ) EPMs

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
WQ-1	Silt fencing, straw bales, or similar devices to control erosion and runoff from disturbance areas would be used on the project site and along routes for the power transmission lines. Erosion-control barriers would be maintained throughout the construction period and removed for disposal at the completion of construction activities.	CWA, ESA	Construction (future environmental compliance)	Project Proponents Contractors

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
WQ-2	Temporary covering of stockpiled materials, spoils, and exposed soils with certified, weed-free straw mulch; erosion-control blankets; or similar measures would be used to control erosion and runoff.		Data collection (PEA, future environmental compliance) Construction (future environmental compliance)	Project Proponents Contractors
WQ-3	The contractors would be required to develop and submit a stormwater pollution prevention plan that complies with the State of Washington Stormwater Management Manual for Eastern Washington when required by permitting processes. The stormwater pollution prevention plan would identify vegetation clearing limits, construction access, and EPMs for erosion control. EPMs for erosion control may include: • Preserving natural vegetation, whenever possible • Using a natural vegetation buffer zone along streams, wetlands, and other waterbodies • Stabilizing construction access to reduce sediment transport onto paved roads • Using a wheel wash to reduce sediment from the construction site onto paved roads • Stabilizing and grading construction roads and staging areas • Temporary and permanent seeding to stabilize exposed soils • Mulching disturbed areas for erosion control • Using erosion-control blankets or nets for exposed soils • Controlling dust • Having erosion-control material on hand at the work site in case of an emergency situation such as unexpected, heavy rain • Using concrete handling and concrete washout • Ensuring materials delivery, storage, and containment		Construction (future environmental compliance)	Project Proponents Contractors

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
WQ-4	Spill containment structures or portable spill kits, commensurate with the amount of fuel stored and supplies, such as shovels, absorbent pads, and/or booms, shall be on-site during construction and operation activities. The backup generator and permanent fuel tank would be equipped with a shutoff system if a leak is detected.		Construction (future environmental compliance)	Project Proponents Contractors
WQ-5	Lubricants used for operation and maintenance of the pumps would be eco-friendly, such as plant-based oils. All lubricants used for equipment within the shore protection zone would comply with the applicable sections of the 2013 EPA regulations for vessel general permits for environmentally acceptable lubricants relative to the regulatory definitions of biodegradable, minimally toxic, and not bioaccumulative.		Construction (future environmental compliance)	Project Proponents Contractors
WQ-6	Refueling and petroleum product storage would occur in specified areas outside the ordinary high-water mark of the Study Area water bodies.		Data collection (PEA, future environmental compliance) Construction (future environmental compliance)	Project Proponents Contractors
WQ-7	Hazardous materials (petroleum products and chemicals) would be transported to the approved site for disposal.		Data collection (PEA, future environmental compliance) Construction (future environmental compliance)	Project Proponents Contractors
WQ-8	When not in use, vehicles and construction equipment containing petroleum products, hydraulic fluids, and/or chemicals would be stored at the staging area or the construction and parking area.		Data collection (PEA, future environmental compliance) Construction (future environmental compliance)	Project Proponents Contractors