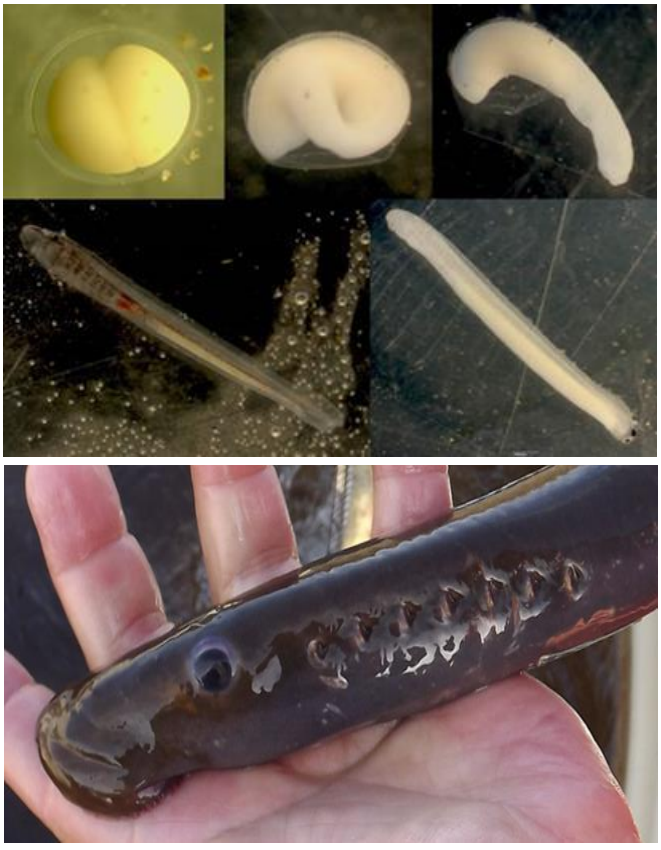
Pacific Lamprey Artificial Propagation and Release Research Environmental Assessment

Draft Environmental Assessment



U.S. Department of Energy - Bonneville Power Administration
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1 Purpose and Need

1.1 Introduction

Bonneville Power Administration (Bonneville) is proposing to fund a program to evaluate the feasibility of artificial propagation and release for early life stage Pacific lamprey (*Entosphenus tridentatus*) in the Yakima, Walla Walla, and Tucannon subbasins. This program is designed as a scientific experiment to evaluate the feasibility of using artificial propagation techniques (in addition to adult translocation) as future enhancement actions for Pacific lamprey throughout its range, with particular emphasis on the Columbia River Basin.

The goal of this project is for the Confederated Tribes and Bands of the Yakama Nation (YN) and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), with support from the Columbia River Inter-Tribal Fish Commission (CRITFC), to conduct experimental early life stage lamprey release and post-release monitoring to inform the development of future enhancement actions.

Bonneville has prepared this draft environmental assessment (EA) pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 USC 4321 *et seq.*) and its implementing regulations which require federal agencies to assess the impacts that their actions may have on the environment and make this impact analysis available to the public.

1.2 Purpose and Need

Bonneville needs to respond to the YN, CTUIR and CRITFC requests to fund the artificial propagation and release of early life stage Pacific lamprey (eggs through juveniles) and the associated post-release monitoring.

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

- Support efforts to mitigate for effects of development and operation of the Federal Columbia River Power System (FCRPS) on fish and wildlife in the mainstem Columbia River and its tributaries pursuant to the Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act; 16 USC §§ 839 *et seq.*) in a manner consistent with the Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program and the purposes of the Northwest Power Act.
- Fulfill Bonneville's commitments under the 2018 Columbia River Fish Accord Extension agreement, as amended, with CRITFC, CTUIR, and YN.
- Minimize adverse effects to the human environment, avoid jeopardizing the continued existence of ESA-listed species, and avoid adverse modification or destruction of designated critical habitat.

1.3 Background

1.3.1 Bonneville Power Administration

Bonneville is a federal power marketing agency within the U.S. Department of Energy with responsibility for marketing and selling power generated by the FCRPS. Bonneville's operations are governed by several statutes, including the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act) (16 U.S.C. § 839b *et seq.*). Among other things, the Northwest Power Act directs Bonneville to protect, mitigate, and enhance fish and wildlife affected by the development and operation of the FCRPS in a manner consistent with the Northwest Power and Conservation Council's (Council) Columbia River Basin Fish and Wildlife Program, the Council's Power Plan, and the purposes of the Northwest Power Act. See 16 U.S.C. § 839b (h) (10) (A).

To partially fulfill its responsibilities under the Northwest Power Act, on May 2, 2008, Bonneville entered into 2008 Columbia Basin Fish Accords Memorandum of Agreement, which was extended in 2018 (Fish Accord) with the YN, the Confederated Tribes of the Warm Springs Reservation, the CTUIR, and CRITFC, as well as the U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers. Under the Fish Accord, Bonneville agreed to make funds available to evaluate the feasibility of using artificially propagated and translocation techniques to better understand and enhance Pacific lamprey.

1.3.2 Northwest Power and Conservation Council's Fish and Wildlife Program

The Northwest Power Act directed the Council to develop a program to protect, mitigate, and enhance fish and wildlife habitat on the Columbia River and its tributaries. Bonneville and the other federal agencies responsible for managing, operating, or regulating federal or non-federal hydroelectric facilities located on the Columbia River or its tributaries must take the Council's program into account to the fullest extent practicable, and Bonneville funds fish and wildlife mitigation in a manner consistent with the Council's program, its power plan, and the purposes of the Northwest Power Act.

As part of its Fish and Wildlife Program, the Council has a three-step process for review of artificial propagation projects proposed for Bonneville funding. Step 1 is conceptual planning, represented primarily by master plan development and approval. The master plan provides the scientific rationale for the activities proposed as part of a fish production program. Step 2 provides preliminary designs (if applicable), cost estimates and environmental review. Step 3 is the final review. The Council's Independent Scientific Review Panel (ISRP)[1] reviews the proposed projects as they move from one stage of the process to the next. In addition to meeting NEPA obligations for Bonneville, this EA addresses the environmental review elements of Step 2.

[1] ISRP was created by the Council in response to Section 4(h)(10)(D) of the Northwest Power Act as amended in 1996 (16 USC 839b(h)(10)(D)(i)). Under the amended Act, the ISRP provides the Council with independent scientific review of projects proposed for funding by BPA.

1.3.3 Pacific Lamprey Conservation Agreement

The U.S. Fish and Wildlife Service (USFWS) developed the Pacific Lamprey Conservation Agreement (USFWS 2012) to solicit a cooperative effort among natural resource agencies, Tribes, and local organizations to reduce threats to Pacific lamprey and improve habitats and population status. The Pacific Lamprey Conservation Agreement recognizes the need to implement artificial propagation and translocation experiments to develop methods and strategies for reintroducing Pacific lamprey to extirpated areas and advancing Pacific lamprey conservation.

1.3.4 History of Pacific Lamprey Translocation Research

Translocation of adult lamprey has been implemented in the Columbia River Basin since 2000. The Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS), CTUIR, YN and NPT developed the Tribal Pacific Lamprey Restoration Plan for the restoration of Pacific lamprey in the Columbia River Basin. The goal of the plan is to "immediately halt the decline of Pacific lamprey and ultimately restore them throughout their historic range in numbers that provide for ecological integrity and sustainable tribal harvest" (CRITFC 2011). The Tribal Pacific Lamprey Restoration Plan has a carefully defined and developed supplementation/augmentation approach in relation to translocation, including the documentation of methodologies and strategies for reintroducing Pacific lamprey to extirpated areas. The 2014 Columbia Basin Fish and Wildlife Program developed by the Council included a recommendation to investigate the potential role of translocation and propagation in lamprey mitigation.

The continued decrease in abundance or complete extirpation in some subbasins, despite restoration actions, suggests that other means of supplementation, including the experimental use of artificially propagated lamprey, should be pursued and investigated in conjunction with translocation and restoration.

1.3.5 History of Pacific Lamprey Artificial Propagation Research

Artificial propagation efforts to date have been limited to research conducted in controlled laboratory environments. To prevent further decline and local extirpations of Pacific lamprey the YN, CTUIR, and CRITFC began developing artificially propagated lamprey and early rearing techniques.

In 2012, the YN succeeded in conducting a pilot project to successfully hold, propagate, incubate, and rear early life stage Pacific lamprey at Marion Drain Hatchery and Prosser Hatchery. In 2013, subsequent artificial propagation research continued at Prosser Hatchery.

In 2012, the CTUIR embarked on pilot Pacific lamprey propagation research at Minthorn Hatchery and the Mukilteo Research Station. By closely coordinating with the YN, the CTUIR successfully fertilized eggs following protocols for Pacific lamprey developed by Japanese (Hokkaido Fish Hatchery 2008) and Finland (Vikström 2002) researchers.

In 2013, the CTUIR continued artificial propagation research at the Mukilteo Research Station and pilot work was started at the newly established Water and Environment Center (WEC) at Walla Walla Community College in collaboration with the YN. In 2014, the majority of CTUIR Pacific lamprey propagation work was conducted at the WEC, as that facility became more fully established. As in previous years, the CTUIR conducted experiments in concert with the YN and the advantages of sharing resources and findings from both tribal programs were again realized.

Work to date has focused on developing the best methods and techniques associated with gamete holding, gamete fertilization, egg incubation, prolarvae holding, transportation of gametes and larvae, disinfection (adult broodstock, eggs, larvae, and juveniles), and larval culture. This laboratory work has provided important insights into Pacific lamprey early life history.

1.4 Public Involvement

To help determine issues to be addressed in the EA, Bonneville conducted public scoping outreach. Bonneville mailed letters on March 1, 2019, to landowners, tribal and government agencies, and other potentially affected or concerned citizens and interest groups. The public letter provided information about the Proposed Action and EA scoping period, requested comments on issues to be addressed in the EA, and described how to comment (mail, fax, telephone, and Bonneville website). The public letter was posted on a project website established by Bonneville to provide information about the program and the EA process. The public comment period began on March 11, 2019, and Bonneville accepted comments on the program from the public until April 11, 2019. Two comments were received during the public scoping period. One requesting a copy of the final EA for archival library resources. The second comment expressed interest in the effects of this proposed propagation program on bull trout in the program. Bonneville developed a Biological Assessment (BA) addressing the effects of the Bonneville funding of artificially propagated Pacific lamprey release and post RM&E through a formal Section 7 ESA consultation with USFWS. All other comments have been addressed in this EA.

All comments and project documents available for public review are posted on Bonneville's website at https://www.bpa.gov/efw/Analysis/NEPADocuments/Pages/Pacific-Lamprey-Artificial-Production-and-Release-Research-DOEEA-2104.aspx.

2 Proposed Action and the No Action Alternative

2.1 Proposed Action: Artificial Production, Release, and Post-Release Monitoring of Pacific Lamprey

Under the Proposed Action, Bonneville would fund the YN and CTUIR to artificially propagate and release early life stage Pacific lamprey in the Yakima, Walla Walla, and Tucannon subbasins and conduct the associated post-release monitoring.

2.1.1 Artificial Production

Existing facilities, the WEC facility at Walla Walla Community College and facilities at Prosser Hatchery, would be utilized to spawn adult lamprey and rear fertilized eggs to the desired life stage prior to release. The Prosser Hatchery facility includes a variety of small- to medium-sized outdoor circular and trough tanks for adult and larval lamprey. The facility would use about 400 gallons of water per minute when all tanks are in use, with both river and well water available (all water would be recycled and returned to the Yakima River). There is also a small building that is used for spawning, incubation, rearing, and feeding experiments.

The WEC is currently supplied with City of Walla Walla water, which is passed through a carbon filter, chilled and UV irradiated. The lab has 5 independent re-circulating systems with a variety of tanks that can support adult holding, spawning and incubation, and rearing.

Early life stage lamprey would be monitored and screened for parasites and pathogens throughout onsite rearing using a combination of grab samples and moribund/fresh mortalities. For releases in Oregon, larval/juvenile disease clearance would occur prior to release by Oregon Department of Fish and Wildlife (ODFW) NE Oregon Pathology lab. For releases in Washington, larval/juvenile disease clearance will occur prior to release by USFWS and/or Washington Department of Fish and Wildlife.

Genetic samples from a subsample of artificially propagated lamprey would be obtained and provided to the CRITFC Hagerman Genetics laboratory for analysis; all of the genetics from contributing parents would also be submitted to provide the baseline data for parentage genetic analysis. Although genetic tagging would serve as the primary means for the extensive artificially propagated lamprey monitoring by the YN, CTUIR, and CRITFC, other types of tagging technologies would also be pursued. For example, larvae larger than 70 mm in size can be Passive Integrated Transponder (PIT) tagged for assessing basic emigration behavior and potentially for assessment of comparative survival rates. Larvae larger than 25 mm in size could be tagged with Visible Implant Elastomer.

2.1.2 Lamprey Releases

Lamprey release sites would be located in the Yakima, Tucannon, and Walla Walla subbasins. The number of lamprey that would be transported at one time would be guided by the density levels within the containers/totes as well as the release plans. The general guideline would be to maintain the mass

density to < 10 g/L (LTWG 2020). In a 5-gallon bucket (80% full), this would equate to 1,000 small larvae (~40 mm, ave. weight 0.15 g) or 100 medium larvae (~100 mm, ave. weight 1.5 g). In a 32-gallon plastic bin (80% full), this would equate to 6,500 small larvae (~40 mm, ave. weight 0.15 g) or 650 medium larvae (~100 mm, ave. weight 1.5 g).

At the release site, lamprey would be either manually transferred using syphon hoses, nets, or portable containers or transported using fish pumps.

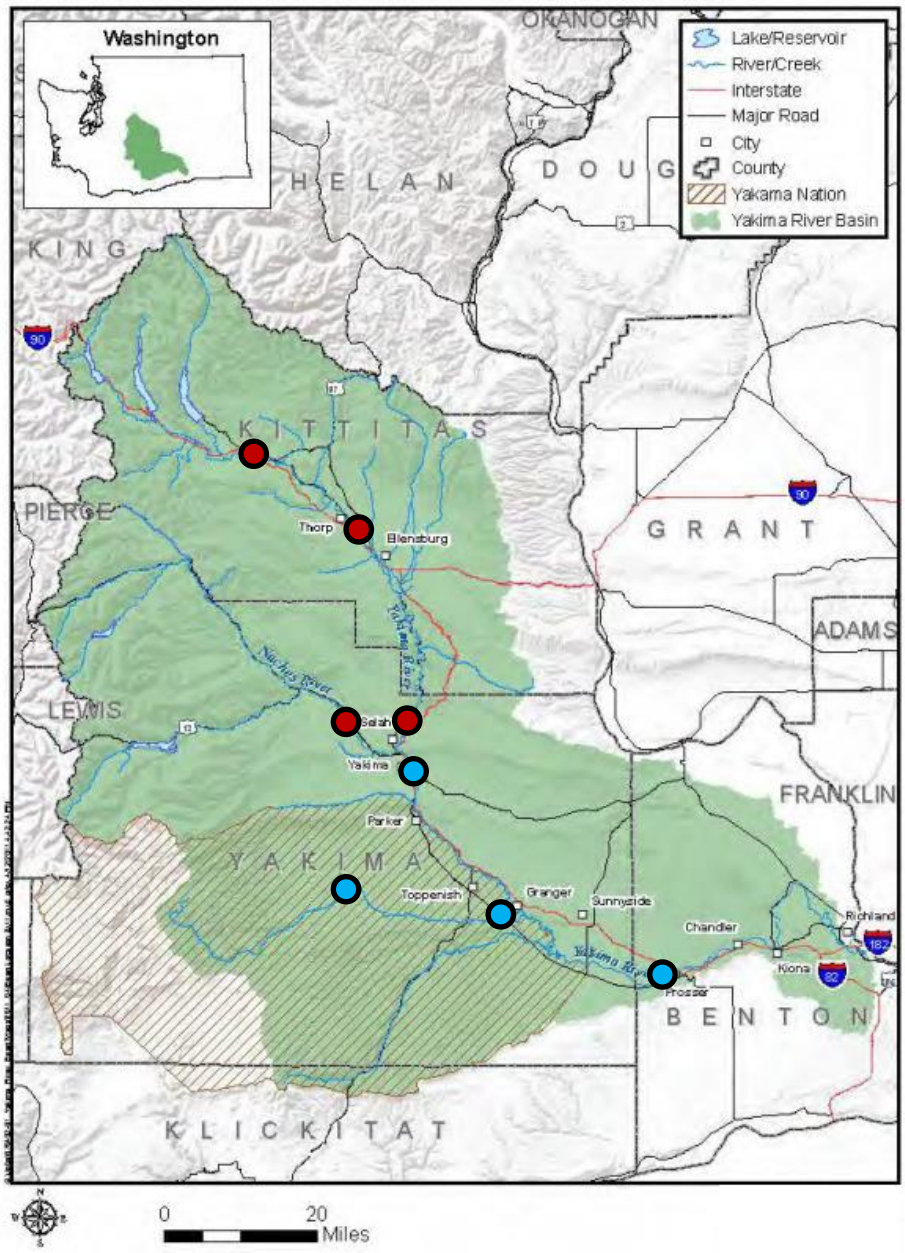
Yakima Basin

Eight release sites have been identified in the Yakima Subbasin (Figure 1). Three sites would be in the Upper Yakima, one site in the Lower Naches near its confluence with the Yakima, two sites in the Lower Yakima River, and two sites in Toppenish Creek on the Yakama Reservation. Six of the release sites would be in areas designated as foraging, migration, and rearing (FMO) habitat for bull trout. Toppenish Creek, where two release sites would be located, does not have designated bull trout critical habitat (Table 1). In the Upper Yakima, the Cle Elum Hatchery Site is a perennial side channel; the Holmes Acclimation Site is a historical side channel that was converted to a perennial acclimation pond; the Lower Wenas Site is a reach near the mouth of Wenas Creek where beaver dam pools are naturally abundant. On the Naches River, the Eschbach Park Site is an irrigation diversion side channel located on the Lower Naches River. The two release sites on the Lower Yakima River are located at publicly accessible locations along the Yakima River mainstem with a combination of swift and slow water habitat. For the Toppenish Creek and Lower Yakima locations, there would only be releases of juvenile lamprey. Post-release monitoring would not be conducted at these locations.

Table 1: Yakima Subbasin Release Site Descriptions

Release Site	Location	Length (km)	CH Designation
Cle Elum Hatchery	rkm 301.2-303.2	2.6	FMO
Holmes Acclimation	rkm 260.7-261.5	1.2	FMO
Lower Wenas	rkm 0.0-2.4	3.0	FMO
Eschbach Park (Naches)	rkm 12.0-14.1	2.9	FMO
Toppenish Creek – #1	rkm 56.8	0.1	None
Toppenish Creek – #2	rkm 2.9	0.1	None
Lower Yakima #1	rkm 183.9	0.1	FMO
Lower Yakima #2	rkm 76.9	0.1	FMO

Figure 1: Yakima River Subbasin with proposed release locations
(Red Dots – Release and post-release monitoring locations; Blue Dots – Release only locations)



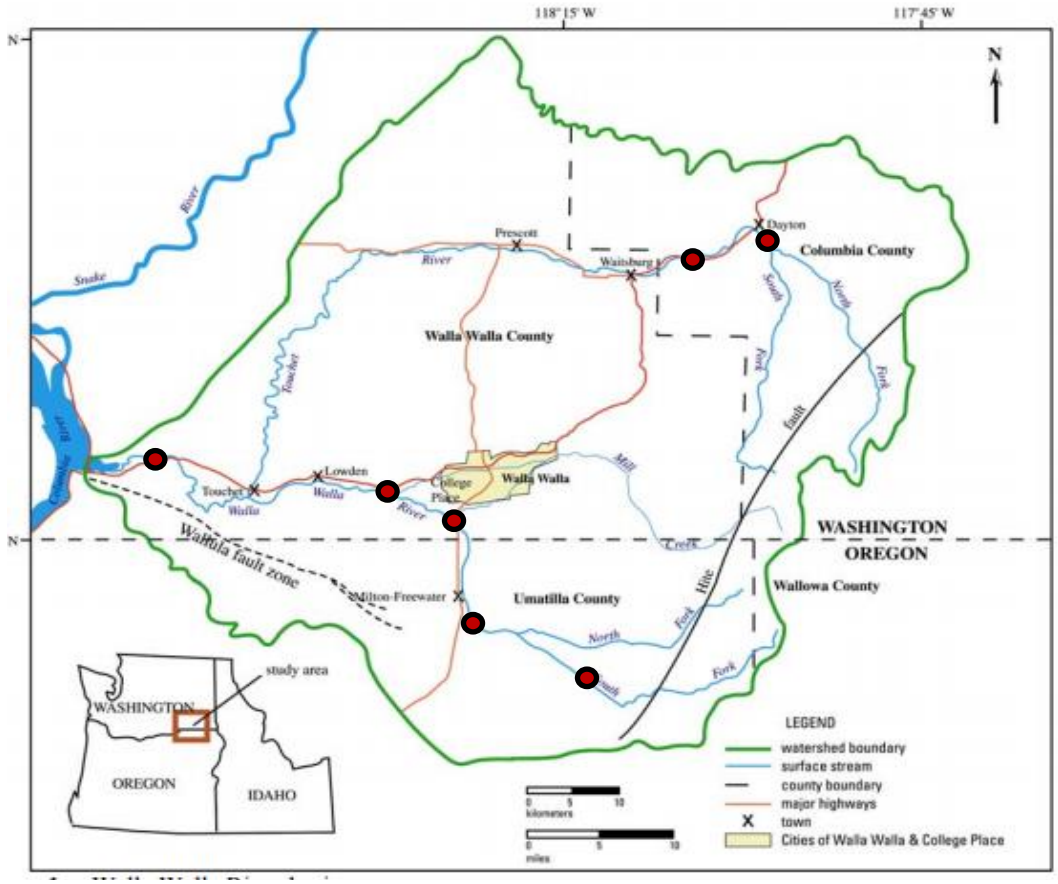
Walla Walla Subbasin

Seven release sites were identified in the Walla Walla subbasin (Figure 2). There would be four sites in the Walla Walla River, one site in the South Fork (SF) Walla Walla, and two sites in the Touchet River. The SF Walla Walla release site is located in 2 km of the most downstream of the 20 miles of spawning and rearing critical habitat in the SF Walla Walla (Table 2). For each of these locations, releases would occur along the edges of the mainstem in backwater areas, alcoves, and pools with sediment that would provide adequate rearing habitat for early life stage lamprey.

Table 2: Walla Walla Subbasin Release Site Descriptions

Release site	Location	Length (km)	Bull Trout CH Designation
Walla Walla – #1	rkm 13-16	3k	FMO
Walla Walla – #2	rkm 57.5-60.5	3k	FMO
Walla Walla – #3	rkm 67-70	3k	FMO
Walla Walla – #4	rkm 83 to 86	3k	FMO
SF Walla Walla – #1	rkm 5-11	6k	SR
Touchet – #1	rkm 75-78	3k	FMO
Touchet – #2	rkm 92-95	3k	FMO

Figure 2: Walla River Subbasin with proposed release locations



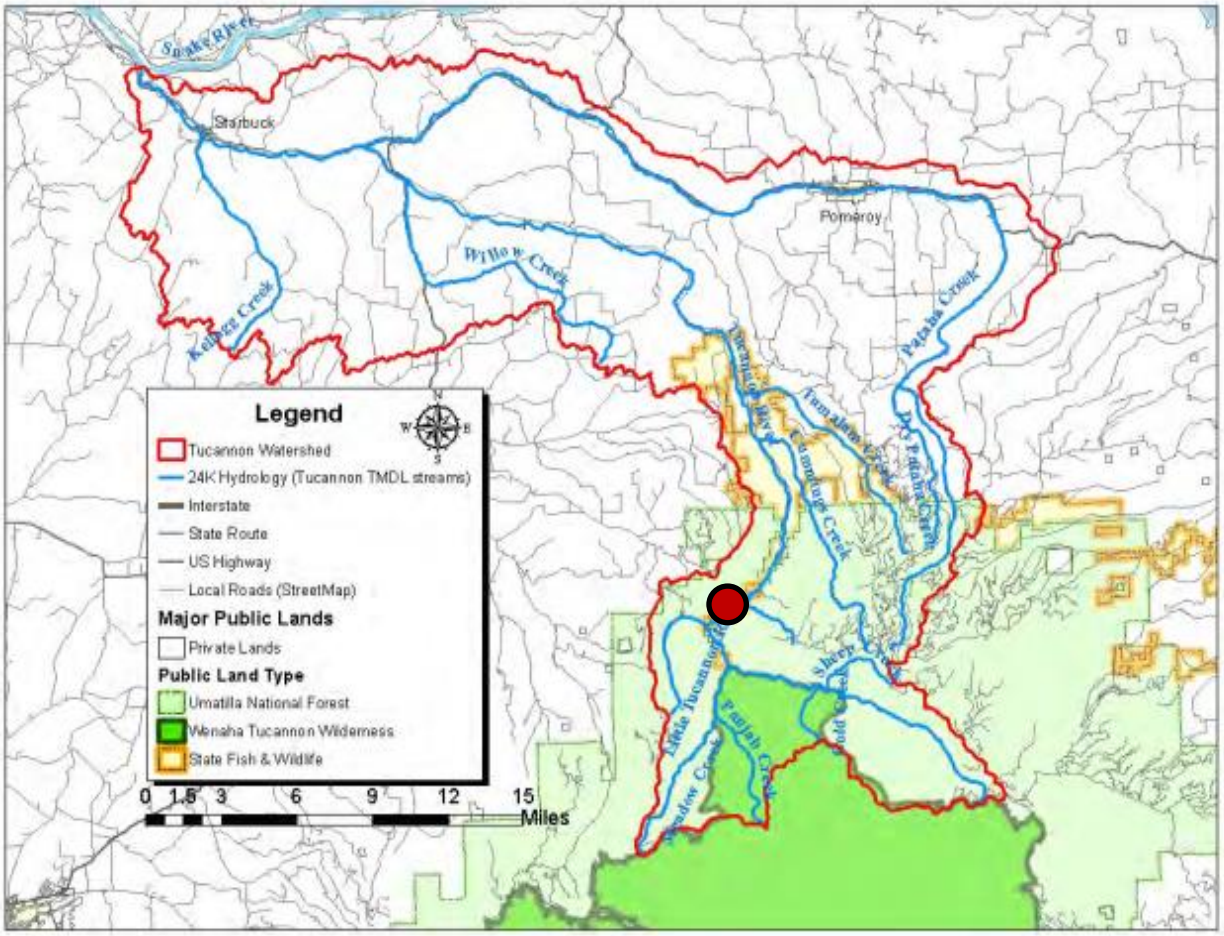
Tucannon Subbasin

There would be one release site in the Upper Tucannon River (Figure 3). A portion of the Tucannon site includes the first mile of designated spawning and rearing habitat in the Upper Tucannon Subbasin (Table 3). The releases would occur along the edges of the mainstem in backwater areas, alcoves, and pools with sediment that would provide adequate rearing habitat for early life stage lamprey.

Table 3: Tucannon River Release Site Description

Release site	Location	Length	Length (km)
Tucannon – #1	rkm 69.5-72.5	3 k	SR

Figure 3: Tucannon River Subbasin with proposed release location (Red Dot – Release and post-release monitoring location)



2.1.1 Post-Release Monitoring

Immediately following release lamprey would be monitored several times to evaluate survival. After that, annual monitoring would be conducted to determine habitat use, growth, densities, and movements over time and survival. Over the long-term additional data on lamprey movements would be collected at index sites using electrofishing surveys and rotary screw traps, etc. 1 to 7 years post release.

Post-release monitoring would include the following activities:

Monitoring enclosures – Monitoring enclosures would be used to limit the movement immediately after release in order to monitor short and long-term behavior, growth, and survival. A small enclosure (e.g. net pen, square plastic tray) would be placed within stream sediment allowing access to in-stream environmental conditions but would remain in a static location to facilitate short- and long-term monitoring and evaluation.

Zooplankton drift sampling – Zooplankton drift sampling would be used to collect Pacific lamprey prolarave drifting downstream. Zooplankton nets would be spread across a portion of the stream channel, downstream of potential/known spawning locations, and sample the entire water column. Sampling would occur after twilight. Each sampling event would last approximately 5 to 20 minutes depending on flow conditions and concentrations of net-clogging detrital matter.

Electrofishing – Electrofishing would be used to collect early life stage lamprey from in-stream sediments. This method uses a backpack or shore-based electrofisher and applies "lamprey" settings which consist of two wave forms: a lower frequency "tickle" wave form to coax larvae out of substrate (125 v: voltage; 3 Hz: pulse frequency; 25%: duty cycle; 3:1: burst pulse train) and if needed, a higher frequency "stun" wave form to immobilize larvae for netting (125 v, 30 Hz, 25% duty cycle) (LTWG. 2020).

Deepwater sampling methods – These methods would be used to collect/observe Pacific lamprey larvae and juveniles in locations that are too deep to conduct traditional electrofishing surveys. These methods would either use electrofishing and surface sampling (Jolley et al. 2017) or electrofishing and video-monitoring (Arntzen and Mueller 2017) to monitor the presence, absence, and distribution of larval and juvenile Pacific lamprey.

Sediment sampling – Sediment sampling would be used in locations that are too deep or turbid to conduct traditional electrofishing surveys. This method uses a small rectangular dredge to sediments in soft substrate areas.

2.2 No Action Alternative

Under the No Action Alternative, Bonneville would not fund the artificially propagated Pacific lamprey release and post-release monitoring. Artificial propagation research would continue to be limited to the laboratory environment with no effort to expand research into the natural environment. Existing adult collection, holding, and spawning procedures for translocation programs would be maintained.

2.3 Comparison of Alternatives

The following table compares the Proposed Action and the No Action Alternative by the purposes of this project.

Table 4: Comparison of Alternatives by Purpose

Purpose	Proposed Action	No Action Alternative
Comply with applicable laws, regulations, and policies that guide the agency.	Would be consistent with applicable laws, regulations and policies.	Would be consistent with applicable laws, regulations and policies.
Support efforts to mitigate for effects of development and operation of the Federal Columbia River Power System (FCRPS) on fish and wildlife in the mainstem Columbia River and its tributaries pursuant to the Northwest Electric Power Planning and Conservation Act of 1980 (Northwest Power Act; 16 USC §§ 839 *et seq*.)	Would support the mitigation efforts called for in the Northwest Power Act by enhancing fish and wildlife habitat in the Columbia River Basin.	Would not provide enhanced fish and wildlife and/or associated habitat in the Columbia River Basin.
Assist in carrying out commitments made by Bonneville under the 2018 Columbia River Fish Accord Extension agreement with CRITFC, CTUIR, and YN.	Would meet the commitments by Bonneville to CRITFC, CTUIR, and YN by providing partial funding to CRITFC, CTUIR, and YN Lamprey RM&E programs. The project would release artificially propagated early life stage Pacific lamprey (eggs through juveniles) as per experimental design and the RM&E associated with artificially propagated lamprey release.	Would not meet some of the commitments made by Bonneville to CRITFC, CTUIR, and YN. Methods to enhance fish and wildlife, particularly Pacific Lamprey populations in extirpated watersheds, would not be evaluated.
Minimize harm to natural or human resources and avoid jeopardy to ESA listed species and adverse modification or destruction of designated critical habitat.	Would have temporary impacts associated with release and RM&E but would have a long term beneficial effect on ESA listed bull trout and bull trout critical habitat.	Would not have impacts but would have ongoing impacts on a series of watersheds that are extirpated of lamprey.

2.4 Mitigation Measures

The following measures are intended to reduce any potentially adverse effects of release and post-release monitoring of artificially propagated Pacific lamprey.

1. Follow the Lamprey Technical Work Group Best Management Guidelines for Native Lampreys during In-Water Work (May 4, 2020) or the most current version.
2. Apply protective measures resulting from consultation with USFWS and NMFS and permit actions of other agencies if applicable.
3. Follow established protocols (legal or scientific) for handling ESA-listed species if applicable.

4. Snorkel enclosed areas to verify that no ESA-listed fish are present before conducting research, monitoring and evaluation.
5. Apply protective measures resulting from consultation with USFWS, if any.
6. Follow any additional Conservation Measures identified in USFWS Bi-Op to be released in 2020.

3 Affected Environment and Environmental Consequences

This chapter provides a description of the affected environment and resources that could be impacted by the Proposed Action and No Action Alternative. It also describes the potential impacts on these resources that could result from implementation of the Proposed Action. The impact levels are characterized as high, moderate, low, or no impact. The impact levels are based on the analysis provided, which incorporates the considerations of context and intensity defined in the Council of Environmental Quality Regulations (40 Code of Federal Regulations 1508.27). The resources considered are fish, wildlife, land use, recreation, and socioeconomics. Effects to other areas and resources were considered, but are not discussed in detail for the following reasons.

1. The actions in the environment are of very short duration:
    a. Impacts are anticipated to be limited to the minimal, temporary effect of human activity during release actions.
    b. No short-term ecological effects from Pacific lamprey release are anticipated.
    c. These changes are expected to result in beneficial effects for the long term on species of prey and the restoring of Pacific lamprey populations.
2. The actions in the environment have no ground-disturbing activities:
    a. The impacts anticipated on resources such as geology, soils, scenic values, transportation infrastructure, wetlands, floodplains, and vegetation, would not be further addressed. These resources would only be impacted by ground-disturbing or site-modifying actions; and none are proposed here with these actions.
    b. For all of these resources, there would be no resource impact or change that could be discussed further than what is disclosed.
    c. The effects to cultural resources would not be addressed because this action has no ground-disturbing activities associated with it, and thus no potential to disturb cultural resources.

3.1 Fish

3.1.1 Affected Environment

Pacific lamprey

Pacific lamprey populations throughout the Columbia River Basin are in decline and considered a species of concern by the USFWS but are not listed under the ESA. The life cycle of the lamprey start off as eggs, which hatch into prolarvae (0-3 months) and subsequently larvae. Larvae live in river sediment for 4 to 6 years on average, but can vary from 3-9 years. They filter feed organic detritus and metamorphose into the juvenile form and migrate to sea. Juveniles are assumed to spend 1-3 years in the ocean; juveniles then return to freshwater as adults to migrate upstream over a one year period before they spawn and die. Spawning typically occurs between March and July depending upon location within their range. The degree of homing is unknown, but adult Pacific lamprey cue in on larval lamprey-

releasing pheromones that are thought to aid adult migration back to spawning locations. Both sexes construct the nests by moving stones with their mouth. After the eggs are deposited and fertilized, the adults typically die within 3 to 21 days after spawning.

The Pacific lamprey is an anadromous fish widely distributed along the Pacific coast of North America and Asia. Historically, Pacific lamprey are thought to be distributed wherever salmon and steelhead occurred. Historical runs of Pacific lamprey in the Columbia River numbered in the hundreds of thousands at Bonneville Dam as recently as 1960. However, available information indicates a substantial decline in numbers of Pacific lamprey (Figure 4). The distribution and abundance of Pacific lamprey have been reduced by construction of dams and diversions as well as degradation of spawning and rearing habitat (Quigley et al. 1996).

The abundance and distribution of Pacific lamprey has substantially declined throughout its range over the past three decades (USFWS, 2019). Many factors have contributed to this decline aside from impeded passage at dams such as, altered management of water flows, dewatering of stream reaches, dredging, pollution/contaminants, poor ocean conditions, degraded water quality, disease, introduction and the establishment of non-native fishes, increased predation, and stream and floodplain degradation (Luzier et al 2011). Mitigation and restoration actions focused on habitat restoration of salmonid species within tributary habitats may have occasionally contributed to this decline as they may not have considered needs unique to Pacific lamprey.

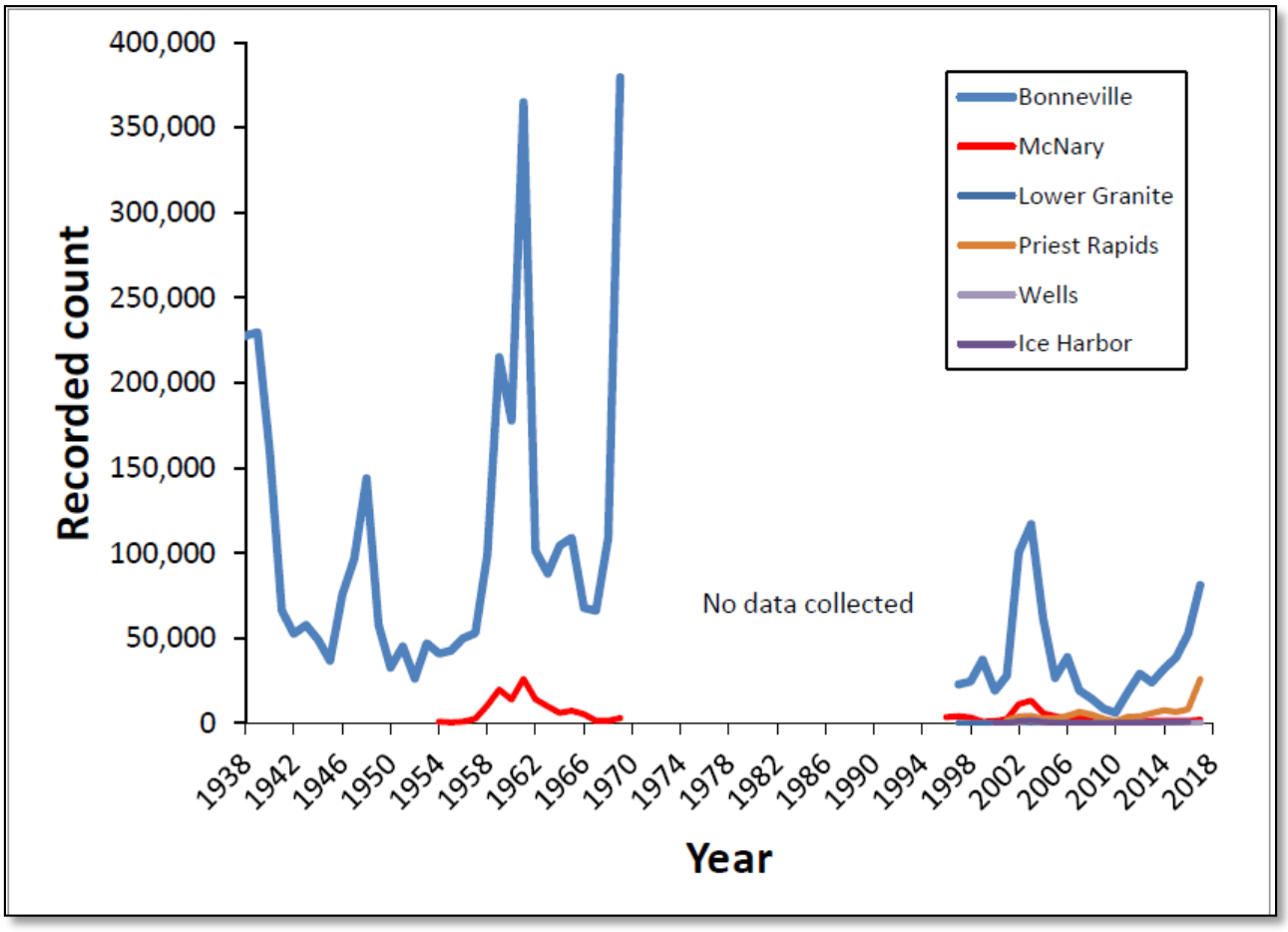
After spending one to three years in the marine environment, Pacific lamprey cease feeding and migrate to freshwater between February and June. They are thought to overwinter and remain in freshwater habitat for approximately one year before spawning. During that time they may shrink in size up to 30 percent. Most upstream migration takes place at night. Adult size at the time of migration ranges from about 15 to 25 inches (USFWS 2019).

The differences in substrate requirements of salmonids versus lamprey is larval lamprey's preference for depositional zones with a mixture of sand and fine organic matter. Rearing habitat is commonly categorized as either Type I (preferred; in depositional zones with a mixture of sand and fine organic matter, resulting in silt mud), Type II (acceptable; shifting sand that may contain gravel and other coarse substrate), or Type III (unacceptable; hard packed coarse substrate, hard-pan clay, and bedrock), based on suitability of substrate for rearing larvae (Slade et al. 2003).

3.1.1 Anadromous Fish

The Columbia River historically produced some of the world's largest runs of salmon but today thirteen populations of salmon and steelhead are listed as threatened or endangered under the ESA.

Figure 4 Adult Pacific lamprey annual counts at Columbia and Snake River dams – 1938 to 2017.



Adult steelhead migrate from a marine environment into the freshwater streams and river. Unlike other salmonids they can spawn more than one time. The maximum age for steelhead is usually about eleven years. Males usually reach maturity after two years, while females reach maturity after three years. Juvenile steelhead may spend up to seven years in freshwater before migrating to estuarine areas as smolts and then into the ocean to feed and mature. They can also remain at sea for up to three years before returning to freshwater to spawn. Some populations actually return to freshwater after their first season in the ocean but they usually do not spawn. Timing of return to the ocean can vary, and even within a stream system there can be different seasonal runs. Steelhead can be divided into two basic reproductive types, stream-maturing or ocean-maturing, based on the state of sexual maturity at the time of river entry and duration of spawning migration.

3.1.2 Other Fish

Bull trout in the mainstem of the upper Yakima River (upstream of Roza Dam) are considered as one stock with a fluvial life history pattern. Although the genetic characteristics of the stock have not been

determined, bull trout in the mainstem of the Yakima River are considered distinct from other Yakima subbasin stocks based on physical, geographical, and thermal isolating factors (dams, warm water temperatures, irrigation diversions, etc.). Bull trout distribution and densities in the Touchet River are limited by a number of historical and present activities which have degraded habitat and water quality. Sediment runoff from agricultural lands and eroding banks have caused considerable sediment embeddedness in the basin. Logging and channel modification have reduced recruitment of large woody debris, and channel modification and bank armoring have also reduced off-channel habitat and connectivity in the Touchet River and throughout the basin (Kuttel, 2001). Bull trout in the Tucannon River migrate upstream in spring and early summer to the spawning areas in upper portions of the Tucannon River watershed (Faler et al., 2003). In the fall, after spawning, they move off the spawning areas and make a slower migration downstream until March or April. By June 1, most bull trout have ascended the Tucannon River. During late fall and winter, bull trout are distributed in the lower half of the Tucannon River basin, down to and including the mainstem Snake River below Little Goose Dam.

The Yakima, Walla Walla, and Tucannon subbasins provide habitat for a variety of other native and non-native fish such as sculpins, dace, sucker, and non-native smallmouth bass, brook trout, carp, channel catfish.

3.1.3 Environmental Consequences – Proposed Action

Pacific Lamprey

Local adaptation is not likely to represent a large risk for Pacific lamprey and would have a negligible short-term effect, but a moderate beneficial long-term effect. Adults do not seem to home to their natal stream as faithfully as salmon. There is evidence that larger bodied Pacific lamprey are more likely to migrate to the interior Columbia River as compared to the lower Columbia River, and adaptive genetic variation is associated with body size variation (Hess, 2016). Even if some smaller bodied adults were used in artificial propagation, their genetic diversity would likely only increase the overall diversity to the interior Columbia River and would not be expected to adversely affect overall fitness of this interior Columbia River regional management units. Due to the short duration and limited spatial extent, effects are not likely to reach levels that would cause injury or harm, and would therefore be insignificant. In addition, at most lamprey release sites, Pacific lamprey are present at a very low levels or have been extirpated. Therefore the effects on Pacific lamprey would be low.

Anadromous Fish

The release of early life stage lamprey would be done using syphon hoses, nets, or portable containers. In some cases, fish pumps would be used. If there are fish in the area when this action occurs they would likely avoid the area until the release was concluded. While some fish habitat at each of the sites would be disturbed, the overall effects from lamprey releases would be low.

Backpack electrofishing would be conducted as part of post-release monitoring of early life stage lamprey. In general, to generate electrofishing fields that effect salmonids [and other fishes], frequencies

greater than 30 Hz and voltages greater than 200 volts are used. The maximum current used for post-release monitoring of lamprey would be 125 volts. Because of the low frequencies, low voltages, and stationary technique used when electrofishing to capture larval lamprey, there would be a low, if any, effect on anadromous fishes.

Other Fish

Post-release monitoring of early life stage lamprey has the potential to introduce aquatic invasive species (AIS). AIS prey on the eggs, larvae, juveniles, and adults of native species and compete with all of these life stages for forage and living space. To prevent the introduction of AIS during monitoring, all field staff would follow these requirements: waders, boots, and any other gear to be used in or near water would be cleaned, washed, and inspected for AIS prior to entering the water; and wading boots with felt soles are not to be used due to their propensity for aiding in the transfer of AIS unless decontamination procedures are used. Because of these protocols, the effects of AIS on native species would be low.

Potential effects to ESA-listed bull trout has been evaluated in consultation with the USFWS. The following conservation measures from the consultation would further reduce potential effects to bull trout and other native fish species:

- Monitoring activities would take place when air and water temperatures are coolest (prioritize for mornings when feasible).
- Researchers would conduct a careful visual survey of the area to be sampled before beginning electrofishing to determine if any fish are present.
- Electrofishing session would start with all settings (voltage, pulse width, and pulse rate) set to the minimums needed to capture lamprey.
- Electrofishing would not occur in turbid water where visibility is poor (i.e. unable to see the bed of the stream).

3.1.4 Environmental Consequences – No Action

In the No Action alternative, the current artificial propagation programs would continue to be limited to the laboratory environment and no effects to fish or fish habitat from the release and post-release monitoring activities would occur.

3.2 Wildlife

3.2.1 Affected Environment

A wide variety of wildlife species can be found within the project area. A variety of vegetation/habitat types occur at the release sites and range from turf grasses, riparian vegetation, and some patches of trees and shrubs. Most of the release sites are close to developed areas so have lower wildlife value due to close proximity to human activities and/or adjacent to roads.

3.2.2 Environmental Consequences – Proposed Action

Wildlife species found in or around rivers and riparian areas are beaver, muskrat, otter, and mink, and could be present at the lamprey release sites. Release and post-release monitoring activities could temporarily displace these animals but they would return or be replaced by other individuals of the same types of species once activities ceased. The project would have no effect on ESA-listed wildlife species because the project area is outside management areas or designated critical habitat for three ESA-listed wildlife species known to occur in the project area: Canada lynx, marbled murrelet, and western yellow-billed cuckoo. The overall effects to wildlife would be low.

3.2.3 Environmental Consequences – No Action

Under the No Action Alternative, artificial propagation research would continue in only the laboratory environment and no wildlife or wildlife habitat would be affected.

3.3 Land Use and Recreation

3.3.1 Affected Environment

Release sites (Figures 1, 2, and 3) are in rural areas where agricultural and sparse residential and commercial land uses predominate. Each of the release sites occur within the ordinary high water level of the rivers where they are located. Access to each of the release sites would use existing roads.

The release sites are primarily located in major rivers so water-based activities (boating, swimming, and fishing) are the main recreational activities that would be present.

3.3.2 Environmental Consequences – Proposed Action

Land Use

Because all of the activities planned at each of the release sites would occur within the ordinary high water level for the rivers they are located and access would utilize existing roads, the Proposed Action would have no effect on existing land uses.

Recreation

Although recreational activities may occur on the rivers where release sites are located, releases and monitoring activities would occur in a relative small area along each of the rivers occur in areas on river margins in 4 feet or less in depth. Because of the short duration and limited spatial extent of the proposed activities, the effects to recreation would be low.

3.3.3 Environmental Consequences – No Action

Land Use

Under the No Action Alternative, there would be no release or post-monitoring activities, and therefore, there would be no effect.

Recreation

Because no changes are expected under the No Action Alternative, there would be no effect to recreation.

3.4 Socioeconomics and Environmental Justice

3.4.1 Affected Environment

3.4.1.1 Socioeconomic conditions

The communities in the vicinity of the release sites are rural and comprised of agricultural, forest, livestock economies with some industrial, or residential development. The Proposed Action would occur in Umatilla County, Oregon, population 76,000; Kittitas County, Washington, population 41,000; Yakama County, Washington, population 243,000; Walla Walla County, Washington, population 59,000; and Columbia County, Washington, population 4,000.

3.4.1.2 Environmental Justice

Executive Order 12898 directs federal agencies to take the appropriate and necessary steps to address disproportionately high and adverse human health or environmental effects of federal actions on the health or environment of minority populations and low-income populations (the environmental justice populations). Guidelines provided by the CEQ (1997) and EPA (1998) indicate that a minority community may be defined where either 1) the minority population comprises more than 50 percent of the total population, or 2) the minority population of the affected area is meaningfully greater than the minority population in the general population of an appropriate benchmark region used for comparison.

3.4.2 Environmental Consequences – Proposed Action

The Proposed Action would not create income opportunities for local populations so the socioeconomic effects would be low.

The Proposed Action is not expected to have adverse human health or environmental effects or disadvantage low-income or minority populations.

3.4.3 Environmental Consequences – No Action

Under the No Action Alternative, no actions would occur and so there would be no adverse human health or environmental effects or disadvantage low-income or minority populations.

4 Cumulative Effects

Cumulative impacts are the impacts on the environment that result from the incremental impact of the project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions.

This section describes past actions in the vicinity of the proposed project, as well as present and reasonably foreseeable future actions in the project area.

4.1 Cumulative Impacts Analysis

Cumulative impacts are impacts that could occur when considered in addition to other past, present, and reasonably foreseeable future actions.[2] The geographic area considered for cumulative impacts includes the Yakima, Walla Walla, and Tucannon subbasins.

4.1.1 Fish

There would be no physical handling of any other Federal/state special-status fish species or impact to protected habitats for fish to administer the release program. The equipment used for release would have a temporary effect and be low. The clearing and conversion of land for logging, agriculture, and rural development, as well as operation of hydroelectric projects, have resulted in the loss of fish habitat. Therefore, the project would have a low cumulative impact on fish.

4.1.1.1 Pacific Lamprey

The Proposed Action would include larval lamprey sampling using an electrofisher, with a focus on depositional habitats along river margins, in shallow water (generally less than 2 meters deep), and in river mainstems in areas deeper than 2 meters. Both shallow- and deep-water sampling will would use the same electrofishing technology (Bergstedt and Genovese 1994, Moser et al. 2007). The deep water sampler would use probes mounted to a square cover and connected to a suction pump to bring larval lamprey to the surface.

Other activities associated with post-release monitoring would be use plankton nets, enclosure traps, and/or sediment sifting surveys. These activities would occur in areas on river margins of 4 feet or less

[2] Shortly before this Draft EA was issued for public review, the Council on Environmental Quality (CEQ) published a final rule updating its NEPA implementing regulations, including revisions to the definition of effects (i.e., impacts) and eliminating the requirement to consider cumulative effects. The new CEQ NEPA regulations are available at https://ceq.doe.gov/laws-regulations/regulations.html. CEQ indicated that its new regulations are effective as of September 14, 2020, and apply to any NEPA process begun after that effective date (CEQ Memorandum for Heads of Federal Departments and Agencies, July 16, 2020.). Because the EA for the Pacific Lamprey Artificial Propagation and Release Research was begun before the effective date of the new CEQ NEPA regulations, this EA was prepared consistent with the pre-revision NEPA regulations.

in depth and be of such short duration and limited spatial extent that they would be considered insignificant to overall populations. So because of the benefits from increased knowledge of lamprey biology, project activities would have an overall beneficial cumulative impact on lamprey species.

4.1.1.2 Anadromous Fish

The Proposed Action would include larval lamprey sampling using an electrofisher. The focus is on depositional habitats along river margins, in shallow water (generally less than 2 meters deep), and in select areas that may be deeper than 2 meters. Electrofishing techniques used for larval lamprey are fundamentally different than those used for salmon. Rather than continually moving and sweeping an area with the probe, the probes are held stationary in one location to agitate lamprey from burrows in the substrate. Because of the low frequencies, low voltages, and stationary techniques used to capture larval lamprey, the cumulative effects to anadromous fish would be low.

Other activities associated with post-release monitoring would be plankton nets, enclosure traps, and/or sediment sifting surveys. These activities would occur in areas on river margins of 4 feet or less in depth and be of such short duration and limited spatial extent that they would be considered insignificant to overall anadromous populations. The cumulative impacts on anadromous species would be low.

4.1.1.3 Other Fish

The activities would conduct larval lamprey sampling using an electrofisher. Because of the extremely low frequencies, low voltages, and stationary techniques used to capture larval lamprey, the cumulative adverse effects to other fish would be low.

All other activities associated with post-release monitoring would be using plankton nets, enclosure traps, and/or sediment sifting surveys. Because activities would be in areas of 4 feet or less in depth and be of such short duration and limited spatial extent, the cumulative adverse effects to other fish would be low.

4.1.2 Wildlife

As described in Section 3.2, the Proposed Action would have a low impact on wildlife and wildlife habitat so the cumulative adverse effects to wildlife would be low.

4.1.3 Land Use and Recreation

The geographical area considered for cumulative impacts on land use and recreation resources includes the Yakima, Walla Walla, and Tucannon subbasins. Land use and recreation in the vicinity have incrementally changed because of past and present actions, and this trend is expected to continue. The project would have a negligible to low adverse cumulative impact on recreation because of temporary disruptions during releases. However, recreational opportunities are not expected to change in the Yakima, Walla Walla, and Tucannon subbasins and so the cumulative adverse effects to land use and recreation would be low.

4.1.4 Socioeconomics

The geographic areas for cumulative impacts on socioeconomics include Umatilla County, Oregon; Kittitas County, Yakama County, Walla Walla County, and Columbia County, Washington.

Cumulative impacts on socioeconomics would be negligible to low as other working land development practices would occur simultaneously in surroundings adjacent to project release sites, such as residential development, agricultural operations, or road construction. Because the employment and income associated with the activities in the geographic areas would be low, temporary, and infrequent, the project would likely not contribute to noticeable long-term economic benefits (employment, income, tax revenue) or demand for housing in communities. In addition, because the project would not disproportionately affect any low-income or minority populations, there would be no cumulative impacts on environmental justice populations. Socioeconomic benefits of the project, when combined with other fish and wildlife mitigation projects, including other Bonneville-funded projects, could combine for cumulative beneficial socioeconomic benefits. Thus, the adverse cumulative impacts from the Proposed Action on socioeconomics would likely be low.

5 Coordination, Consultation, and Compliance

5.1 Agency Coordination and Public Involvement

Meetings and conference calls among the YN, CTUIR, CRITFC, USFWS, National Marine Fisheries Service (NMFS), and Bonneville have been ongoing for technical coordination and planning of actions to benefit Pacific lamprey.

Input from members of the public who may have an interest in this project have been contacted during the public scoping effort described in Section 1.6. Outreach to landowners surrounding release sites has occurred and would continue.

5.2 Environmental Review and Coordination

In conducting the artificially propagated Pacific lamprey release and post-release monitoring the YN, CTUIR, CRITFC and Bonneville would comply with federal laws, regulations, and Executive Orders. The following section describes how the proposed action is in compliance with the NEPA; ESA; Heritage Conservation and Cultural Resources Protection; Magnuson-Stevens Act including Essential Fish Habitat; and other relevant Federal Executive Orders.

5.2.1 National Environmental Policy Act

NEPA requires Federal agencies to assess the impacts that their actions may have on the environment. Major Federal actions significantly affecting the quality of the human environment require the preparation of an EIS. This EA has been prepared to determine if the project would create any significant environmental impacts that would warrant preparing an EIS, or whether it is appropriate to

prepare a Finding of No Significant Impact (FONSI). In this EA, Bonneville evaluated two alternatives to meet the purpose and need to maintain the status of the artificially propagated Pacific lamprey release and post-release monitoring: the Proposed Action and the No Action Alternative. The Proposed Action would involve the artificially propagated Pacific lamprey release in fifteen locations within Upper Yakima River Watershed, Naches River Watershed, Mid Walla Walla River Watershed, and Upper Tucannon River Watershed as well as post-release monitoring.

5.2.2 Endangered Species Act

The ESA and its amendments (16 U.S.C. 1531 *et seq.*) require federal agencies to ensure that the actions they authorize, fund, and carry out do not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat. A formal Section 7 consultation will be completed by the USFWS to determine effects of the artificially propagated Pacific lamprey release and research program on threatened and endangered species. An informal consultation with NMFS will be completed reflecting updates to the proposed new locations involving artificially propagated lamprey RM&E.

5.2.1 Cultural Resources Protection

Section 106 of the National Historic Preservation Act requires Federal agencies to consider the effects of their actions on historic properties that are listed or eligible for listing on the National Register of Historic Places.

Bonneville concluded that the Proposed Action has no potential to cause effects on historic properties since it would not include any ground-disturbing activities or any activities to affect existing structures. However, the tribal proponents would follow established procedures for protecting archaeological and cultural resources if encountered during the artificially propagated lamprey release process. The proponents would avoid damaging cultural and historic resources and would comply with applicable cultural resource preservation laws.

Cultural resource-related laws and regulations include the following:

- Antiquities Act of 1906 (16 U.S.C. 431–433),
- Historic Sites Act of 1935 (16 U.S.C. 461–467),
- Section 106 of the NHPA (54 U.S.C. § 300108), as amended,
- Archaeological Data Preservation Act of 1974 (16 U.S.C. 469 a–c),
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470 et seq.), as amended,
- Native American Graves Protection and Repatriation Act (25 U.S.C. 3001 et seq.),
- Executive Order 13007 Indian Sacred Sites, and
- American Indian Religious Freedom Act of 1978 (PL 95-341, 92 Stat. 469, 42 U.S.C. 1996, 1996a)

5.2.2 Magnuson-Stevens Act and Essential Fish Habitat

NMFS is responsible for ensuring compliance with the Magnuson-Stevens Fishery Conservation and Management Act of 1975. Public Law 104–297, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Fishery Conservation and Management Act to establish new requirements for evaluating and consulting on adverse effects to essential fish habitat (EFH). Under Section 305(b) (4) of the Act, Bonneville is required to consult with NMFS for actions that adversely affect EFH; in turn, NMFS is required to provide EFH conservation and enhancement recommendations. EFH exists within the Yakima, Walla Walla, and Tucannon subbasins for salmonids.

As discussed in Section 4.1, the proposed action would occur in the shallow and slow-moving areas of rivers. These habitats are not considered EFH for spawning, breeding, feeding, and growth to maturity for salmon and steelhead. Conservation measures and best management practices would be implemented to avoid and minimize impacts to fish and their habitats as identified in this EA. Since releasing artificially propagated lamprey and post-release monitoring would occur in areas of shallow and slow-moving water, the activity would avoid habitat areas used by salmonids and so would have no effect on EFH.

5.2.3 Migratory Bird Treaty Act and Executive Order 13186

The Migratory Bird Treaty Act, as amended, implements various treaties and conventions between the U.S. and other countries, including Canada, Japan, Mexico, and Russia, for the protection of migratory birds (16 USC 703-712). Under this Act, taking, killing, or possessing migratory birds, or their eggs or nests, is unlawful. The act classifies most species of birds as migratory, except for upland and nonnative birds.

Executive Order 13186, issued in January 2001, directs each Federal agency undertaking actions that may adversely impact migratory bird population to work with USFWS to develop an agreement to conserve those birds. The protocols developed by this consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts, or other agreements; and the creation of or revisions to land management plans. This order also requires that the environmental analysis process include effects of federal actions on migratory birds. On August 26, 2013, USFWS and the U.S. Department of Energy signed a Memorandum of Understanding to complement the Executive Order, which is currently under the process of being renewed. This Memorandum of Understanding addresses how Bonneville and USFWS work cooperatively to address migratory bird conservation and is in the process of being renewed. Because of the nature of the Proposed Action, there would be no impacts to migratory birds.

5.2.4 Executive Order on Environmental Justice

In February 1994, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, was released to federal agencies. This order states that federal agencies shall identify and address, as appropriate, disproportionately high and adverse human health or

environmental effects of its programs, policies, and activities on minority and low-income populations. As discussed in Section 3.4, Socioeconomics and Environmental Justice, the Proposed Action would not cause disproportionately high and adverse impacts on minority and low-income populations.

5.3 Distribution and Availability

Copies of the EA are available on the Bonneville website: https://www.bpa.gov/efw/Analysis/NEPADocuments/Pages/Pacific-Lamprey-Artificial-Production-and-Release-Research-DOEEA-2104.aspx.

A copy of the EA is available on request from Bonneville's Public Affairs Department by calling the toll-free document request line at 1-800-622-4520.

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