Wapato Diversion: Improvements for Anadromous Fish Passage

WaterSMART
Aquatic Ecosystem Projects for Fiscal Year 2023

Funding Opportunity No. R23AS00106
Prepared By
Yakama Nation

In Partnership
Bureau of Indian Affairs

PO Box 151
Toppenish, WA 98948
Office Phone: 509-945-1073
Manager: Michael Porter
portm@yakamafish-nsn.gov

June 1, 2023

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1 TECHNICAL PROPOSAL AND EVALUATION CRITERIA

1.1 EXECUTIVE SUMMARY

Date:	June 1, 2023
Applicant:	Yakama Nation (Category A Applicant)
Applicant Partner:	Bureau of Indian Affairs (BIA)
City/Counties/State:	Yakima/Yakima/Washington
Reclamation Area:	Yakima Project

The Yakama Nation (YN) in partnership with the Bureau of Indian Affairs (BIA) will model alternatives that improve passage of anadromous fish species at the Wapato Diversion on the lower Yakima River of Central Washington State by helping to address a key element identified in the Yakima Basin Integrated Plan (YBIP): fish passage at lower Yakima River diversions. These improvements will benefit two of the four populations comprising the Yakima Major Population Group of federally-threatened Middle Columbia River (MCR) Steelhead juveniles and adults; juveniles and adults from the entire Yakima populations of spring and summer run Chinook, Coho, and Sockeye salmon; and juvenile and adult Pacific Lamprey.

The YN is currently coordinating with USBR staff and developing conceptual alternatives for improving infrastructure, operations, fish passage, and fish harvest opportunities at the Wapato Diversion, which is owned by the federal government and operated by USBR. If awarded, aquatic ecosystem restoration study and design funding would further existing efforts to improve the Prosser Diversion for anadromous fish passage. The proposed efforts would begin upon award, expected in January 2024, and conclude in December 2026.

1.2 Project Location

Provide specific information on the geographic location of the proposed planning area (e.g., watershed, basin, county) or location of the project being designed, including a map showing the geographic location. For example, [project name] is located in [county and state] approximately [distance] miles [direction, e.g., northeast] of [nearest town]. The project latitude is {##°##'N} and longitude is {###°##'W}

The Wapato Diversion is located on the Yakima River, Section 17, T12N, R19E, W.M., approximately 5 miles south of Yakima, WA and 1.7 miles north of Parker, WA. Figure 1-1 shows the location of the Wapato Diversion. The diversion coordinates are 46.524433° N, 120.477200° W.

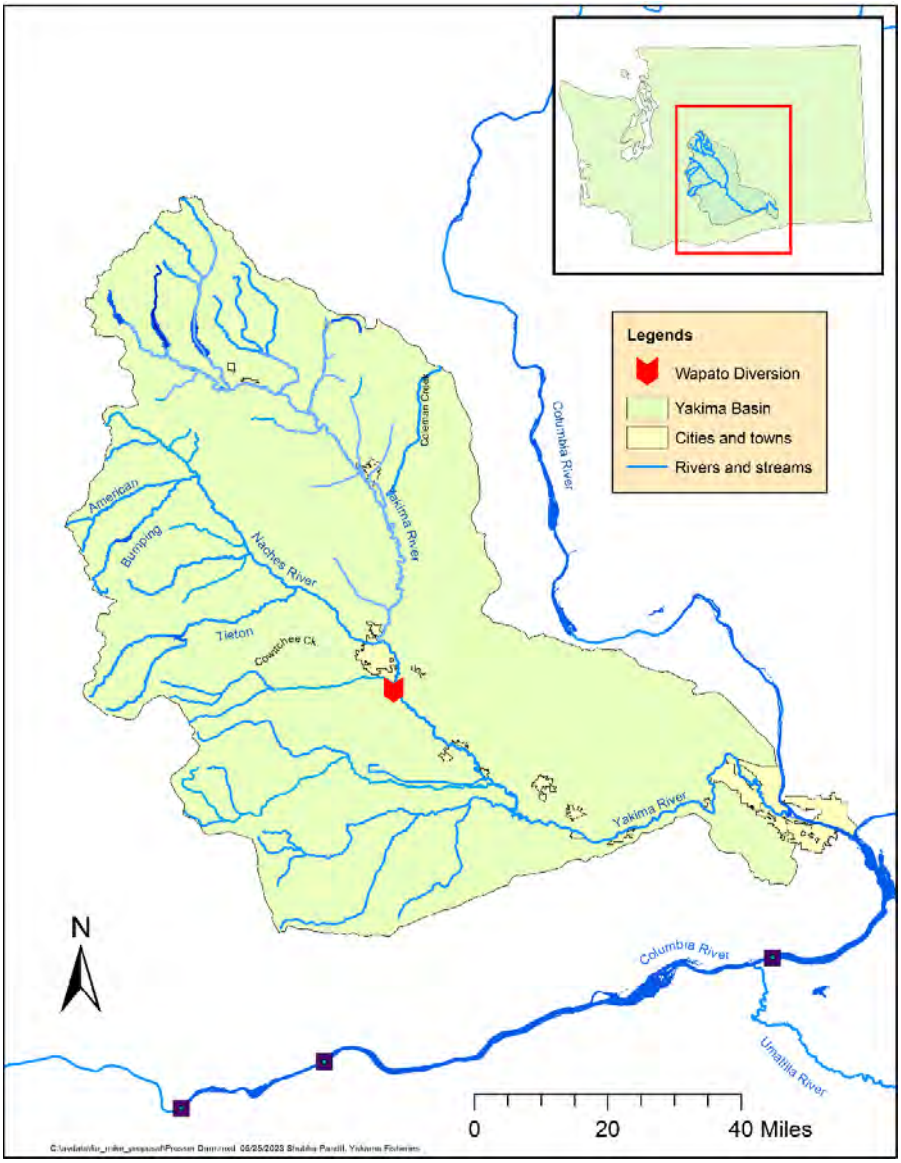


Figure 1-1. Location of Wapato Diversion.

1.3 PROJECT DESCRIPTION

Provide a more comprehensive description of the technical aspects of your project, including the specific activities to be accomplished and the approach to complete the work. The project description should clearly indicate if the proposal is for Task A: Study and Design or Task B: Construction.

Proposals should address all project-specific requirements, as applicable to your task area (e.g., project components, design products to be developed, specific construction processes). This section provides an opportunity for the applicant to provide a clear description of the technical nature of the project and to address any aspect of the project that reviewers may need additional information to understand.

The Wapato Diversion is the largest irrigation diversion in the Yakima River Basin. It delivers approximately 2,000 cubic feet per second of Yakima River water (Figure 1-2) to 136,000 acres within the Wapato-Satus Unit of the Wapato Irrigation Project, which is operated by the BIA on the Yakama Reservation in south-central Washington State.

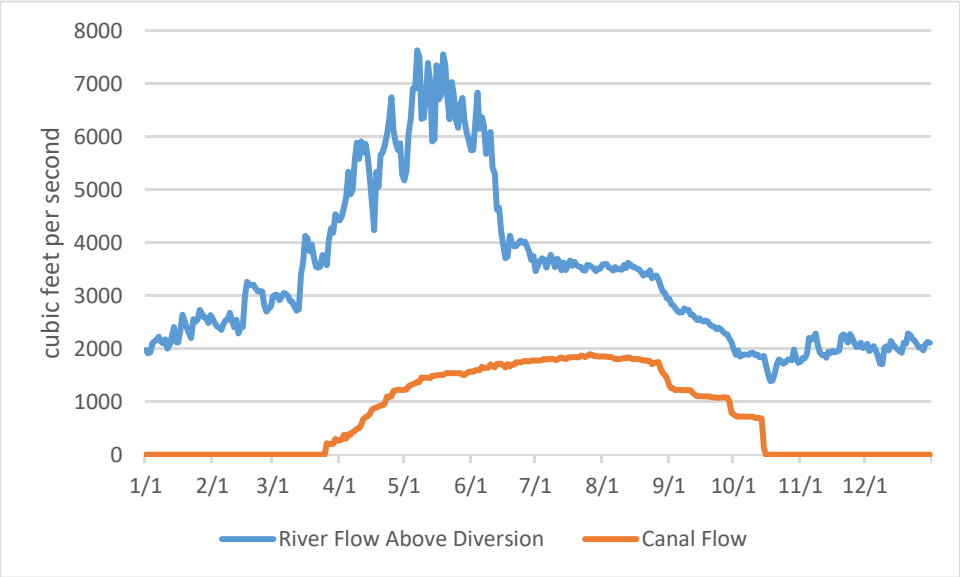


Figure 1-2. Median daily Yakima River flow (cfs) and canal deliveries at the Wapato Diversion, 2010-2022.

The Wapato Diversion was constructed in 1917 by the BIA. The BIA owns and operates Wapato Diversion and plans to rehabilitate/improve the facility in collaboration with the Yakama Nation, the Bureau of Reclamation (USBR), and other project partners. The BIA's primary goal is to assure their long-term ability to safely and efficiently divert the full water right at the Wapato Diversion. Significant alterations are being considered at the Wapato Diversion and fish-related goals have been elevated and are included as primary goals in order to address trust responsibilities and stakeholder input. Aquatic Ecosystem Restoration Projects Program funding support would complement the BIA's existing efforts and allow fisheries considerations a more prominent role in the design process.

The BIA and their design consultant have completed a scoping phase at a cost of $444,000 that included site and environmental investigations, hydraulic modeling for development of conceptual alternatives, agency coordination, and scoping meetings and discussions with tribal resource managers and fishers. The BIA has also funded a $2,590,000 second phase for structural and conceptual design evaluations, feasibility studies, further discussions with tribal resource managers and fishers, and permitting/consultation for structural testing and interim headworks repair that is scheduled for completion in 2024. To meet tribal and Yakima Basin-wide goals clarified in the scoping process, along with ESA criteria for fish passage and survival, alterations to the Wapato Diversion must be designed to assist the Wapato Irrigation Project's operators and users along with tribal members, while optimizing fish passage and flood and sediment conveyance.

The first component of this study and design (Task A) proposal is to build physical and computational hydraulic models to determine how various design alternatives for the Wapato Diversion fulfill these needs:

- Ability to divert the Wapato Irrigation Project's entire water right from the Yakima River during the summer
- Safety and reliability in operations and maintenance
- Safe access and fishing opportunity for tribal members
- Reduced delay and mortality from upstream and downstream passage at the diversion
- Efficient flood conveyance and sediment transport
- Functionality of a reconnected side channel just upstream from the diversion

The second proposal component (Task B???) is to design facilities at the Wapato Diversion for detecting passage of tagged fish in Wapato Diversion spillways, the Wapato Canal, and the canal bypass system based on the best alternative as identified by the hydraulic models.

1.4 Applicant Category and Eligibility

Yakama Nation federally recognized tribe of the United States of America.

1.5 Performance Measures

CONSTRUCTION ONLY

1.6 EVALUATION CRITERIA

E.1.1 Evaluation Criterion A- Project Benefits

(30 Points)

Up to 30 points may be awarded based on the evaluation of the benefits that are expected to result from the proposed project. This criterion evaluates the extent to which the project will address restoration or protection needs for aquatic ecosystems.

Sub Criterion A.1. General Project Benefits

For Task A: Study and Design applicants, respond to sub-criterion A.1. by describing the anticipated benefits of your study and design effort and the projects you are developing through this effort.

- **What are the critical issues of concern in the watershed? Provide documentation and support for how the critical issues were identified.**

The Yakima River and its tributaries (Figure 1-1), a critical part of the region's water supply and infrastructure, also provide spawning, rearing and/or foraging habitat for two resident and four anadromous salmonid species (including ESA listed species), and anadromous Pacific Lamprey. However, multiple published papers and ongoing surveys and research projects have identified deleterious changes in floodplains, riparian corridors, stream channels, fish passage, streamflow, inputs of sediment, nutrients and pollutants, sediment transport, and invasive species (Yakima Subbasin Fish and Wildlife Planning Board 2004; Conley et al. 2009; Reiss et al. 2012).

The lower Yakima River is the migration corridor for all five of the basin's anadromous species: Chinook, threatened Steelhead, Coho, Sockeye, and Pacific Lamprey, and it provides important spawning, rearing and/or foraging habitat for most of the year as well. The lower Yakima River is diverted to supply several irrigation districts and a hydroelectric plant. The diversion structures themselves, upstream storage of natural flow peaks for downstream irrigation water withdrawal, agricultural runoff and modification of riparian and floodplain habitat have degraded the lower river's ability to perform these functions and maintain healthy fish populations.

Juvenile entrainment and survival

Water diversions for irrigated agriculture, including the Wapato Diversion, entrain fish including downstream-migrating juvenile salmon, Steelhead and Lamprey into irrigation canals; from which, high fish mortality has been observed in the canal. While properly designed and maintained screens and bypasses effectively remove entrained fish from irrigation canals, the process of diversion, screening and return to the river delays, injures or kills a significant proportion of entrained juvenile salmonids and Lamprey. This impact is compounded by each diversion in the path of juvenile fish migrating to the Columbia River, and the benefits of restoring fish populations and their habitat upstream are diminished in proportion to these downstream losses.

Adult passage and harvest

Adult salmon and Steelhead are able to pass the Wapato Diversion via three fish ladders built into the two spillways. The ladders were designed to pass adult salmon and Steelhead but are less

effective for less powerful swimmers such as juvenile salmonids, adult Bull Trout or Pacific Lamprey.

Locations for tribal members to exercise their treaty-reserved ceremonial and subsistence fishing rights on the Yakima River are essentially limited to the tailraces of lower Yakima River diversions. At the Wapato Diversion, tribal fishing access has been restricted over the years and is now generally limited to the east bank of the east branch of the river below the diversion.

Water delivery

During the summer, with irrigation demand at its peak, the Wapato Irrigation Project has difficulty diverting the full 2,029 cfs allocation of water available from natural flow plus contracted upstream storage to Yakama Reservation users. This problem is exacerbated by sediment deposition above the fixed crest of the diversion. Channel excavation has had only temporary benefits as sediment has continued to accumulate near the diversion intake.

Tag detection

The full impacts of Yakima River diversions on juvenile salmonids had not been quantified until costly and labor-intensive studies using miniaturized acoustic transmitters and a network of receivers quantified these impacts. This effort will not continue indefinitely, but there is a crucial need to continue monitoring and to evaluate diversion improvements. Every year thousands of fish of different species with PIT tags are released to monitor whether our objectives of increasing fish population are being achieved. This requires robust and reliable infrastructure to detect and provide the necessary information from the passive integrated transponder (PIT) tags that are already released in large numbers upstream from the diversion.

Side channel disconnection

Simplification of the Yakima River channel and constriction of the Yakima River floodplain have reduced fish habitat quantity and quality both upstream and downstream from the Wapato Diversion. A prime example is the left-bank (east) side channel of the Yakima River just upstream from the Wapato Diversion that was cut off from the main channel by an Interstate 82 bridge embankment completed in 1981 (Figure 1-3).

Figure 1-3. 1949 (left) and 2021 (right) aerial photos depicting a left-bank side channel immediately upstream from the Wapato Diversion, which was blocked by freeway bridge construction at the center of the right-hand image.

- **Explain how your project will benefit aquatic ecosystems, including benefits to plant and animal species, fish and wildlife habitat, riparian areas, and ecosystems. For example, will your project create new habitat, improve water quality, improve stream or riparian conditions, restore fish passage and connectivity, or otherwise benefit aquatic ecosystems.** ***Note: In your response to this criterion, A.1., please generally describe the expected benefits of your project to aquatic ecosystems; a quantitative explanation of project benefits is requested below in response to criterion A.2.***

The Wapato Diversion has had negative impacts on fish populations since the original diversion was constructed in 1917. Electric barriers were installed in the Wapato Canal in 1929, and were replaced with drum screens in 1939 (Tuck 1995). The present ladders, screens and bypass facilities were constructed in 1986. The new screening and bypass system was far superior to the facility it replaced, but studies at other Yakima River diversions with similar screens and bypasses since the 1980s have shown that significant mortality in juvenile fish is still occurring.

Concerns about canal and bypass mortality in the lower Yakima River prompted the USBR to fund a study by USGS beginning in 2018 with the collaboration of YBIP participants, the Yakama Nation and federal and state resource agencies. Preliminary results of this study are described in a later section of this proposal, and have confirmed existing concerns in more detail. The study results are the principal scientific basis for this proposal. Initial concepts for reducing or eliminating smolt mortality at the Wapato Diversion require more data and analysis, beginning with modeling the most promising concepts.

Benefits of modifications to the Wapato Diversion include:

- Reducing entrainment and resulting mortality of juvenile salmon, Steelhead and Lamprey
- Facilitating water delivery to Yakima Reservation users under their federally-reserved water rights

- Maintaining adult salmon and Steelhead passage but improving passage for juvenile salmonids, adult Bull Trout and Pacific Lamprey
- Improving treaty-reserved ceremonial and subsistence fishing opportunity at the diversion site
- Improving Flood Conveyance and Sediment Transport
- Monitoring juvenile and adult salmon, Steelhead and Lamprey populations

As a part of the study and design process, physical and computational modeling are both required to test the effectiveness of proposed designs in providing these benefits. Improved monitoring of fish movement will provide a baseline against which to compare the effects of the modifications that will be selected and built, and will inform decisions about how to operate the rebuilt facility. Incorporating adult summer Chinook collection into the design process will assure that maintenance access and other features that would affect a collection facility are designed accordingly.

- **Does the project affect water resources management in 2 or more river basins (defined as a minimum HUC-10 level)? Explain how and identify the area benefitted (provide a map).**

This project affects the three 8-digit HUCs (Upper Yakima, Naches, and part of Lower Yakima) with anadromous fish populations that must pass the Wapato Diversion in both directions. Water demand and passage conditions at the Wapato Diversion affect the storage and release of irrigation water and fish passage flows upstream, and the success of management actions to restore declining and extirpated anadromous fish populations.

The Yakima River flows for 214 miles from the crest of the Cascade Mountains, near Snoqualmie Pass, to its confluence with the Columbia River near Richland, WA. Nearly 40 percent of the basin is forested, another 40 percent is rangeland, and 15 percent is cropland. The Yakima River Basin, one of the top agricultural producing regions in Washington State, covers over 6,000 square miles and is home to over 370,000 human residents, including 11,000 members of the Yakama Nation. A majority of Yakama members live within the Yakama reservation, an area of 1,130,000 acres that includes part of the Yakima River Basin. The Yakamas have retained fishing rights, through treaty with the United States government, within reservation areas, 11 million acres of ceded lands, and usual and accustomed places within the Pacific Northwest.

The Yakima River hosts federally-threatened MCR Steelhead in addition to populations of other anadromous fish species. Migratory fish have access to the full 214 miles of the Yakima River and 1500 miles of tributaries, with passage made more challenging by the seasonal thermal fish passage block at the Yakima River delta, high predation throughout the lower river, and entrainment and high passage mortality of juvenile fish at river diversions. The Yakima River contains multiple federal diversion dams: Wanawish, Prosser, Wapato, Roza and Easton. Each of these dams are equipped for fish passage, but contribute to migration challenges because they do not provide for safe passage under all conditions. Sockeye are trucked above federally-owned Cle Elum Dam, and downstream passage at the reservoir outlet is under construction. Federally-owned dams on Bumping, Rimrock, Keechelus, and Kachess Lakes represent the upstream extent of anadromous access. As a result, there is a permanent passage barrier on one of the tributaries at the Yakima River delta, seasonal passage barriers elsewhere in the Yakima watershed, and unsafe

passage conditions at Federal diversion dams in the basin that kill large numbers of migrating smolts and periodically block adult salmon from migrating upriver.

Significant improvements in tributary passage have been accomplished since 1980, as displayed in Figure 1-4 below, and will continue. YBIP partners are working on multiple barriers throughout the watershed as part of a larger Yakima River fish passage strategy. Major efforts are underway to restore passage over storage dams in the upper basin that have completely blocked passage for 90-120 years. For example, a nearly $200M project to provide passage over the Cle Elum Dam in the headwaters is nearing completion, and a similar scale project at Rimrock Dam is anticipated for construction within 10 years. Efforts to improve passage in the lower Yakima River, where fish have seasonal or unsafe passage, are also underway. These include projects to reduce smolt entrainment at Sunnyside dam completed in 2021, operational improvements at Roza Dam to provide year-round surface passage and increase passage survival in 2022, and replacing the Roza Dam fish screens planned for 2024-5.

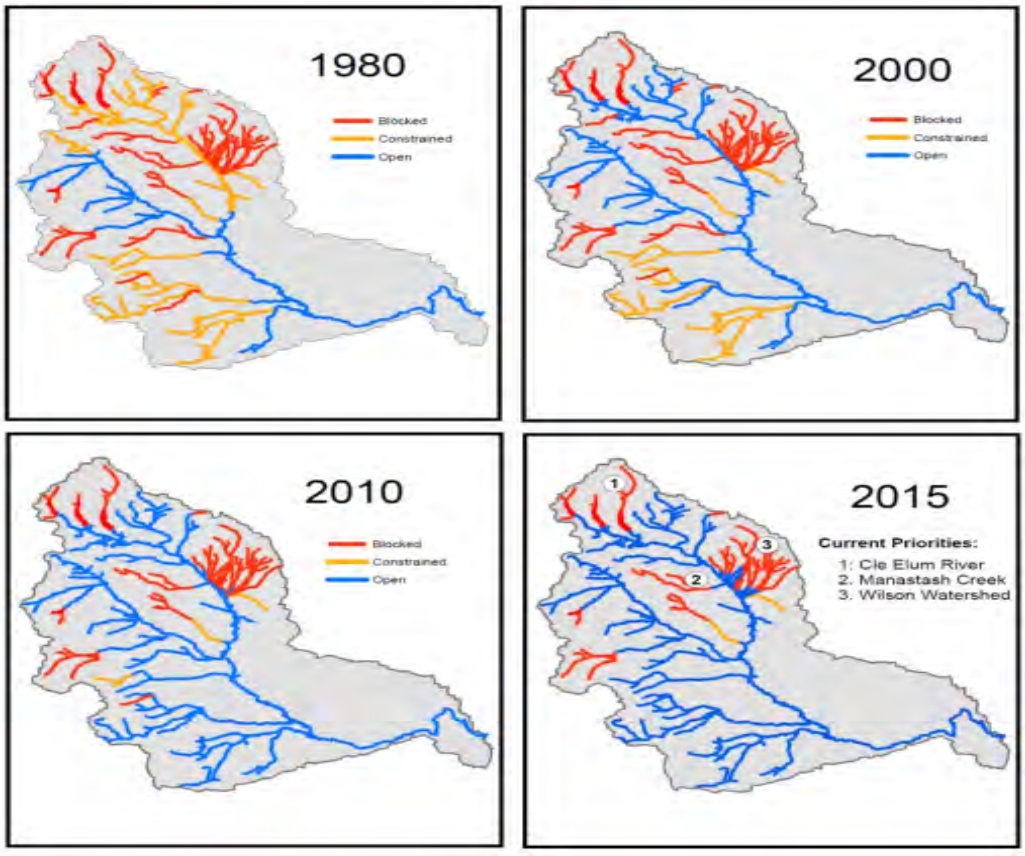


Figure 1-4. Improved fish passage in the Yakima basin since 1980 at all run-of-river dams in the river, including the Wapato Diversion.

USGS investigators and their partners tagged juvenile spring run Chinook, Steelhead, and fall-summer run Chinook smolts upstream of the lower basin with acoustic tags and monitored their passage routes and survival as they migrated downstream to the Columbia River. The study identified the Wapato Diversion as one of the key locations for unsafe passage conditions and the Yakima River delta as another high mortality area, both contributing to estimates of 65 – 90% mortality in the lower Yakima River. Adult Sockeye telemetry studies in 2019 and 2020 identified

the Yakima River delta as a thermal barrier to summer adult salmon runs (Kock and others, 2019 & 2020). Long term temperature monitoring of the delta has been in place since 2011. This baseline data provides opportunity for rigorous analysis of the impact of this barrier removal on temperature conditions in support of fish passage (Appel and others, 2011). Temperature data has shown the thermal barrier is getting rapidly worse over time. Climate change will continue to narrow the opportunities for adult fish to access the watershed, and threatens to eliminate migration opportunities summer migrating species, such as the entire run of Sockeye and summer Chinook, and continue to truncate the migration period of other species and runs.

- **Does the project provide regional benefits, in addition to fish or habitat restoration, including:**
    - **Supporting water needs for multiple water uses (i.e., agricultural, municipal, Tribal, environmental, recreational)?**

While a dependable supply of irrigation water provides its most immediate benefits to agriculture and related industries, seepage from the delivery system can also be managed to provide wildlife habitat, replenish groundwater supplies, augment wetlands, springs and small tributary streams, and promote the growth of culturally-important plants.

    - **Reducing water conflicts?**

The ability to divert the Project's full allocation of water, coupled with ongoing delivery efficiency projects, would streamline management and result in fewer disparities in deliveries within the Wapato Irrigation Project.

    - **Providing other regional benefits, such as job creation or public safety benefits?**

A more reliable water supply would spur investment in higher-value perennial crops that would yield more income and stimulate the entire Yakama Reservation economy.

- **Is this project a component of a broader strategy or plan to replace aging facilities with alternate facilities providing similar benefits? Describe how this project fits within the strategy or plan and how it will continue to provide benefit.**

The Wapato Diversion is over 100 years old and has both operational and safety issues that require rehabilitation or replacement of the facility. New research has resulted in a high level of concern about the impact of this and other large diversions on fish populations, including threatened species, and management of flood flows is an additional issue of concern to the Yakama Nation, local governments and land managers. An early emphasis on hydraulic modeling and fish monitoring will bring focus to a long-term project that needs to address a variety of concerns and involve many participants and funding sources.

- **Describe the status of the species and/or habitat that will benefit from the project:**
    - **Does the project contribute to the restoration of species listed under the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.)?**
        - **Does the project contribute to the restoration of listed anadromous fish?**

The Middle Columbia River (MCR) Steelhead Distinct Population Segment (DPS) includes the four naturally spawning populations of Steelhead using the Yakima River and comprising the Yakima River Major Population Group. The MCR Steelhead DPS was listed as threatened on March 25, 1999 (64 FR 14517) and its threatened status was reaffirmed on June 28, 2005 (70 FR 37160) and August 15, 2011 (76 FR 50448). Two of the populations comprising the Yakima River MPG—Naches River and Upper Yakima River—migrate past the Wapato Diversion to spawn upstream, while the Satus Creek and Toppenish Creek populations spawn in Yakima River tributaries downstream from the Wapato Diversion.

The Wapato Diversion is within the Yakima River Core Area, one of 24 core areas in eastern Washington, eastern Oregon, and portions of Idaho comprising the Mid-Columbia Recovery Unit for Bull Trout; this core area is within the Upper Mid-Columbia region, one of four regions in the recovery unit. The Mid-Columbia Recovery Unit is one of six recovery units that comprise the Coterminous United States Population of Bull Trout (*Salvelinus confluentus*), which was listed as threatened by the USFWS on November 1, 1999 (64 FR 58910).

- **Are the species subject to a recovery plan or conservation plan under the ESA?**

Improved passage through the Wapato Diversion will contribute to the recovery of Columbia River Coho and Sockeye, Mid-Columbia spring and fall/summer-run Chinook, and federally-threatened Mid-Columbia Steelhead in the Yakima Basin. This action is identified as high priorities in Steelhead recovery planning, the Fishery Management Plan for Pacific Salmon Essential Fish Habitat (EFH), and additional planning efforts sponsored by or involving NOAA Fisheries, as described below:

NOAA's MCR Steelhead Recovery Plan (2009) identified improving passage conditions for outmigrating smolts at lower Yakima River diversions as a High Priority Strategy. The plan identifies studying smolt survival at these facilities to identify infrastructure modification to improve passage conditions. The MCR Steelhead 5-year review (NOAA 2022) identifies smolt mortality at the Wapato Diversion as one of its Geographic Areas of Habitat Concern.

The Wapato Diversion is located in and can impair access to essential fish habitat for Chinook and Coho salmon identified as part of the Pacific Salmon Fisheries Management Plan (Appendix A). Additionally, the diversion is located in and can impair passage to Spawning Area and Complex Channel and Floodplain Habitat Areas of Particular Concern (HAPCs). Modifying the diversion to meet modern passage criteria is consistent with the Conservation Measures described in Section 4.2.2.10 of Appendix A of the Pacific Salmon FMP for EFH. (https://www.pcouncil.org/documents/2019/08/salmon-efh-appendix-a.pdf/)

The White House's Council on Environmental Quality recently released a draft report by NOAA that identified improving passage survival in focused tributary habitats as necessary to reach salmon recovery goals for mid-Columbia stocks (multiple species) identified by the Columbia Basin Partnership, a NOAA-led initiative. The report identified significantly increasing smolt survival in the Yakima by improving Federal diversion dams and specific habitat improvements. (NOAA 2022, p20, https://media.fisheries.noaa.gov/2022-07/icrb-salmon-Steelhead-recovery-summary-draft-v2.5.pdf).

The proposal aligns with three of the six guiding principles of the National Saltwater Recreational Angler Policy. The proposed actions in the proposal can increase survival of outmigrating Chinook

and Coho salmon smolts (through reducing mortality in the canal as well as increasing upstream fish passage for adults), which support popular saltwater recreational fisheries in WA, OR, and AK. The proposal supports Principle 1 (Support ecosystem conservation and enhancement) by restoring natural habitats with actions to allow these species to more safely pass manmade passage barriers. The proposal supports Principle 3 (Coordinate with state and federal management agencies), as demonstrated in the partnerships to improve survival at the passage barriers. The proposal supports Principle 4 (Advance innovative solutions to evolving science, management, and environmental challenges). The proposal is built upon cutting edge scientific investigations conducted by USGS, Yakama Nation, and partners that used acoustic tracking of multiple stocks to identify natural and operational factors that affect smolt and adult passage through the Yakima.

Bull Trout residing in the Yakima River Core Area are addressed in the Bull Trout recovery plan for the coterminous United States, which was completed in 2015. For the Yakima River Core Area, an action plan was completed in 2012 and updated in 2017. A Bull Trout 10-year Plan was completed by the Fish Habitat Subcommittee of the YBIP Workgroup in 2022.

- **Has there been a designation of critical habitat? If so, how does the proposed action benefit such critical habitat?**

Critical habitat for MCR Steelhead has been designated in the Upper and Lower Yakima River migration corridor (NOAA 2005). Critical habitat includes the stream channels to the lateral extent defined by the ordinary high water mark (33 CFR 319.11). Many factors, both human-caused and natural, have contributed to the decline of the functional condition of the constituent elements of designated critical habitat. Steelhead habitat has been altered through activities such as urban development, logging, grazing, power generation, and agriculture, including irrigation diversions.

The Yakima River Critical Habitat Unit (CHU, USFW, 2010) supports adfluvial, fluvial, and resident life history forms of Bull Trout. This CHU includes the mainstem Yakima River and tributaries from its confluence with the Columbia River upstream to its headwaters at the crest of the Cascade Range. The Yakima River CHU is located on the eastern slopes of the Cascade Range in south-central Washington and encompasses the entire Yakima River basin located between the Klickitat and Wenatchee Basins.

The Wapato Diversion is within critical habitat that serves as a migration corridor for threatened Steelhead and Bull Trout, and their upstream and downstream movements are affected by the performance of its fish ladders and its water diversion and bypass system. Juvenile and adult Steelhead belonging to the threatened Naches River and Upper Yakima River populations would benefit from reducing juvenile entrainment rate and mortality of entrained juveniles, and from improving upstream passage of both juvenile and adult Steelhead past the Wapato Diversion. Threatened Bull Trout that may forage, migrate and overwinter in the Yakima River would benefit from a nature-like fishway that reduces their dependence on fish ladders designed for adult salmon and Steelhead. Adding tag monitoring capability would help quantify those benefits, and document how operational adjustments at the rehabilitated diversion affect migrating fish.

- **If the species are not listed under the ESA, please describe their status. For example, are they native species, game species, at-risk species, species of greatest conservation need, species of Tribal significance, or state listed?**

Each native fish species is significant to the Yakama Nation's identity and culture. The Yakama Nation has taken the lead in enhancing native populations of spring Chinook, fall Chinook and Pacific Lamprey, none of which are listed under the Endangered Species Act, but all of which have experienced steep population declines (Table 1-1). The Yakama Nation has also successfully reintroduced summer Chinook, Coho and Sockeye salmon, which had been extirpated from the Yakima Basin. Spring and summer Chinook, Coho and Sockeye all migrate as juveniles and adults past the Wapato Diversion.

Sub Criterion A.2. Quantification of Specific Project Benefits

What are the types and quantities of aquatic ecosystem benefits provided? We have provided separate sub-criteria for Task A: Study and Design. (For purposes of this sub criterion, applicants submitting a Task A: Study and Design proposal need only to respond to Sub-Criterion A.2.1)

A.2.1. Task A: Study and Design Applicants Only. Please respond to the following sub criteria by providing details and quantification of the critical issues within the watershed and explaining how your Task A Study and Design project will address those issues. Please *only respond to questions that apply to your project*. Provide documentation and support for each of your responses.

- **Species and Habitat Health**
  - **Provide information regarding the current status of species and habitat health in the planning area. Provide factual support for the status information, including citations to relevant studies, habitat or species health assessments, and statistical information to describe the critical species and habitat issues of concern in your planning area, including issues related to fish or wildlife health and habitat conditions.**
  - **Species status and health**

Returns of anadromous fish to the Yakima Basin have declined precipitously from historic levels. Table 1-1 summarizes the decline in anadromous fish abundance from the most commonly cited historic estimates (Northwest Power Planning Council 1989) to the 2013-2022 average counts at the Prosser Diversion on the University of Washington's Data Access in Real Time (DART) website (https://www.cbr.washington.edu/dart).

Table 1-1. Historic and present returns of anadromous fish species to the Yakima River Basin.

Species	Historic Estimate Number	Average Count at Prosser Diversion, 2013-2022	Percentage of Historic Estimate
Chinook	4,000,001	134,763	3.40%
Steelhead	800,001	3,589	4.50%
Coho	1,100,001	51,753	4.70%
Sockeye	2,000,001	4,134	2.10%
Pacific Lamprey	750,002	3052	0.4%

[1]NW Power Planning Council 1989; [2]R. Lampman, YN, personal comm;[3]includes jacks

Chinook salmon returning to the Yakima Basin are comprised of spring, summer and fall runs. Based on redd surveys (Yakama Nation, 2019), spring Chinook spawn earliest at the highest elevations in large streams in the upper Yakima and Naches watershed. Reintroduced summer Chinook spawn mainly upstream from the Wapato Diversion in the lower Naches River and in the Yakima River above and below the Naches River confluence. Fall Chinook spawn the latest, in the Yakima River mainly downstream from the Wapato and Sunnyside diversions.

Two of the four threatened MCR Steelhead populations belonging to the Yakima Major Population Group spawn upstream from the Wapato Diversion, mainly in the upper Yakima River and Naches River watersheds. Steelhead belonging to the Naches population also spawn in Ahtanum Creek, which empties into the Yakima River less than half a mile upstream, and apparently in the Yakima River near the diversion. About 2% of a group of Steelhead spawners radio-tagged in 2011 showed movements consistent with spawning within about 5 river miles upstream or downstream from the Wapato Diversion in 2012 (C. Frederiksen, YN, personal comm.). Two of the four Steelhead populations spawn in the Satus Creek and Toppenish Creek watersheds, which empty into the Yakima River more than 20 river miles downstream from the Wapato Diversion.

Reintroduced Coho salmon spawn in Ahtanum Creek just upstream from the diversion, and the Naches and upper Yakima watersheds. After passing the Wapato Diversion, returning Sockeye salmon are trapped at Roza Dam 20 miles upstream and transported to their site of reintroduction above Lake Cle Elum in the upper Yakima watershed (an irrigation storage reservoir with no adult passage) to spawn in tributaries to the lake and along the lakeshore.

Although Yakima Basin Steelhead enter the Columbia River in early summer, lethal summer temperatures in the lower Yakima River downstream from the Wapato Diversion usually prevent entry to the Yakima River until the weather cools in September. Steelhead overwinter in the Yakima River before spawning the following spring, but fall-spawning Chinook and Sockeye have a shorter time window between migration and spawning. Unless a significant summer rain event cools the lower Yakima River, Sockeye, especially, may be in poor spawning condition by the time they are finally able to ascend the Yakima River.

Pacific Lamprey migrate upstream in the Yakima basin mainly from March through May. Juvenile Lamprey counts at the Prosser Diversion (Chandler Counting Facility) indicate that outmigration occurs over the entire January-July sampling period. The Cle Elum Hatchery site has been selected for larval Lamprey outplanting in the Upper Yakima Basin, along with off-channel sites in the Thorp-Ellensburg area and lower Wenas Creek, while adult translocation is focused on tributaries of the Lower Yakima River.

Adult Pacific Lamprey migration is hampered by diversion dams, although the Wapato Diversion had the highest upstream migration success (82%) of the six diversions studied from 2012-2014 (Johnsen et al. 2013; Grote et al. 2014, 2016). Translocation of adult Pacific Lamprey has resulted in an increasing proportion of Pacific Lamprey among the juvenile Lamprey salvaged from sediment deposits in the Wapato and Sunnyside canals (Beals and Lampman, 2015).

Fish ladders at Yakima River diversions are not usually serious obstacles to adult salmon and Steelhead. However, passage delays were observed at the four major Yakima River diversions in a

1990-1992 radiotelemetry study of adult Steelhead, with median delays ranging from 0.4 days at Sunnyside Diversion to 6.9 days at the Wapato Diversion. Over the same time period, passage delays of adult spring Chinook ranging from about 0.2 days at the Wapato and Sunnyside diversions to 1.1 days at Roza Dam. As noted in a 2015 Yakima River Steelhead biological assessment by the USBR, low water temperatures and the normal overwintering behavior of adult Steelhead likely increased the Steelhead delays.

Nevertheless, debris and mechanical failures can affect the performance of fish ladders at all Yakima River diversions, and high river flow can necessitate ladder closure[1] to prevent clogging with debris. A 7-day shutoff of Prosser ladders during high river flow in May, 2011 was immediately followed by the highest one-day count of adult spring Chinook in that decade, indicating that the Prosser diversion is a barrier at all flows without operating ladders. Similar data are not available for the Wapato Diversion, but passage of adult spring Chinook over the Wapato spillways, which are approximately 9 feet above the tailrace at moderate flows, has not been documented despite numerous observed attempts (Michael Porter, YN, personal comm.).

Juvenile entrainment and survival

The YBIP (https://yakimabasinintegratedplan.org/), building on earlier restoration efforts by the Yakama Nation and others, has coordinated a multitude of projects that address factors limiting anadromous fish populations within the basin such as habitat, streamflow, and fish passage. Major limiting factors that remain include diversions that entrain juvenile salmon from the Yakima River into irrigation canals. All irrigation diversions in the Yakima River have juvenile screening and bypass systems that return juvenile fish to the river. Despite these measures, ongoing studies of juvenile salmon and Steelhead migrating past several large irrigation diversions continue to document not only entrainment, but significant mortality of entrained fish, which must pass through diversion headgates and canals, past screens and through bypass flumes, weirs and discharge pipes back to the river.

Juveniles of all five anadromous species native to the Yakima River Basin pass the Wapato Diversion on their journey to the Pacific Ocean. Over the past three decades, the Yakima Basin upstream from the Wapato Diversion has been the focus of massive efforts to restore habitat and passage, supplement native populations and reintroduce extirpated species.

As detailed above, two runs of Chinook, two of the four local populations of threatened Steelhead, all of the Yakima Basin's reintroduced Sockeye, nearly all returns of Yakima Basin Coho, and part of the Yakima Basin Pacific Lamprey population spawn upstream from the Wapato Diversion. Juveniles migrating to the ocean from these upstream spawning and rearing areas must pass the Wapato Diversion, and the bulk of this juvenile outmigration coincides with the irrigation season when the diversion is operating (Figure 1-5).

[1] Shutting off attraction jets reduces during high water events reduces sediment buildup that could otherwise render ladders inoperable after the flow has receded. This operation hinders or stops migration during the shutoff period.

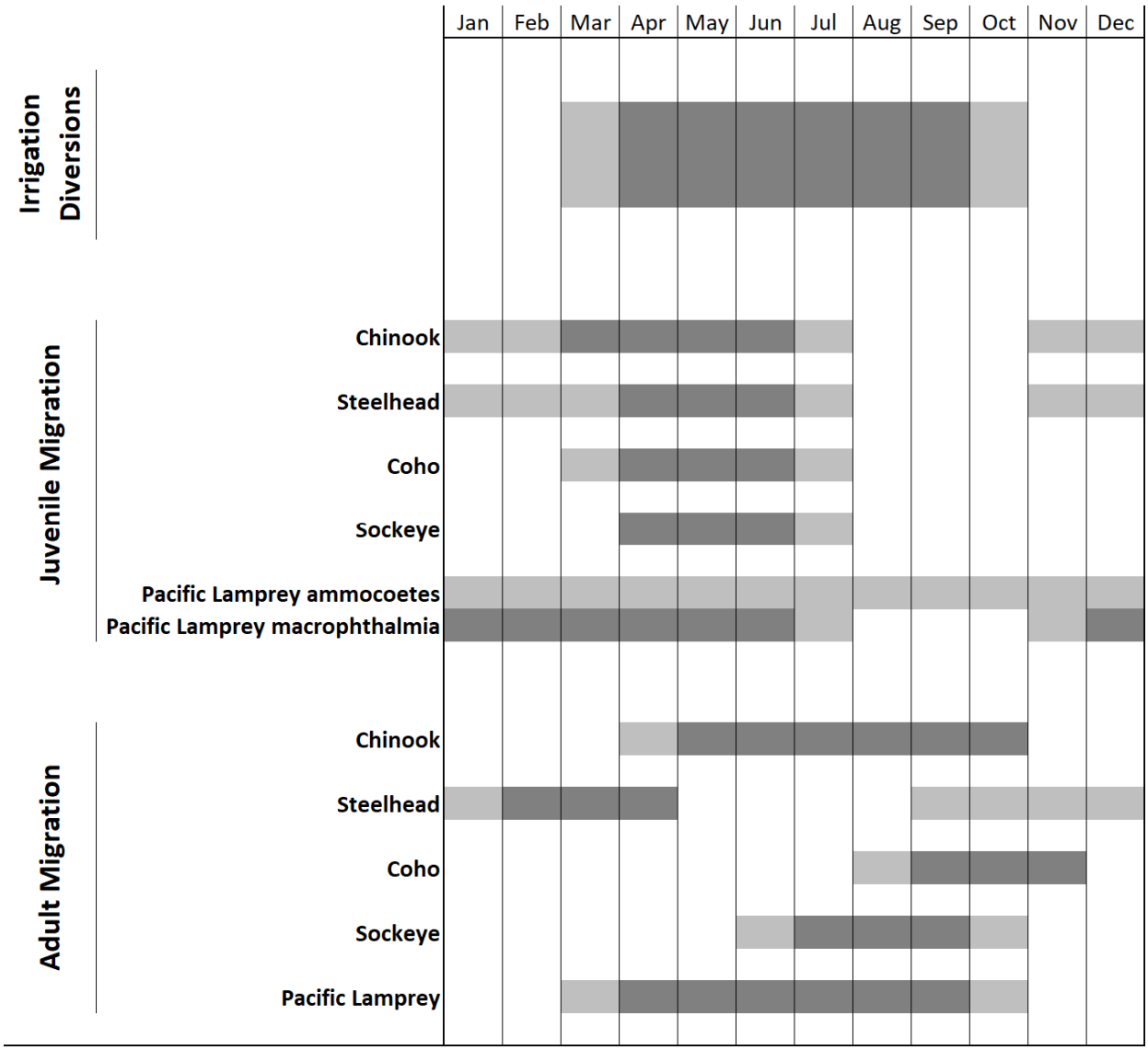


Figure 1-5. Timing of irrigation diversions and migration of juvenile and adult salmon, Steelhead and Pacific Lamprey past the Wapato Diversion, based on counts and detections at Roza Dam (upstream) and the Sunnyside and Prosser diversions (downstream). Heavier shading shows when most of the migration takes place.

The U.S. Geological Survey (USGS) is conducting an ongoing study of the impact of the Wapato Diversion, along with three other diversions, on juvenile Chinook and Steelhead, including the relationship of entrainment probability to the percentage of Yakima River flow diverted into the Wapato Canal, and the survival rate of entrained fish (Figure 1-6).

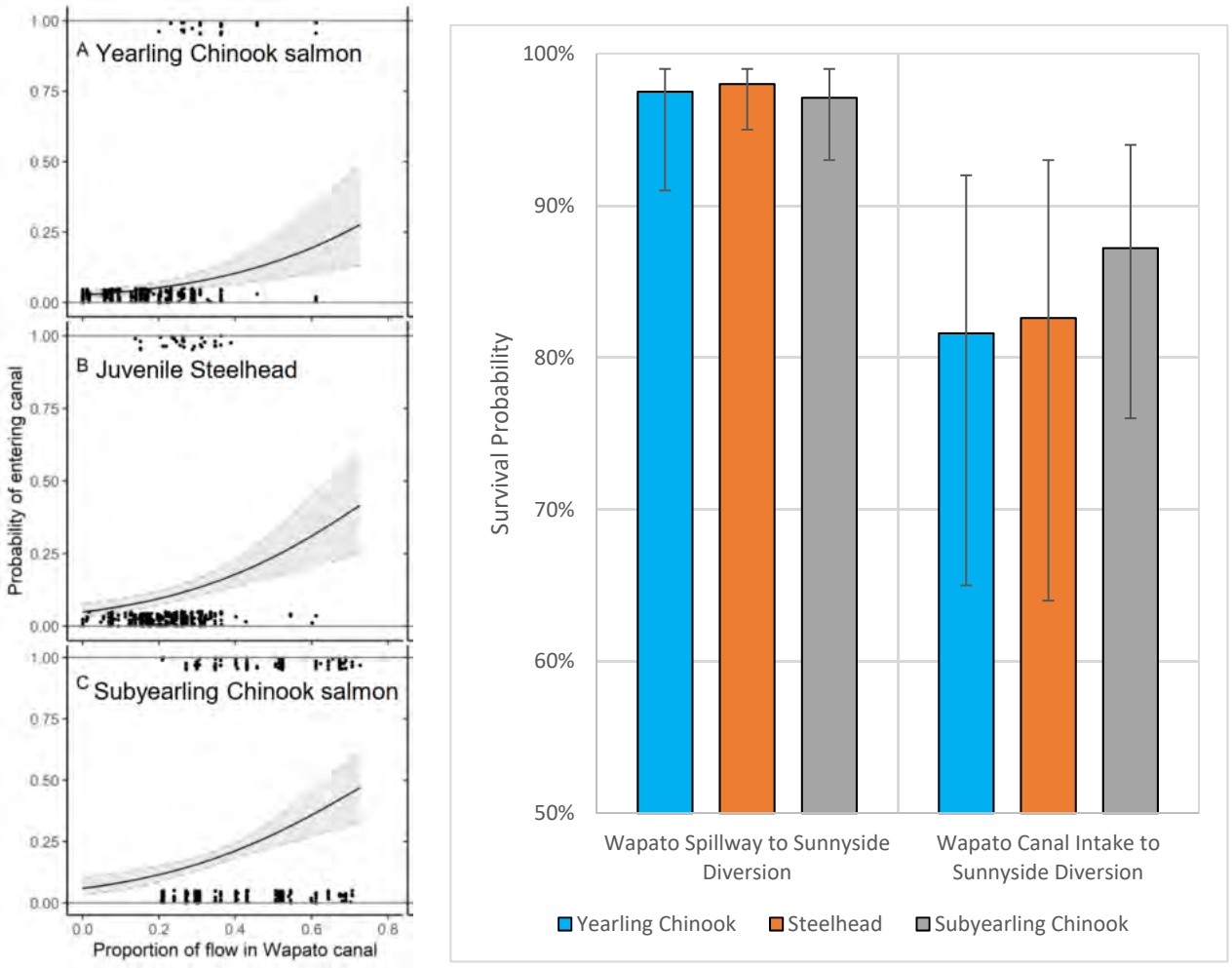


Figure 1-6. Entrainment and survival probabilities with 95% confidence intervals for juvenile Chinook and Steelhead passing the Wapato Diversion, 2018-2021 (preliminary USGS data).

Studies by the USGS have identified two locations within the Wapato diversion, screening and bypass system where juvenile fish are killed. Based on two sets of 4-point releases and subsequent detections of tagged yearling Chinook, mortality appears to be concentrated at the headgates and within the bypass to the Yakima River, with no mortality observed in the canal between those locations (T. Kock, USGS, personal comm.).

An achievable goal for juvenile fish protection at the Wapato Diversion is to increase survival of all downstream migrants passing the Wapato Diversion to the level currently observed for fish remaining in the river as shown in Figure 1-6, i.e. an improvement of 10 to 15 percentage points. This goal will be refined, and a Federal mandate applying to all of the major Yakima River diversions is likely as agency consultations continue. Based on the research results described above, the preliminary goal could be accomplished through a combination of improvements including:

structures to guide juvenile fish toward spillways and away from headgates, modifying spillways to reduce canal entrainment and improve spillway survival, modifying headgates to reduce velocity and turbulence of water entering the canal, modifying components of the bypass system between the screens and the river outlet or, if practicable at this location, replacing in-canal screens with in-river screens.

Adult passage and harvest

The Wapato diversion dam is a permanent structure that is made passable to adult salmon and Steelhead by three concrete fishways that require considerable maintenance to perform over the annual range of flows. A nature-like fishway that partly or totally replaces the east branch diversion dam would provide a nearly maintenance-free passage route for the approximately 27,000 adult and jack Chinook, Steelhead, Coho, Sockeye and Pacific Lamprey that migrate past the diversion, based on average annual Prosser ladder counts. A nature-like fishway also can be designed to improve upstream passage of juvenile salmonids, adult Bull Trout and Pacific Lamprey, which the existing ladders were not designed to accommodate. Both the maintenance and juvenile/Bull Trout passage issues contributed to the recent decision to replace a concrete diversion dam with a roughened channel on the Naches River upstream from the Wapato Diversion; the Yakama Nation and resource agencies will evaluate this issue as it pertains to the Wapato Diversion. A nature-like fishway at this location can also provide safer and more dispersed tribal fishing opportunities when combined with access to both banks of the east branch.

Water delivery

Deploying operable crests to vary the water surface elevation above the diversion while remaining within fish ladder operational criteria would remedy the problem of delivering the Wapato Irrigation Project's full allocation to Yakama Reservation water users. The pool could be raised if needed during the period of high demand and low river flow, and dropped below the level of the present fixed crest at higher river flow to facilitate sediment transport.

Tag detection

Every year more than 60,000 PIT-tagged juvenile Chinook, Coho and Steelhead are released at various locations upstream from the Wapato Diversion to assess their survival to downstream locations and their rate of return as adults to the Yakima River. PIT tag antennas on spillways have been proven to be effective at Lower Granite Dam on the Snake River and at Roza Dam on the upper Yakima River. It is likely that 50,000 PIT-tagged juvenile salmon and Steelhead pass the Wapato Diversion each year, and the ability to detect even 10% of these tags through all passage routes, supplemented by experimental releases above each spillway would allow estimates of detection probability, survival, and passage by route. Spillway antennas at the Wapato Diversion, combined with antennas in the canal and fish bypass similar to those at the Prosser diversion, would continuously measure the efficacy of downstream passage improvements and allow testing of different operational strategies. The projects releasing tags would be able to refine their estimates of migration timing and survival using PIT tag detections at this new location midway between release sites and Prosser.

Side channel reconnection

For the left-bank side channel between the upstream freeway bridge embankment and the Wapato Diversion, a new inlet just below the embankment would restore this 2,000-foot channel as flowing and functioning salmonid and Lamprey habitat in a river reach that has a reliable summer water supply at favorable temperatures. Spillway modifications or a roughened channel near the left riverbank would arrest bank aggradation caused by the current fixed-crest spillway and prevent plugging of the side channel inlet.

Habitat health

The Wapato Diversion is in the upstream portion of the Lower Yakima River, where releases from storage help maintain summer flows and summer temperatures that can support salmonids. Rearing conditions for salmonids begin to deteriorate a few miles downstream as more water is withdrawn for irrigation. In addition, as the river passes through a water gap just upstream from the diversion, an interstate highway with on- and off-ramps constricts the already-narrow floodplain, cutting off a side channel of the Yakima River and exacerbating upstream flooding.

Upstream and downstream passage is a critical component of habitat health for both resident and anadromous fish, and the negative impact of the Wapato Diversion on downstream migrants has been quantified in the USGS studies discussed in the Species Status and Health section above. There is little evidence that the diversion's ladders are deficient for adult salmon and Steelhead passage under normal flow conditions, but the ladders must be closed at river flows exceeding 7,000 cfs to avoid damage and clogging with debris and bedload. In addition, the ladders were not designed to facilitate passage of juvenile salmonids, adult Bull Trout or Pacific Lamprey.

- **Describe how your conceptual project will address these issues and how your study and design efforts will inform your approach. If you are able to quantify the expected species and habitat benefits of the project you are studying and designing, please do so.**

The Yakama Nation, the BIA, and resource agencies at the state and federal levels have contributed to the concepts described in this proposal. All of these entities will continue to cooperate in setting priorities for species and habitat health related to the Wapato Diversion. The impact of this and other diversions on survival of downstream migrants has deservedly received the greatest attention, and numerical survival goals will be refined in a collaborative process as the study phase proceeds toward design.

Investigations by teams with members belonging to Yakama Nation Fisheries, USBR and USGS are using several different methods (e.g. sensor fish, cameras to identify the presence of piscivorous fish in the canal, electrofishing general abundance surveys, water quality monitoring, etc.) to refine our understanding of the mechanisms for juvenile salmonid mortality around the Wapato Diversion. This information is being used by a working group composed of the Bureau of Indian Affairs, USBR, Yakama Nation, Washington State Department of Ecology, Washington Department of Fish and Wildlife, and NOAA Fisheries to inform the development of alternatives to improve fish passage at the Wapato Diversion.

Eliminating the negative effects of entrainment into the Wapato Canal would increase survival of juvenile fish currently entrained into the canal by 10 percentage points (subyearling Chinook), 15 percentage points (Steelhead), and 16 percentage points (yearling Chinook) according to current comparisons of survival for canal and river migration routes.

- **Watershed Benefits**
  - **Provide information regarding the current status of water quality, ecological function, and ecological resiliency in the planning area. Provide factual support, citations to relevant studies, and statistical information to describe the critical issues in your planning area related to water quality, ecological function, and ecosystem resiliency conditions.**

The lower Yakima River provides winter and spring rearing habitat for juvenile salmon and Steelhead preparing for migration to the Pacific Ocean. Warmer temperature, lower gradient and greater water depth combine to reduce energy expenditure and provide more feeding opportunity for these species. However, as the spring season progresses, a large proportion of high-elevation snowmelt is trapped in reservoirs and irrigation demands increase. As a result, flow declines and water temperature rises. Runoff from irrigated croplands raises river temperatures further and adds excess nutrients and other pollutants.

Adult summer Chinook, Steelhead and Sockeye arrive at the mouth of the Yakima River when water temperatures are approaching their summer peaks. Unless there is a midsummer break in the weather, upstream migration may be precluded until fall, forcing these fish to expend energy reserves needed for spawning as they hold in the Columbia River near the Yakima or stray—temporarily or permanently—to cooler tributaries of the upper Columbia.

  - **Describe how your conceptual project will address these issues and how your study and design efforts will inform your approach. If you are able to quantify the expected watershed benefits of the project you are studying and designing, please do so.**

Because the majority of migratory salmonids and Pacific Lamprey in the Yakima Basin must pass the Wapato Diversion to reach the ocean, the diversion affects the survival of most anadromous populations in the Yakima River Basin. Reducing or eliminating the effects of entrainment would increase the productivity of these populations in proportion to survival improvements realized at this single location. Recognizing its basinwide implications, the Wapato Diversion was included by the USBR, Yakama Nation and natural resource agencies in studies to better understand the specific sources of juvenile fish mortality associated with the Wapato Diversion. When the BIA was able to begin the Wapato Diversion Improvement Project (https://wapatodiversion.com) in 2021, these entities were invited to join the effort to address fish passage issues and help develop a list of potential alternatives. The USBR has also assigned funds to the project to allow their Value Planning Team and Technical Science Center staff to assist in developing alternatives. While this project will not address water quality, plans for modernization (BIA 2018) and water conservation (BIA and YN 2019) have been developed specifically for the Wapato Irrigation Project to address water quality including the reuse of return flow.

- **Water Supply Benefits**
  - **Provide information regarding the current status of water availability for aquatic ecosystems. Are there issues with sufficient water availability for ecosystems seasonally or year-round? Provide factual support, including hydrographs, citations to relevant studies, and stream flow information to describe the critical issues in your planning area related to water availability for aquatic ecosystems.**

Figure 1-7 shows the regulated flow pattern of the Yakima River below the Wapato and Sunnyside diversions in the 1990s (dotted line) along with modeled unregulated flow (dashed line), which removes the storage reservoirs and major irrigation diversions to approximate natural mid-to-late summer flow, but ignores the damping effects on winter flow of the natural lakes that preceded the reservoirs. The 1908-1915 period (solid line) best depicts historical spring and early summer peak flows because it preceded large-scale storage. However, irrigation diversions were already reducing summer flow during the 1908-1915 period to levels generally below the current regulated summer flow[2], which is still well below modeled unregulated flow as shown in Figure 1-7.

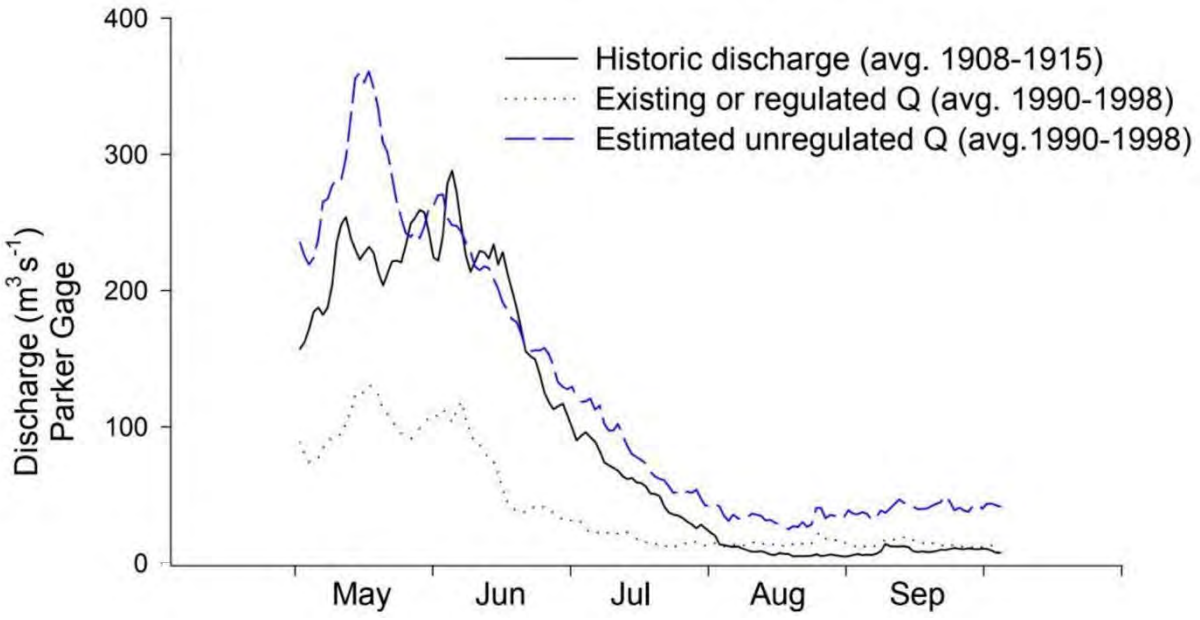


Figure 1-7. Comparison of existing, regulated discharge belolw the Sunnyside Diversion with two approximations of pre-development discharge (From Stanford et al. 2002).

These data clearly show that storing spring peak flows in reservoirs followed by withdrawal of both stored and natural flows has truncated the migration season that salmon and Steelhead evolved to utilize. In mid-July, when high temperatures typically reach lethal levels near the mouth of the Yakima, river flow is less than half of its pre-development level. Under the present flow regime, the later-migrating stocks of juvenile salmon and Steelhead are subjected to greater mortality as river conditions deteriorate and as more are drawn into canals. Native and invasive predators adapted to low flow and warm temperatures move upstream to consume increasing numbers of the survivors.

- **Describe how your conceptual project will address these issues and how your study and design efforts will inform your approach. If you are able to quantify the expected water supply benefits of the project you are studying and designing, please do so.**

[2] Instream flow targets were implemented under the 1994 Yakima Basin Water Enhancement Project (Title XII of Public Law 103-434).

Water rights and the application of water conservation to instream flow are addressed under the YBIP and are not part of this project. However, any winter diversions made possible by modifying the Wapato Diversion could increase beneficial subsurface inputs to the Yakima River.

- **Other Quantifiable Benefits**
  - **Provide information regarding the other critical issues of concern in your project planning area. Are there issues related to human safety (significant flood risk/ damaged infrastructure), significant long term management costs, limited economic opportunity or a lack of jobs, lack of recreational access including access to safe recreational spaces or fishing access? Provide factual support, including citations to relevant data or studies, and information to describe the other critical issues in your planning area.**

The Wapato Diversion appears to have a minor influence on flood stage compared to the much narrower constriction imposed by the freeway crossing a half mile upstream, raising the water surface less than 1 foot compared to the bridge alone at 25,000 cfs), according to a 2010 study by the USBR. At the 100-year flood event (59,700 cfs), the backwater effect of the Wapato Diversion extends 1.7 miles upstream according to a 2012 study by Northwest Hydraulic Consultants. Nevertheless, flooding concerns, sediment transport and public safety are three of the nine design considerations guiding the overall objective of this project.

Operator safety, operational issues and stability of the Wapato Diversion are another three of the design considerations. Tribal fishing access at the Wapato Diversion, another specified design consideration, is now generally limited to the east bank of the east branch of the Yakima River below the diversion. There is no safe access available to the opposite bank of the east branch, or to the west branch.

  - **Describe how your conceptual project will address these issues and how your study and design efforts will inform your approach. If you are able to quantify other expected benefits of the project you are studying and designing, please do so.**

An important component of the conceptual design for the Wapato Diversion is replacing the east spillway with a nature-like fishway that would also increase the crest width and further improve flood passage. A proposed adjustable crest for the west spillway would allow the crest to be lowered during smolt outmigration to increase sweeping velocity across the headworks inlet, raised in summer to improve diversion efficiency, and lowered in the other seasons to pass floods and facilitate sediment transport.

A nature-like fishway replacing the east spillway would increase the crest width to reduce this backwater effect, eliminate two fish ladders with their maintenance and operator safety issues, and provide more and safer tribal fishing opportunity. The associated maintenance bridge over the west channel would enhance operator safety and could provide safe access to tribal fishing sites along the east channel. These features require both computational and physical modeling.

E.1.1.1 *Evaluation Criterion B- Prior Restoration Planning and Stakeholder Involvement and Support*

Points will be awarded based on the extent to which the proposal demonstrates diverse stakeholder support for and/ or involvement in the project, and evidence that the project builds upon prior restoration planning efforts.

For Task A: Study and Design projects, more points will be awarded for study and design projects that are inclusive and incorporate input and participation by a diverse range of stakeholders, and that included such input in an earlier stage of the process.

For purposes of this criterion, applicants submitting a Task A: Study and Design proposal need only to respond to Sub-Criterion B1

Sub-Criterion B1: Task A: Study and Design Stakeholder Involvement and Support and Restoration Planning (40 points)

More points will be awarded for study and design projects that involve a diverse array of stakeholders.

- **Prior Planning and Design: Prior to applying for a Task A, it is expected that applicants will have already performed some general planning work and preliminary studies (e.g., a watershed restoration plan, planning on a river/stream-reach scale, or other planning effort) that led to the identification of a restoration concept and prioritization of their specific restoration project(s), and that included some stakeholder involvement. The following sub criteria request specific information about those prior planning efforts.**
  - **Describe any prior planning efforts related to your proposed project, i.e., planning that took place before you submitted your proposal.**
    - **Describe the specific planning, strategy, study, and any design document(s) (plan(s)) that support your project. Explain when the plan was prepared and for what purpose.**

The Wapato Diversion was the subject of numerous studies that culminated in the design and construction of new fish passage and protective facilities in 1986. Recent technological advances and multi-agency cooperation have made it possible to tag and track juvenile fish through the entire diversion and bypass system and within the Yakima River to assess the effect of the diversion as a whole along with its components on the survival of juvenile salmon and Steelhead. Tests with "sensor fish" are helping to pinpoint locations in the diversion and bypass where injuries are most likely occurring. The preliminary results of this work have elicited broad stakeholder support for funding and developing concepts and designs to reduce impacts of the Wapato Diversion on juvenile fish.

Under the Wapato Diversion Improvement Project (https://wapatodiversion.com), the BIA, the YN and BIA's design consultant developed a list of design ideas and elements for conceptual-level design and analysis and presented them in the Wapato Diversion Dam Conceptual Design Alternatives Report in June 2022 (DOWL 2022). In this 337-page report the design consultant describes the available data and existing structures and the conceptual analyses and investigations completed for each of the design concepts. With broad stakeholder involvement including WIP water users, tribal fishers, the USBR, NOAA Fisheries, and Washington State natural resource agencies, the BIA and YN are refining these concepts to be carried forward into the design phase of the Project.

- **What was the scope of the planning effort that supports your project? Describe the geographic extent and types of issues (e.g., water quantity,**

water quality, and/or issues related to ecosystem health or the health of species and habitat within the watershed).

The geographic scope of this planning effort is the Wapato Diversion dam, the upstream portion of the Wapato Canal, and the fish ladders, screens and bypass structures associated with the diversion and canal, all within the area depicted in Figure 1-8. Ongoing efforts to improve and address the environmental effects of the WIP delivery system down-canal from this project area are guided by separate plans, including:

- Wapato Irrigation Project Modernization Plan (BIA 2018)
- Wapato Irrigation Project Comprehensive Water Conservation Plan (BIA and YN 2019)
- Toppenish Creek Corridor Enhancement Project (YN-DNR 2019)
- Yakama Nation Reservation Managed Aquifer Recharge Program, Toppenish and Satus Basins (Yakama Nation Water Resources Program 2022; in review)

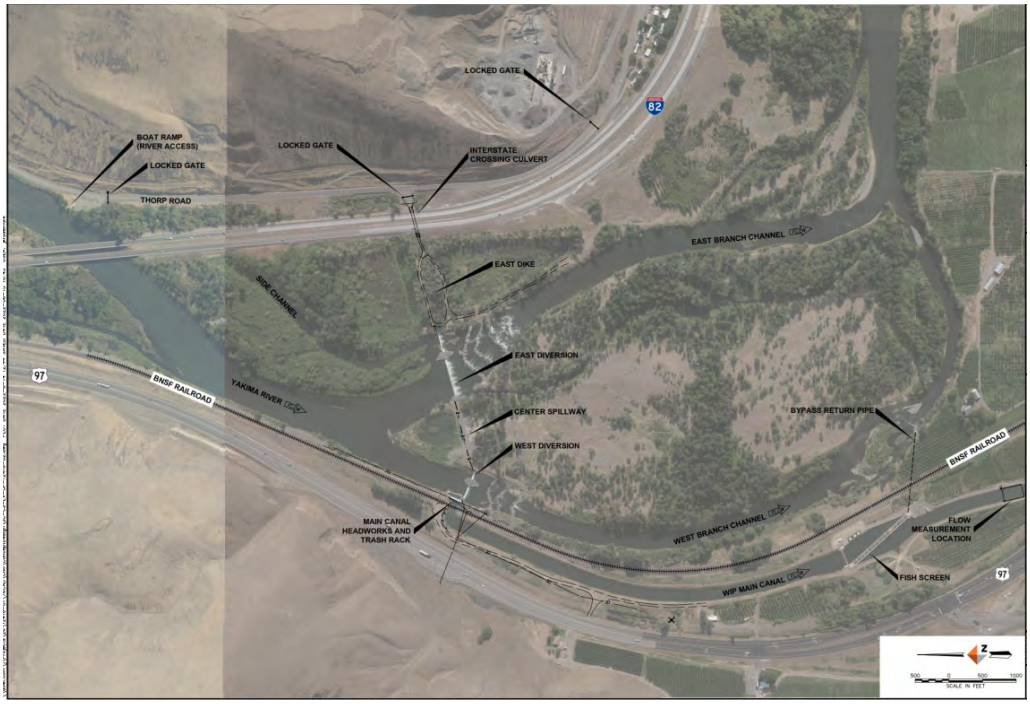


Figure 1-8. General site overview, Wapato Diversion. From Figure 1 in DOWL (2022) Wapato Diversion Conceptual Design Alternatives Report.

The Wapato Irrigation Project is the largest of the six irrigation divisions comprising the USBR's Yakima Project. Unlike the other five divisions, the Wapato Division is operated by the BIA, but it receives most of its water supply from the Yakima Project for irrigation of 136,000 acres of land.

The Yakima Project also operates six storage dams in the upper Yakima Basin, and two power plants. In total, these storage, diversion and hydroelectric facilities, along with agricultural development made possible by the Yakima Project, have drastically changed the Yakima River and have played a role in the decline of native fish populations.

Restoration efforts in the Yakima Basin are coordinated under the YBIP, which was launched by a diverse group of interests in 2009 to build a framework for resource

management that would address the community's needs and put longstanding conflicts over water and fisheries behind them. The Integrated Plan identifies seven elements needed to achieve a balanced and comprehensive approach to water resource management and ecosystem restoration in the Yakima River Basin: Reservoir Fish Passage, Structural and Operational Changes, Surface Water Storage, Groundwater Storage, Habitat/Watershed Protection, Enhanced Water Conservation, and Market Reallocation. The Wapato Diversion Improvement Project fits into YBIP as a component of the Structural and Operational Changes element.

- **Was the plan developed collaboratively? If the referenced plan was not developed collaboratively, please explain why, for e.g., the planning effort is focused on a very small area or concerns internal to the applicant.**

Beginning with construction of the original rotary drum screens in 1939 (Tuck, 1995), juvenile fish passage and protection at the Wapato Diversion has involved multiple entities. Passage of P.L. 96-162 in 1979 launched the Yakima River Basin Water Enhancement Project, and P.L. 96-501, the Northwest Power Act, in 1980. The Power Act provided funds for off-site mitigation of Columbia River hydropower impacts, which were used to design and construct new fish ladders and fish screens in two phases at diversions throughout the Yakima River Basin, including the Wapato Diversion during Phase I in 1986. The Yakama Nation and agencies of the federal and state governments also focused on other irrigation impacts such as instream flow, water loss in delivery systems, and water quality impacts of return flow.

The Wapato Diversion Improvement Project was launched when a team consisting of the BIA, the YN and the BIA's design consultant developed a list of nine design considerations to guide the first phase of the project: Operator Safety, Fisheries Issues, Operational Issues, Sediment Transport, Stability, Flooding Concerns, Fish Harvest, Constructability and Public Safety. Balancing the competing needs of these design considerations, the team also developed a list of "design concepts", each of which addresses one or more of the design considerations, and is carried forward for analysis and evaluation by the team, with additional stakeholders and subject matter experts brought in as concepts were developed.

Concerns about canal and bypass mortality at major Yakima River diversions prompted the USBR to fund a study by USGS beginning in 2018 with the collaboration of YBIP participants, the Yakama Nation and federal and state resource agencies. Preliminary results of this study were described in previous sections of this proposal, and confirmed existing concerns in more detail. The study results are the principal scientific basis for this proposal. Initial concepts for reducing or eliminating smolt mortality at the Wapato Diversion require more analysis, beginning with modeling the most promising concepts.

Success in replacing concrete diversion dams and fish ladders with nature-like channels, most recently at the Nelson Diversion on the Naches River upstream from the Wapato Diversion, have prompted broad interest in developing this low-maintenance and passage-friendly concept for the east channel at the Wapato Diversion as a partial or full replacement of the present concrete spillway.

- **Explain how any prior planning effort relates to your current proposal and how your current proposal adds value and builds on any prior planning efforts.**

This proposal builds on the issues raised and concepts proposed in the planning process for the Wapato Diversion Improvement Project and multi-agency efforts coordinated under the YBIP. Rigorous evaluation of these concepts is the first step in improving fish passage and survival in the lower Yakima River. The overall project will require more resources for study, design and construction than the BIA is able to provide on its own, but the benefits of the proposed comprehensive project will extend well beyond the diversion itself into the tribal community and will help restore healthy fish populations throughout the Yakima Basin.

- **Stakeholder Involvement and Support for Task A: Study and Design Projects Identify stakeholders in the project area who have *committed to be involved* in the study and design process.**

  - **Describe what sector(s) the participating stakeholders represent and how they will engage in this effort, e.g., will they contribute funding or in-kind services, or otherwise engage in the study and design process?**

    - **Provide documentation of the commitment by stakeholders to participate in the study and design process. This could include letters from stakeholders committing to be involved in the study and design process; such letters should explain what their specific interest is and how they plan to participate.**

    - **Are any stakeholders contributing to the cost-share?**

The Wapato Irrigation Project owner (BIA) has committed $700,000 in matching funds to the proposed project.

  - **Describe stakeholders in the project area who have *expressed their support* for the study and design process, whether or not they have committed to participate.**

In addition to the BIA's commitment of matching funds, Wapato Irrigation Project users represented by the Yakama Reservation Irrigation District have provided a letter of support for this project. BNSF Railway Company, whose right of way along the Yakima River crosses the Wapato Canal next to the diversion headworks, is helping to develop alternatives that will likely include modifications to the railroad crossing. Letters of commitment and support can be found in the supplemental materials.

    - **Supporting documentation for this sub-criterion could include letters of support from stakeholders or a description of feedback from interested stakeholders.**
  - **What will the applicant do during the study and design process to ensure participation by a diverse array of stakeholders?**

Stakeholders will be engaged throughout the entirety of the project to find the best solution for improving fish passage at the Wapato Diversion. Meetings and concept

development have been funded by the BIA. This proposal will provide funding to bolster stakeholder engagement throughout the hydraulic modeling, analysis, and preferred alternative selection. The USBR's value planning services have been offered to the project, and will be employed to vet alternatives and provide stakeholder engagement in that process. The environmental assessment process under the National Environmental Policy Act also includes provisions for outreach and engagement with stakeholders and the public.

Community Outreach and Education

To help supplement these existing ongoing efforts and to bring greater understanding about passage problems on the Lower Yakima River and the Wapato Diversion, this proposal includes funding for additional community outreach and education. YBIP has also previously supported community outreach for the Lower Yakima River projects through their website (https://yakimabasinintegratedplan.org/), public meetings regarding YBIP progress, and newsletters.

- **If some sectors are not yet represented, explain how this will be accomplished. Support could include a description of stakeholder interests in the project area, and what you will do to engage them (e.g., workshops, public meetings, or outreach tools such as using local media, outreach to known stakeholder groups, web-based outreach, social media, or other kinds of announcements, etc.).**

Yakama tribal fishers, who have Treaty-reserved fishing rights at the Wapato Diversion site, have been interviewed on their past and present practices at the site, and their ideas for improving fishing access. Project planners will continue to engage tribal members along with the harvest management unit of the Yakama Nation Fisheries Program.

- **Is there opposition to the proposed project effort? If so, describe the opposition and explain how it will be addressed. Opposition will not necessarily result in fewer points.**

YBIP is the basin's inclusive long term watershed scale planning group, and their letter of support indicates the importance of this proposal to Yakima River Basin stakeholders and their consensus on moving forward. Given the age of the diversion, its current state of disrepair, the risks to workers, and the difficulty in diverting the full allocation of water stored for use by the Wapato Irrigation Project, and the need for fish protection addressed by this proposal, opposition to the overall project has not been encountered and is not expected. However, thorough discussion of individual alternatives will be encouraged, as an early high level of engagement will streamline regulatory approval for solutions that emerge from the process.

E.1.2 Evaluation Criterion C— Project Implementation and Readiness to Proceed

(15 points) Up to 15 points may be awarded based upon the extent to which the proposed project is prepared to commence *study and design* OR *construction* work upon entering into a financial assistance agreement.

Task A: Study and Design applicants should respond to sub criteria C1. Applicants that provide a well-developed implementation plan and schedule, logical budget and budget narrative will receive the most points under this criterion.

Sub-Criterion C1: Task A: Study and Design Project Implementation

- **Describe the implementation plan for the proposed study and design project. Please include an estimated project schedule that shows the stages and duration of the proposed study and design work, including major tasks, milestones, and dates.**
  - **Describe the plan to conduct project specific outreach during your award period. What regional stakeholders will you target and how will you connect and engage with them and incorporate their feedback?**
  - **Describe the plan to carry out any relevant studies (e.g., Project-Specific Study and Analysis, Restoration Project Opportunities and Alternatives Analysis, Benefits Analysis, or Legal and Institutional Requirements Research).**
  - **Describe the current design status of the project and describe the design activities will need to be completed to advance the project to 60% design?**
- **Proposals with a budget and budget narrative that provide a reasonable explanation of study and design project costs will be prioritized.**
- **If the applicant intends to do any on-site investigation or monitoring work, please provide documentation of permission and detail any permits or easements that may be required for access.**

The implementation plan for the proposed study, design project, an estimated project schedule are provided in table 1-2. The table also shows the stages and duration of the proposed study and design work, including major tasks, milestones, and dates.

Table 1-2. Aquatic Ecosystem Restoration Projects Task A: Estimated Timeline and Budget.

Task	Action	Begin	Complete	Estimate
1	Present Best Available Science & Obtain Agency/Program Level Support for Biologically-Based Objectives for Improved Fish Passage (Pre-ESA Consultation, 1 workshop, 2 follow-up meetings)	Jan 2024	Apr 2024	$100,000
2	Prepare & Present Conceptual Design Alternatives to Stakeholders (1 technical presentation, 1 public presentation, 1 tribal fishers presentation) (Assumptions Include: new headworks, new railroad bridge, canal stage control, dam crest gate(s) on west branch, nature-like fishway to replace ladders on east branch, improved access & opportunity for tribal fishers, fish monitoring)	May 2024	Sep 2024	$100,000
3	Develop Criteria & Select Preferred Combination of Conceptual Design Alternatives w/Stakeholders (2 technical workshops, 1 public meeting, 1 tribal fishers meeting)	Oct 2024	Feb 2025	$95,000
4	Develop Physical Model for Project (flow, velocity, stage, sediment & debris continuity, stream morphology, safety, harvest opportunities)	Apr 2025	Jun 2025	$750,000
5	Develop Physical Model for Headworks and Nearby Dam Crest Gate & Provide Recommendations Concerning the Need for 3D Computational Model (Satisfy diversion right, enhance hydraulic cues to reduce entrainment, reduce mortality at headworks, safety)	Jul 2025	Sep 2025	$750,000
6	Perform Sensor Fish Study on Physical Model of Headworks & Nearby Dam Crest Gate (retrofit model as necessary & scale up recorded data to evaluate survival at the prototype scale)	Oct 2025	Dec 2025	$250,000
7	Prepare & Present Physical Modeling Results to Stakeholders (1 technical presentation, 1 public presentation, 1 tribal fishers presentation)	Jan 2026	Mar 2026	$50,000
8	Obtain Agency/Program Level Support for Combination of Design Alternatives to Carry Forward for 60% Design (1 technical meeting)	Apr 2026	May 2026	$30,000
9	Complete 60% Design Package (Assumptions Include: new headworks, new railroad bridge, canal stage control, dam crest gate(s) on west branch, nature-like fishway to replace ladders on east branch, improved access & opportunity for tribal fishers, fish monitoring, draft basis of design reports, draft specifications)	Jun 2026	Dec 2026	$240,000

Information about Yakama Nation budget for project management and administration of grant funds is provided in the budget narrative.

E.1.3 Evaluation Criterion D—Presidential and Department of the Interior Priorities

Up to 15 points may be awarded based on the extent that the project demonstrates support for the Biden-Harris Administration's priorities, including E.O. 14008: *Tackling the Climate Crisis at Home and Abroad* and E.O. 13985: *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government,* and the President's memorandum, *Tribal Consultation and Strengthening Nation-to Nation Relationships.*

Please address only those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority (ies) is well supported in the application.

- **Climate Change: E.O. 14008 emphasizes the need to prioritize and take robust actions to reduce climate pollution; increase resilience to the impacts of climate change; protect public health; and conserve our lands, waters, oceans, and biodiversity.**
    - **If applicable, describe how the project addresses climate change and increases resiliency. For example, does the project help communities respond to or recover from drought or reduce flood risk?**

Rising levels of greenhouse gases in Earth's atmosphere are expected to continue increasing air temperatures locally and globally for the foreseeable future. While annual precipitation in the Pacific Northwest may not change greatly, the east slopes of the Cascade Mountains, including the Yakima River Basin, will see less snow and more rain, resulting in more frequent winter floods, earlier and more rapid spring runoff, and lower and warmer stream flow in summer. Measurable declines in the Washington Cascade snowpack and earlier peak flows in Washington streams have already occurred (Climate Impacts Group 2020). Salmonids in snow-fed watersheds are especially vulnerable to future climate change (Yan et al. 2021). Mantua et al. (2010) observed that with the projected loss of all snowmelt-dominated basins in Washington State by the 2080s, and a rain-dominated regime for the Yakima, winter flooding and summer low flow will become the norm.

Replacing the east spillway and fish ladders of the Wapato Diversion with a nature-like fishway, together with an operable crest for one or both spillways that can be set lower than the present spillway elevation, will reduce backwatering and allow the diversion to pass higher floods from rain-on-snow events that are projected to occur more frequently. Early snowmelt and accelerated runoff will also increase the WIP's dependence on reservoir storage to irrigate crops during the summer. An operable spillway crest that allows more efficient diversion and delivery of these reservoir releases to users will increase the WIP's resiliency to climate change.

Climate change will reduce Yakima River flow during the principal outmigration period for juvenile salmon and Steelhead, and a greater proportion of that flow will be diverted for irrigation under established water rights. Under this proposal the diversion intake, headgates and bypass system would be redesigned to reduce the proportion of juvenile salmonids entrained into the canal at a given diversion rate, and to reduce injury and mortality of entrained fish.

Every improvement in outmigration survival of Chinook, Steelhead, Coho, Sockeye and Pacific Lamprey through the Wapato Canal and bypass increases the number of recruits per spawner

(productivity) for these populations in direct proportion to the survival increase. Higher productivity means greater resilience to the negative effects of climate change.

Reducing delay and energy expenditure of upstream migrants is especially important to the success of native Steelhead and reintroduced summer Chinook and Sockeye in the Yakima Basin. These populations attempt to ascend the Yakima River during the hottest time of the year. A nature-like fishway at the Wapato Diversion has the potential to speed upstream migration and increase the likelihood of successful spawning by all species in a warming environment.

- **How will the project build long-term resilience to drought? How many years will the project continue to provide benefits? Please estimate the extent to which the project will build resilience to drought and provide support for your estimate.**

What is the goal for the rehabilitation project in terms of service life?

- **Will the proposed project reduce greenhouse gas emissions by sequestering carbon in soils, grasses, trees, and other vegetation? Does the proposed project seek to reduce or mitigate climate pollutions such as air or water pollution? Does the proposed project contribute to climate change resiliency in other ways not described above?**

Not applicable to this proposal.

- **Disadvantaged or Underserved** Communities: E.O. 14008 and E.O. 13985 affirm the advancement of environmental justice and equity for all through the development and funding of programs to invest in disadvantaged or underserved communities.

  - **Please use the Council on Environmental Quality's interactive Climate and Economic Justice Screening Tool, available online at Explore the map – Climate & Economic Justice Screening Tool (https://screeningtool.geoplatform.gov) to identify any disadvantaged communities that will benefit from your project.**

The Wapato Irrigation Project serves lands within the Yakama Reservation. The Yakama Nation is a Federally Recognized Tribe that is considered disadvantaged.

- **If applicable, describe how the project benefits those disadvantaged or underserved communities identified using the tool. For example, does the project improve water quality, provide economic growth opportunities, improve or expand public access to nature, or provide other benefits in a disadvantaged or underserved community?**

Although the specific changes that will ultimately result from the Wapato Diversion Improvement Project will not be known until the alternatives analysis is concluded, there is a high likelihood that the project would benefit tribal members who farm or lease allotments for farming, or whose livelihoods benefit from the farm economy. In addition, modifications to the diversion for fish passage and maintenance access would improve the opportunity for tribal members to exercise treaty-reserved fishing rights.

Improving the Project's principal water diversion would directly benefit Yakama tribal members. These benefits can be measured in terms of crop values and lease income, and by assessing the number of tribal fishing sites, the number of days members can access their fishing sites and important cultural areas without interference from dam operations, and any changes in the

quantity of fish harvested relative to total adult passage numbers pre- and post-implementation. The hydraulic model funded by this proposal would be able to assess the level of benefit that each potential alternative would have on reducing flood risk and flood return intervals.

Ultimately the potential improvements to fish passage at the Wapato Diversion will have a significant impact on anadromous fish production in the Yakima River Basin. This will provide the Yakama Nation with greater access to treaty trust resources.

- **Tribal Benefits:** The Department of the Interior is committed to strengthening tribal sovereignty and the fulfillment of Federal Tribal trust responsibilities. The President's memorandum, *Tribal Consultation and Strengthening Nation-to Nation Relationships*, asserts the importance of honoring the Federal government's commitments to Tribal Nations.

    - **If applicable, describe how the project directly serves and/or benefits a Tribe, supports Tribally led conservation and restoration priorities, and/or if the project incorporates or benefits Indigenous Traditional Knowledge and practices.**

For nearly 50 years the Yakama Nation has exercised its sovereignty as a leader of fish and wildlife restoration in the Yakima River Basin. This project would build on the Yakama Nation's efforts to restore and benefit from natural resources that are integral to their existence as a people, while rehabilitating infrastructure essential to the modern Reservation economy.

The Lower Yakima River is part of an extremely diverse Traditional Cultural Landscape associated with the Yakama Nation. These locations have many associated legendary and monumental sites which are told through the oral history and way of teaching in ichishkinsinwit (the language that belongs to the land). Archaeological sites including burials/cemeteries, fishing sites, villages, and ceremonial sites, and many other resource types are interconnected and associated elements of the area. The Yakama Nation retains the traditional responsibility, as a people, to respect the laws of this land understood as Nami-taman-wit (The Creator's Law). In this way, Yakamas have a responsibility to the resources that sustain our lives. Without these resources we would not live every day, and we know every breath that we take is as a deeply spiritual gift. If we understand this and do not take the steps necessary to protect our resources, we will bring harm to ourselves, others, and future generations yet unborn. The Wapato Diversion Improvement Project presents an opportunity for a multiple First Foods management approach to negotiate the re-establishment of traditional practices and harvesting opportunities (Quempts, et. al., 2018). This approach incorporates traditional knowledge of salmon production, run timing, and habitat conditions that would also contribute vital knowledge about the site's potential for rehabilitation. Traditional knowledge would also help to contextualize climate change projections and resource impacts through data sharing agreements that would preserve ecological and traditional knowledge about species, harvesting locations, and traditional uses when working with nonindigenous partners (Climate and Traditional Knowledges Workgroup 2014).

    - **Does the proposed project support Reclamation's Tribal trust responsibilities or a Reclamation activity with a Tribe?**

In its 2014 Indian Policy Manual, Reclamation pledges to "… actively seek partnerships with Indian tribes to ensure that tribes have the opportunity to participate fully in the

Reclamation Program as tribes develop, manage, and protect their water and related resources." Beginning with this study and design project, improving Wapato Irrigation Project facilities cooperatively with the Yakama Nation and the BIA helps fulfill this commitment.

2015 South Ely Street
Kennewick, WA 99337
Customer Service 509-586-9111
Business 509-586-6012
FAX 509-586-7663
www.kid.org

May 16, 2023

To: U.S. Bureau of Reclamation Aquatic Ecosystem Restoration Projects Program FY23 (R23AS00106) Reviewers

Re: Request for Letter of Support for Prosser Dam and Chandler Canal Improvements Study and Design Proposal

Dear Review Committee,

We are writing to express our strong support for the Yakama Nation's application under the U.S. Bureau of Reclamation Aquatic Ecosystem Restoration Projects Program for the Prosser Dam and Chandler Canal Improvements Study and Design Proposal in the Lower Yakima River. The Kennewick Irrigation District has been exploring solutions to improve fish passage and river conditions on the lower Yakima River for several decades. KID has been and will continue to be involved in all aspects of the project to improve Prosser Dam and the Chandler Canal and believes this current effort will bring dramatic improvements to fish survival while maintaining water deliveries.

Prosser Dam and Chandler Canal pose significant challenges to fish passage and survival. Prosser Dam supplies irrigation water from the Yakima River through the Chandler Canal. The dam is a barrier to both returning adults and out-migrating juvenile fish and can divert up to half of the Yakima River's flow, resulting in dangerous fish passage conditions. During low flow conditions, juvenile fish that pass through the dam infrastructure are thought to have only around 40% survival. Other issues with the dam include configuration of fish ladders, design of the diversion headworks, abundance of aquatic vegetation both above and below the dam, and more.

Addressing fish passage and survival at Prosser Dam and Chandler Canal is a high priority for fishery health in the Yakima River Basin. Fish passage in the Lower Yakima River is a limiting factor to anadromous fish production in the entire Basin. The Yakama Nation's proposal pursues study and design of improvement or replacement alternatives to Prosser Dam and Chandler Canal that would increase fish survival. These improvements will build on major salmon and steelhead recovery efforts in the region, providing widespread benefits to fish throughout the Yakima River Basin and downstream through the Columbia River Basin and into the Pacific Ocean.

KID is pleased to continue working with the Yakama Nation on finding alternatives to improve fish passage at this critical structure while maintaining our capability to receive our water supply.

Thank you for your consideration of the Yakama Nation's proposal.

Sincerely,

Gene a Huffman

Gene Huffman
Board President

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
South Central Region 3 • 1701 South 24th Avenue, Yakima, WA 98902-5720
Telephone: (509) 575-2740 • Fax: (509) 575-2474

May 31, 2023

To: U.S. Bureau of Reclamation Aquatic Ecosystem Restoration Projects Program FY23 (R23AS00106) Reviewers

Topic: WDFW Letter of Support for Prosser and Wapato Diversions Improvements for Anadromous Passage Study and Design Proposal

Dear Review Committee,

I'm writing to express Washington Department of Fish and Wildlife's strong support for the Yakama Nation's application under the U.S. Bureau of Reclamation's Aquatic Ecosystem Restoration Projects Program. The proposal addresses the Prosser and Wapato Diversions Improvements for Anadromous Passage Study and Design Proposal in the Lower Yakima River.

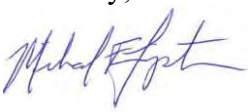
Prosser and Wapato Diversion canals pose significant challenges to fish passage and survival. The two diversions create barriers and cause mortalities to both returning adults and out-migrating juvenile fish. The diversions divert up to half of the Yakima River's flow, resulting in dangerous fish passage conditions. During frequent annual low flow conditions, juvenile fish that pass through the diversions infrastructure can result in upwards of 40% juvenile survival loss. Other issues with the diversions include poor functioning fish ladders, design problems of the diversion headworks, and abundance of aquatic vegetation above and below the dam.

Addressing fish passage and survival at the Prosser and Wapato Diversions is a high priority for fish recovery in the Yakima River Basin. Fish passage in the Lower Yakima River is a limiting factor to anadromous fish production in the entire Basin. Significant resources are being invested in the upper watershed including fish passage at storage dams and habitat protection and restoration. The challenges associated with these lower river diversions must be addressed to prevent compromising the improvements being made further upstream.

The Yakama Nation's proposal pursues study and design of improvement or replacement alternatives to Prosser and Wapato Diversions that would increase fish survival. These improvements will build on major salmon and steelhead recovery efforts in the region, providing widespread benefits to fish throughout the Yakima River Basin and downstream through the Columbia River Basin and into the Pacific Ocean.

Thank you for your consideration of the Yakama Nation's proposal.

Sincerely,



Mike Livingston
South-Central Washington Regional Director
509-424-1757

May 22, 2023

To: U.S. Bureau of Reclamation Aquatic Ecosystem Restoration Projects Program FY23 (R23AS00106) Reviewers

Re: Support for Prosser Dam and Chandler Canal Improvements Study and Design Proposal

Dear Review Committee,

As members of the Yakima Basin Integrated Plan (Integrated Plan), we are writing to express support for the Yakama Nation's application under the U.S. Bureau of Reclamation Aquatic Ecosystem Restoration Projects Program for the *Prosser Dam and Chandler Canal Improvements Study and Design Proposal in the Lower Yakima River*.

This project is a critical component of the Habitat Protection and Enhancement and Fish Passage elements of the Integrated Plan. The Integrated Plan is a unique integrated water resource management effort supported by a coalition of 23 members, including conservation groups, agricultural interests, irrigators, and local, state, and federal agencies. The U.S. Bureau of Reclamation, Washington State Department of Ecology, and the Yakama Nation are leading plan implementation through partnership with these and other organizations. Federal legislation authorizing the Integrated Plan lays out an ambitious fishery goal:

> To protect, mitigate, and enhance fish and wildlife and the recovery and maintenance of self-sustaining harvestable populations of fish and other aquatic life, both anadromous and resident species, throughout their historic distribution range in the Yakima Basin.

To meet this goal, the Integrated Plan developed a Salmon and Steelhead 10-Year Restoration Strategy to accelerate actions to improve safe fish passage and to restore river flow and habitat. This strategy prioritizes a suite of actions aimed at the Lower Yakima River, where current fish passage conditions are a critical limiting factor to the entire Integrated Plan salmon and steelhead restoration effort. Addressing fish passage and survival at the Prosser Dam and Chandler Canal, owned by the U.S. Bureau of Reclamation, is of the highest and most urgent priorities among these actions.

Prosser Dam and Chandler Canal pose significant challenges to salmon and steelhead in the Lower Yakima River. Prosser Dam supplies irrigation water from the Yakima River through the Chandler Canal. The dam is a barrier to

both returning adults and out-migrating juvenile fish and poses significant challenges to fish passage in low flow conditions. During low flow conditions, juvenile fish that pass through the dam infrastructure are thought to have only around 40% survival. Other issues with the dam include configuration of fish ladders, design of the diversion headworks, abundance of aquatic vegetation both above and below the dam, and more.

The Yakama Nation's proposal pursues study and design of improvement or replacement alternatives to Prosser Dam and Chandler Canal that would increase fish survival. The proposal is a critical step in improving conditions for fish in the Lower Yakima River. These improvements will build on major salmon and steelhead recovery efforts in the region, providing widespread benefits to fish throughout the Yakima River Basin and downstream through the Columbia River Basin and into the Pacific Ocean.

Thank you for your consideration of the Yakama Nation's proposal.

Sincerely,

Urban Eberhart
Kittitas Reclamation District

Cory Wright
Kittitas County

Amanda McKinney
Yakima County

Brandon Parsons
American Rivers

Lisa Pelly
Trout Unlimited

Scott Revell
Roza Irrigation District

Mike Livingston
WDFW

Tom Tebb
WA State Dept. of Ecology

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

November 1, 2021

Talmuch Oxford
Columbia-Cascades Area Office
1910 Marsh Road
Yakima, WA 98901-2058

Dear Talmuch Oxford,

I am writing to authorize an expenditure from the groundwater mitigation fund held by Reclamation. The terms of the settlement agreements that created the fund require that the Yakama Nation authorize, in writing, any use of funds in the account.

The Yakima Nation authorizes disbursement of the remainder of the funds to the Yakama Nation for the scoping of the fish survival improvement options at Prosser Dam and Chandler irrigation diversion. This funding will be utilized to establish a scoping effort to fulfill the following actions at the site:

1. Examine and describe the current Prosser Dam and Chandler irrigation structure and water use
2. Analyze fish impacts as they relate to individual structures at the site. (i.e. canal head gates, bypass return pipe)
3. Identify knowledge gaps and assist in implementing research or studies to assist in bridging gaps
4. Initial development site strategies for improvement of smolt survival
5. Development of theoretical smolt survival changes versus site strategies employed

This effort is envisioned as a multi-year effort, with funding from multiple sources. This initial disbursement will fund the preliminary scoping effort of the first two years.

Please consider this letter the required authorization to disburse funds to the Yakama Nation. Please feel free to contact Phil Rigdon or Michael Porter with any additional questions.

Thank you,

George Selam, Chairman
Roads Irrigation and Land Committee
Yakama Tribal Council