P2IP Biological Assessment Amendment

Chapter 2. Description of Proposed Action

2.1 Proposed Action

The Proposed Action is the federal funding and authorizations by the USACE, Reclamation, Bonneville, the USFWS, and the NMFS 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, fish-rearing, and acclimation facilities; and the development, testing, and operation of interim fish passage systems(see **Table 2.1**).

Table 2.1. Comparison of the Environmental Baseline and the Proposed Action

Federal Actions (Co-Lead Agencies)	**Environmental Baseline (No Action)**	**Proposed Action**
Federal Funding	No additional Federal funds	At least $200 M funding
Approval of P2IP Activities on Federally managed land/facilities	Only on an ad hoc basis	As possible to support P2IP activities, consistent with applicable law
Providing eggs, juvenile, and adult salmon	Only on an ad hoc basis	As possible to support P2IP activities, consistent with applicable law
P2IP Activities (Project Proponents)	***Environmental Baseline (No Action)***	***Proposed Action***
Telemetry Receivers		
P2IP telemetry receivers	68	107 or more
*Existing resident fish receivers**	0	94
Multidimensional fish tracking receiver array	0	Up to 200
Salmon Collection Facilities/Locations		
Existing hatcheries and acclimation facilities	3	12
Other collection methods (seining, fyke netting, hook and line, weirs, and screw traps)	3	5 or more
Rearing and Acclimation Facilities		
Utilization of existing hatcheries	6	9
*Land-based acclimation facility^*	0	5
Net pens	3	5
Tributary streamside incubation (Sanpoil River, Spokane River, Little Spokane River, etc.)	0	3 or more sites

Federal Actions (Co-Lead Agencies)	**Environmental Baseline (No Action)**	**Proposed Action**
Data Collection to Inform Design of Land-based Acclimation Facilities	0	3 or more sites
Salmon Release		
Release sites	22 or	36 or more
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.

Federal actions may include the following:

- Providing federal funding to support P2IP activities, within respective agency authorities, throughout the Project 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 action.
- Participating in the planning, design, development, implementation, feasibility assessments, environmental compliance processes, and operations of interim passage facilities and guidance structures, where appropriate.

All federal actions that are a part of P2IP are being considered for potential impact on ESA-listed species. See **Table D-1** in **Appendix D** for a detailed table on the P2IP activities.

2.1.1 P2IP Activities

The federal actions would support the P2IP to test key biological assumptions from the Fish Passage and Reintroduction Phase 1 Report: Investigations Upstream of Chief Joseph and Grand Coulee dams (UCUT 2019) that are considered to critically influence the success of the reintroduction effort. See **Table D-1** in **Appendix D** for a detailed table of P2IP activities.

The P2IP is proposed to be completed in a stepwise fashion. **Table 2.2** summarizes the activities proposed under each P2IP step.

Table 2.2. Summary of P2IP Activities by Step

Step 1 – Research Studies: baseline studies and small-scale salmon production programs to support research studies

• Juvenile and adult salmon research studies (ongoing and additional studies)
• Installation of research equipment
  o New telemetry receivers
• Development and installation of satellite rearing facilities
  o Net pens (expansion and new)
  o Land-based, temporary acclimation facilities
• Collection and transport of eggs, juvenile salmon, and adult salmon from existing hatcheries
• Fish-rearing activities
• Trap-and-transport operations for upstream passage of adult salmon[1]
• Data collection for design of new land-based acclimation facilities, fish collection, and interim passage facilities

Step 2 – Ongoing research studies, interim passage activities, long-term production programs, and supporting studies
• Ongoing juvenile and adult salmon research studies • Design, modification, and testing of existing long-term[2] hatchery facilities* • Design, modification, and testing of existing interim[3] fish passage
Step 3 – Future Activities
• Construction or installation of equipment to test upstream passage • Construction or installation of long-term downstream passage structures (including testing similar to upstream passage) • Construction and development of land-based acclimation facilities • Ongoing installation of research equipment

*The Project Proponents' site-specific designs would be submitted to the appropriate Co-lead Agency for design sufficiency review and acceptance.

Detailed descriptions of the P2IP activities are presented in Appendices A, B, and C of the P2IP PEA. These activities are summarized below.

[1] Refer to **Appendix D** for a detailed table of P2IP activities.
[2] Fish ladders
[3] Trap and transport activities

2.1.2 Research Studies

Juvenile survival and behavioral studies would be performed for subyearling and yearling summer/fall Chinook and sockeye salmon[4] using marking techniques, such as PIT tags, juvenile salmon acoustic telemetry systems (JSATS) or acoustic, and coded-wire tags (CWT). Up to 250,000 juvenile Chinook and 250,000 juvenile sockeye salmon could be released annually to accommodate the tagging studies for the 20-year study duration. The current research goals are to mark all released juvenile Chinook with CWT and to mark a subset of juveniles with PIT and or 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, migratory metrics, and dam passage survival; estimate smolt-to-adult return rates; and provide returning-migrating salmon for subsequent adult behavioral and survival studies. Estimates from juvenile survival studies would be used to update life cycle model (LCM) inputs, adaptively manage research projects, and evaluate the program's success.

Information from JSATS-tagged fish would inform the decision-making process for the need, design, and subsequent effectiveness testing (such as collection efficiency) of downstream passage facilities at each dam in the Action Area. PIT antennas and/or telemetry receivers, would be installed, operated, and maintained throughout the Action Area, including at dams. Researchers would collect, compile, manage, and interpret the fish data.

System-wide Juvenile Survival

- This PIT-based study would examine assumptions made in the LCM about survival of juvenile summer/fall Chinook and sockeye salmon as they migrate through the Columbia River System to the Pacific Ocean.
- The number of juvenile Chinook salmon released into the blocked area would increase from up to 180,000 to 250,000 individuals, annually. Section 2.1.3 describes the origins and ongoing source of the juveniles for release.
- Up to 250,000 juvenile sockeye salmon could also be released into the blocked area annually. Section 2.1.3 describes the origins and ongoing sources of the juveniles for release.
- Researchers would collect, compile, manage, and interpret the fish data.
- Results from these studies would be used to estimate migratory survival and smolt-to-adult survival rates for fish released from the following general locations:
    - Kettle Falls
    - Sanpoil River
    - Little Falls Dam

[4] Juvenile Chinook and sockeye salmon would be obtained from federal and non-federal hatcheries with available eggs or juveniles for P2IP use. Juvenile salmon for P2IP activities would be subject to availability of surplus eggs and fish. P2IP Proponents would be responsible for coordination with appropriate parties to obtain surplus salmon. This PEA includes all potential sources of donor stock identified in the Phase 1 Report (2019) and Hardiman et al. 2017, in the Proposed Action for evaluation and disclosure of potential effects related to translocation of the eggs and fish.

  - Spokane River
  - Grand Coulee Dam or Lake Roosevelt
  - Chief Joseph Dam or Lake Rufus Woods
- Detections from existing PIT antennae at downstream Columbia River dams and other locations in the basin would be used to calculate survival estimates.
- Additional PIT antennae would be installed, operated, and maintained throughout the Action Area, including at dams and tributaries.
- Estimated survival rates would be used to update LCM inputs to adaptively manage research projects and evaluate the program's success.

Fish returning to the Columbia River as adult salmon would be used for subsequent upstream behavior and studies.

These studies are expected to continue through 2043 and are designed to be performed repeatedly, but the acoustic studies may not occur annually.

Downstream Movement, Behavior, and Dam Passage of Juvenile Summer/Fall Chinook and Sockeye Salmon

- This JSAT-based study would examine assumptions made in the LCM about survival of juvenile summer/fall Chinook and sockeye salmon and their behavior, dam passage routing, and travel time in the following reaches:
  - Mouth of 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
  - Chief Joseph Dam to Chelan River/Beebe Bridge
- Up to 6,000 acoustic-tagged juveniles of each species, Chinook and sockeye salmon, would be released at the study sites annually to collect baseline data on downstream dam passage and survival through reservoirs in the blocked area.
- This study would use the deployed telemetry receivers described above to collect data from tagged fish.
- Acoustic tag detections would provide information on near-dam behavior and route-specific dam passage routing and survival at Grand Coulee Dam, Chief Joseph Dam, and the Spokane River dams (Little Falls, Long Lake, and Nine Mile dams).

Results would be used to inform planning and development of interim or permanent juvenile passage facilities at all five dams.

These multiyear studies are expected to begin early in the project and be repeated at strategic intervals through 2043 as fish passage facilities become operational.

Juvenile Sockeye Survival through Lake Roosevelt, Grand Coulee Dam, Rufus Woods Lake, and Chief Joseph Dam

- Juvenile behavior, movement, and survival would be evaluated through PIT tag, acoustic tag, and JSATS-based research studies.
- The studies would utilize existing deployed receivers and new receiver deployments, as described in Appendix A of the P2IP PEA, to collect data from tagged fish.
- Researchers would collect, compile, manage, and interpret fish data from these studies.
- These studies are expected to continue through 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 Columbia River System to the Pacific Ocean and back to the Upper Columbia Basin as adults. Annual juvenile fish releases are expected to occur annually for the PIT tag studies.
- The acoustic studies would evaluate the LCM assumptions of rearing and outmigration specifically within the blocked area. The acoustic studies would occur throughout the 20-year study period but would likely not occur each year.

This JSATS-based study 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 Project 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 Project Area. These multiyear studies are expected to begin early in the project and be repeated at strategic intervals through 2043.

Appendix A of the P2IP PEA provides a detailed description of the P2IP research activities (Reclamation 2024).

Adult Salmon Research Studies

Adult survival and behavior studies would be expanded for naive and local-origin Chinook and sockeye salmon. Project Proponents would transport up to 15,000 adult Chinook salmon and 15,000 adult sockeye from live-capture and regional hatchery operations with surplus salmon to various release locations within the blocked area[5]. The number of adult salmon would vary annually depending on availability. The collection of summer/fall Chinook salmon would be completed by the facility owner/operators consistent with their existing NMFS BiOps for the hatchery programs in the Upper Columbia River basin. If a collection location does not have established collection dates for summer/fall Chinook salmon in a NMFS BiOps then the Project Proponents would only

[5] Adult Chinook and sockeye salmon would be obtained from federal and non-federal hatcheries and other collection actions available for P2IP use. Adult salmon for P2IP activities would be subject to availability of surplus fish. P2IP Proponents would be responsible for coordination with appropriate parties to obtain surplus salmon. This PEA includes all potential sources of donor stock identified in the Phase 1 Report (2019) and Hardiman et al. 2017, in the Proposed Action for evaluation and disclosure of potential effects related to translocation of the fish.

transport Chinook with known P2IP Upper Columbia River blocked area PIT tags before and after the run schedule cut-off dates established by the technical advisory committee (TAC) for the upper Columbia summer Chinook management period. Within the run schedule dates established by the TAC or existing hatchery program BiOp , additional surplus summer/fall Chinook would be transported from corresponding collection sites to the blocked area. Morphometrics would be used to select against possible spring Chinook to reduce the probability of transporting a spring Chinook into the blocked area. Additionally, post hoc genetic analysis would be utilized to evaluate spring Chinook salmon's presence, prevalence, and origin in the trap and transport program and determine if additional coordination is needed with NMFS to adjust the P2IP trap and transport program.

All adults transported would have a tissue sample collected for genetic analysis and parentage-based tagging 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 Project Area. The parentage-based tagging information would be stored in a centralized genetics database 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 and evaluating the success of the project. 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 plan, combined with studies designed to evaluate juvenile survival in the blocked area, would provide much of the information necessary to evaluate the project 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 detected using existing acoustic tag receivers deployed for concurrent resident fish monitoring programs already in operation.
- Additional radio telemetry and acoustic receivers would be installed near the dam forebays and 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 and transported adult salmon would be hauled via truck transport from existing facilities, 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 and the Kettle River.)
- Researchers would collect, compile, manage, and interpret data.
- Spawning would be documented with traditional spawning ground surveys on foot, deepwater redd surveys, or aerial drones.

Salmon research studies would be repeated through 2043.

2.1.3 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 the P2IP PEA 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 of the P2IP PEA to be reared and released in the blocked area.
- 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 of the P2IP PEA.
- Egg incubation and early rearing would be done using existing hatchery facilities or through an expansion or upgrade of existing facilities, or development of new acclimation facilities in the Sanpoil and Spokane River watersheds.
- 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.
- Designs and plans for new or expanded incubation and early rearing sites 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 satellite acclimation sites.
- Net pen locations would include Sherman Creek (Kettle Falls), Two Rivers, Keller Ferry, Sanpoil Arm, and Rufus Woods Lake.
- Net pens would be similar in shape and dimension to those currently used by the Lake Roosevelt Artificial Production program for triploid rainbow trout (that is, approximately 20 feet square and 16 feet deep).
- New, expanded, or upgraded acclimation sites would occur in the Sanpoil and Spokane River watersheds.

- Siting of the acclimation facilities would be based on studies, existing infrastructure, and site conditions.
- Data collection may include geotechnical studies, surveying, and well drilling to characterize site conditions to inform the design process. These actions could occur at each potential site over a 20-year period.[6]

Subyearling production would 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). Release locations are detailed in the **Appendix D** maps.

2.1.4 Interim Fish Passage

Interim passage actions would focus on the study, design, installation, testing, and operation of fish passage systems. Data collection could include geotechnical studies and surveys, along with existing operational data, to characterize site conditions, inform hydrologic modeling, and aid in the design process. These actions could occur at each dam over the next 20 years.

The existing trap-and-transport program for naïve[7] and local-origin[8] adults would be expanded early in the P2IP project. Fish could be collected from Priest Rapids Dam, Wells Hatchery and Dam, and below Chief Joseph Dam, and from hatcheries with available surplus salmon[9]; then fish would be transported and released upstream in the blocked area. Adult traps at existing facilities would not change configurations or operational periods to supply the P2iP action. Adult trapping will continue at those sites, per the terms of prior agreements, reviews, and ESA consultations specific to the respective hatchery programs. Only the transport and release of surplus adults from these facilities is part of the P2iP action. Adult salmon release sites could include Rufus Woods Reservoir, Lake Roosevelt, the Columbia River transboundary reach, Hangman Creek, the Sanpoil River, the Spokane River, the Little Spokane River, and other spawning and rearing areas. See **Table D-1** in **Appendix D** for more information on the project activities.

Fish passage designs would be developed based on research studies, existing infrastructure, and site conditions. There is currently not sufficient information to provide a site-specific or implementation-level review of individual fish passage facility designs. The Project Proponents would employ fish passage experts to work with staff from Reclamation, the USACE, Avista Corporation, Bonneville, the National Oceanic and Atmospheric Administration, the USFWS, and Washington Department of Fish and Wildlife to develop fish passage alternatives. Interim fish

[6] The duration of the Proposed Action is 20 years and would be ongoing; however, consultation would be reinitiated on an as-need-basis, after the initial 15-year consultation period.
[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.
[9] Adult Chinook and sockeye salmon would be obtained from federal and non-federal hatcheries and other collection actions available for P2IP use. Adult salmon for P2IP activities would be subject to availability of surplus fish. P2IP Proponents would be responsible for coordination with appropriate parties to obtain surplus salmon. This PEA includes all potential sources of donor stock identified in the Phase 1 Report (2019) and Hardiman et al. 2017, in the Proposed Action for evaluation and disclosure of potential effects related to translocation of the fish.

passage designs, and construction plans related to any P2IP study activities (Appendix C of the PEA) would be submitted to the relevant owner/operator/agency for design review, site-specific (and as necessary) environmental compliance, and any other regulatory needs. The construction and operations of any long-term or permanent fish passage structures are not included in the P2IP and would require site-specific regulatory compliance with the relevant agencies.

Fish passage design, installation, operation, and testing efforts have been sequenced for the dams as follows; however, adjustments could be made 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

2.1.5 Conservation Measures

The following is a list of conservation measures and are a subset of the environmental protection measures (EPMs) from the P2IP PEA and future environmental compliance, as required, to reduce or eliminate environmental impacts during the P2IP project. See **Appendix A** for the comprehensive list of EPMs.

Conservation measures for fish resources include:

- Continue to implement fish hatchery program operations during the P2IP research.
- Utilize live-capture, selective fishing gear to collect Chinook and sockeye brood stock that would allow release of non-target species immediately, or as soon as practicable. Use live-capture, selective gear when and where incidental take of Upper Columbia River spring-run Chinook, steelhead, and bull trout could occur. Upper Columbia River steelhead are more likely to be captured during August through November brood stock collection.
- Release incidentally captured individuals immediately or as soon as is practicable.
- During trapping operations for brood stock or to manage hatchery fish on the spawning grounds, apply measures that minimize the risk of harm to listed salmon and steelhead, including, but not limited to, limitations on the duration (hourly, daily, weekly) of trapping, limits on the duration of traps holding listed fish, and allowance for free passage of listed fish migrating through trapping sites in main stem and tributary river locations when those sites are not being actively operated.
- Sort and promptly release any listed steelhead that might enter the hatchery ladder and adult holding facilities.
- Continue to implement the Salmonid Disease Control Policy of the Fisheries Co-managers of Washington State 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.

- Do not handle ESA-listed fish if the water temperature exceeds 69.8 degrees Fahrenheit at the capture site. Under these conditions, suspend collection until temperatures are lower.
- Internally tag (such as with coded-wire tag or PIT tag) at least a portion of each hatchery release group for monitoring and evaluation purposes.
- Seining operations
    - During purse and beach seine operations, release any non-target fish immediately (that is, within 60 seconds) or as soon as is practicable, including all ESA-listed fish (that is, bull trout, wild Chinook, or wild steelhead).
    - Sort by hand or by use of a knotless dip net. Sort and/or release all fish prior to removing the entire seine from the water. Do not dry sort.
    - Do not exceed a sorting time of 75 minutes.
        - For beach seine operations, the sorting time is defined as the elapsed time from when the outer towed end of the net first contacts the shore or block until the net is emptied of fish.
    - 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.
- Check net pens for mortalities at least once per week. Remove mortalities and recover PIT tags.
- Fyke net operations
    - Check nets daily. Release any non-target fish immediately, including all ESA-listed fish (that is, bull trout, wild Chinook, or steelhead).
- Hook and line capture
    - Scan all potential non-target fish for PIT tags. Release any non-target fish with PIT tags immediately, including all ESA-listed fish (that is, bull trout, wild Chinook, or steelhead) and report data to the National Oceanic and Atmospheric Administration annually.
    - Use only barbless hooks. Do not use treble hooks.
- Geotechnical investigations
    - Limit disturbance of riparian vegetation to the minimum necessary to achieve investigation objectives, minimizing habitat alteration and the effects of erosion and sedimentation.

Conservation measures for vegetation and wetlands include:

- Revegetate disturbed areas to conditions similar to prework conditions by spreading stockpiled native materials (for example, spoils, vegetation, rock, and woody debris), seeding, and/or planting with certified weed-free seed mixes or native cultivars.

Avoid mapped wetlands during construction activities to the maximum extent practicable. Where practicable, ensure no ground-disturbing activities occur within a 50-foot buffer area of mapped wetlands.

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Appendix A

Environmental Protection Measures

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Appendix A. Environmental Protection Measures

The following list is a preliminary list of environmental protection measures (EPMs) for the Phase 2 Implementation Plan: Testing Feasibility of Reintroducing Salmon in the Upper Columbia River Basin (P2IP) programmatic environmental assessment (PEA) 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
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
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
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

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
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 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.	ESA	Seining, Fyke Netting, and Hook and Line operations (PEA)	Project Proponents

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
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. Net pen feeding would promote health and growth while minimizing waste. If necessary, feed protocols will be adjusted over time, such as reducing feed volume when staff observe uneaten feed. Feeding of fish in net pens would follow best practices for promoting health and growth while minimizing waste by adjusting feed type and quantity according to a feeding schedule over time.	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,	N/A	Live fish transport (PEA and future environment compliance)	Project Proponents

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
FR-9 *(cont.)*	the truck would be fueled to full prior to fish loading the fish. • 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.	*(see above)*	*(see above)*	*(see above)*

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	N/A	Live fish transport (PEA and future environment compliance)	Project Proponents

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
FR-11 *(cont.)*	tank regulator would be set to an output of 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.	*(see above)*	*(see above)*	*(see above)*

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

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
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

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
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
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. 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
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

EPM #	EPM Description	Ensure Compliance with	Project Activity/NEPA Phase	Responsible Party
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