Grant County
PUBLIC UTILITY DISTRICT

Powering Our Way of Life.

VIA ELECTRONIC FILING

April 13, 2021

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
Mail Code: DHAC, PJ-12
888 First Street, N.E.
Washington, D.C. 20426

RE: **Priest Rapids Hydroelectric Project No. 2114**
License Compliance Filing – Calendar Year 2020 Activities under Priest Rapids Hydroelectric Project

- **Article 401(a)(1) - Downstream Passage Alternatives Plan**
- **Article 401(a)(2) - Progress and Implementation Plan**
- **Article 401(a)(3) - Habitat Plans**
- **Article 401(a)(4) - Artificial Propagation, Hatchery and Genetic Management and Monitoring and Evaluation Plans**
- **Article 401(a)(6) Avian Predation Control Program**
- **Article 401(a)(7) Northern Pikeminnow Removal Program**
- **Article 401(a)(8) - Priest Rapids Dam Alternatives Spill Measures Evaluation Plan**
- **Article 404 - Fishery Operation Plan**

Dear Ms. Bose,

Please find enclosed the 2020 Calendar Year Activities Under Priest Rapids Hydroelectric Project consistent with the requirements of Article 401(a)(1) Downstream Passage Alternatives Action Plan, Article 401(a)(2) Progress and Implementation Plan, Article 401(a)(3) Habitat Plans, Article 401(a)(4) Artificial Propagation, Hatchery and Genetic Management, and Monitoring and Evaluation, Article 401(a)(6) Avian Predation Control Program, Article 401(a)(7) Northern Pikeminnow Removal Program, Article 401(a)(8) Priest Rapids Dam Alternatives Spill Measures Evaluation Plan and Article 404 Fishery Operations Plan (collectively referred to as the Fishery Articles) of the Priest Rapids Hydroelectric Project License (Project).

On June 15, 2012, the Federal Energy Regulatory Commission (FERC) issued an Order modifying and approving Public Utility District No.2 of Grant County, Washington's (Grant PUD's) May 1, 2012 request to modify the filing protocol and deadlines for the Fishery Articles[1]. Under this Order, Grant PUD is required to file an annual report with FERC by April 15.

[1] 139 FERC ¶ 62, 236

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Grant PUD distributed this annual report to members of the Priest Rapids Coordinating Committee including National Marine Fisheries Service, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Colville Confederated Tribes (CCT), Yakama Nation and the Columbia River Inter-Tribal Fish Commission on March 3, 2021 for review and comment. After a 30-day comment period, comments were received from the CCT and incorporated into the report.

FERC staff with any questions should contact Tom Dresser at TDresse@gcpud.org.

Respectfully,

Ross Hendrick

Ross Hendrick
Senior Manager – Environmental Affairs

Cc PRCC

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CALENDAR YEAR 2020

ACTIVITIES UNDER PRIEST RAPIDS HYDROELECTRIC PROJECT LICENSE (FERC NO. 2114)

Public Utility District No. 2 of Grant County, Washington

April 2021

Executive Summary

Public Utility District No. 2 of Grant County, Washington (Grant PUD) owns and operates two hydroelectric dams on the Columbia River, Wanapum and Priest Rapids, know altogether as the Priest Rapids Hydroelectric Project (PRP), and is operated under the terms and conditions of the Federal Energy Regulatory Commission (FERC) Hydroelectric License No. P-2114 issued by FERC on April 17, 2008.[1]

Grant PUD operates the PRP through the coordination of the seven-dam system and other Columbia Basin entities with current operational agreements with the fishery agencies, tribal representatives, and other operators to provide protection and improvement for a range of fisheries and other resources within and downstream of the PRP. These agreements include the Hanford Reach Fall Chinook Protection Program Agreement (Grant PUD 2004) and the Priest Rapids Project Salmon and Steelhead Settlement Agreement (SSSA, Grant PUD 2006). The Project is also subject to the requirements of the FERC license and related laws and regulations, as well as to the requirements (incorporated by refence in the license) of the Biological Opinion (BiOp) of the PRP issued by the National Marine Fisheries Service (NMFS) for its effects on anadromous salmonids, the Clean Water Act Section 401 Water Quality Certificate (WQC) issued by the Washington Department of Ecology (WDOE), and the BiOp for the PRP issued by the United States Fish and Wildlife Service (USFWS) regarding the effect of the PRP on bull trout.

This report is intended to fulfill the annual reporting requirement for the following license articles:

- 401(a)(1) – Downstream Passage Alternatives Action Plain including:
    - NMFS BiOp: 1.2 (Wanapum) and 1.11 (Priest Rapids)
    - NMFS and USFWS Fishway Prescriptions: 8(Wanapum) and 14 (Priest Rapids)
- 401(a)(2) – Progress and Implementation (P&I) Plan, including
    - 401(a)(3) – Habitat Plan
    - 401(a)(6) – Avian Predation Control Program
    - 401(a)(7) – Northern Pikeminnow Removal Program
    - NMFS BiOp: 1.33
    - NMFS and USFWS Fishway Prescription: 24
- 401(a)(4) – Priest Rapids Dam Alternative Spill Measures Evaluation, and
- 404 – Fishery Operations Plan.

These license articles require that annual plans and reports filed with FERC to document compliance with the requirements of PRP license and to propose plans for the coming year.

On May 1, 2012, Grant PUD filed a request with FERC to combine these individual reports into one comprehensive report and change the filing deadline to April 15 annually. The combination of the reports and revised filing date would ease coordination with the natural resource agencies

[1] 123 FERC ¶ 61,049

and result in a more efficient review and approval process. FERC issued an Order on June 15, 2012[2] approving Grant PUD's request.

This report provides a description of the activities related to the implementation of protection, enhancement, and mitigation measures required within the FERC License and issued orders, BiOp (NMFS 2008a & USFWS 2007), and SSSA for the PRP completed during the calendar year January 1 through December 31, 2020. Information incorporated into this report is based upon activities occurring within the Priest Rapids Coordinating Committee (PRCC) and related subcommittees (Hatchery and Habitat) associated with achieving performance and standards for:

- Juvenile salmonids, juvenile and adult salmonids passage measures,
- Predator control programs,
- No Net Impact (NNI) and habitat funds, and
- Hatchery supplementation and monitoring and evaluation.

Specific details on the suite of activities covered by this report can be found in Sections 2 through 5.

The activities and plans covered in this report occurred in consultation with the PRCC and its hatchery and habitat subcommittees and the Priest Rapids Fish Forum (PRFF). The PRCC and its hatchery and habitat subcommittees are made up of representatives from NMFS, USFWS, Washington Department of Fish and Wildlife (WDFW), Yakama Nation (YN), Confederated Tribes of the Umatilla Reservation (CTUIR), the Colville Confederated Tribes (CCT), and Grant PUD.

Yearling Chinook

Grant PUD conducted three consecutive years of performance standard evaluations during 2003 – 2005 to determine Project-wide survival for yearling Chinook for the PRP (Table 1). The three-year consecutive arithmetic average of 86.6% exceeded the required standard of 86.49% per the 2008 National Marine Fisheries Service Biological Opinion for the Priest Rapids Project (Anglea et al. 2003, Anglea et al. 2004a and 2004b, Anglea et al. 2005). Results were formally accepted by the PRCC and approved by NMFS on September 28, 2005.

Per Section 15.7.2 (Timing and recalibration) of the SSSA, the survival estimates for yearling Chinook that were originally scheduled to be re-evaluated at five-year intervals (next study would have occurred in 2010). However, because of concern over juvenile steelhead survival through the PRP, NMFS and the PRCC agreed that the yearling Chinook evaluation originally scheduled for 2010 would occur in 2014 (SOA 2011-06).

[2] 139 FERC ¶ 62,236

Table 1 Survival estimates and standard errors (SE) in parenthesis (development and total PRP) for yearling Chinook through the PRP for years 2003-2005 and 2014.

Year	Wanapum Development	Priest Rapids Development	Total Survival for Priest Rapids Project*
2003	N/A	N/A	86.6% (SE=0.0442)
2004	N/A	N/A	86.4% (SE=0.0309)
2005	N/A	N/A	86.9% (SE=0.0214)
3 Year Consecutive Average			**86.6% (SE=0.0322)**
2014[1]	94.5% (SE=0.013)	96.1% (SE=0.009)	90.8% (SE=0.0150)

*Performance Standard Requirement = 86.49%

[1]Required Check-in per Statement of Agreement 2011-06; Wanapum Drawdown

At the request of NMFS and PRCC, Grant PUD conducted a yearling Chinook performance standard check-in during the 2014 Wanapum fracture event. In preparation for that evaluation, the PRCC developed SOA 2014-02. A couple of key elements included in SOA 2014-02 included the following (1) results from the Wanapum acoustic tag survival evaluation (for spring Chinook and juvenile steelhead) would only be used to inform ESA consultations and would not be used for NNI-Fund calculations and (2) results from the Priest Rapids Reservoir survival and Priest Rapids Top-spill Bypass survival and behavior evaluations (if valid) will be counted as progress towards meeting performance standard in the Priest Rapids Project for juvenile steelhead and yearling Chinook. Further details related to SOA 2014-02 can be reviewed in the Calendar year 2014 Progress and Implementation Annual Report.

The survival estimates for yearling Chinook migrating through the PRP in 2014, when including survival estimate from the Wanapum Development (under drawdown scenario) was 90.8% (CI=95%, SE=0.015; Skalski et al. 2014). This is 4.3% above the required juvenile salmonid Project passage survival of 86.49% (Table 1: NMFS 2008a).

Observed development-level (reservoir and dam) passage survival for yearling Chinook migrating through Wanapum was 94.5% (SE=0.013), while survival through Priest Rapids Development was 96.1% (SE=0.001). The Wanapum and Priest Rapids dams ("concrete") passage survival was 98.8% and 97.1% respectively (Table 2, Hatch et al. 2015). Based on point estimates[2], survival for yearling Chinook utilizing the various passage routes at Wanapum and Priest Rapids dams (bypass, spillway, and powerhouse) was greater than 96%, with the exception of powerhouse survival at Priest Rapids Dam (92.6%, Table 2). Although the fracture at Wanapum impacted day to day operation of the powerhouse, Wanapum Fish Bypass (WFB) and spillway, observed survival at Wanapum Dam exceeded 97.0%. Specific details on the behavior and survival evaluation can be reviewed in Hatch et al. (2015) and Skalski et al. (2014).

Yearling Chinook performance standards for the PRP were achieved in 2005 and again confirmed in 2014 as part of the ESA consultation associated with the Wanapum Drawdown after a myriad of capital improvements (as required per the 2004 and 2008 NMFS BiOps) had been completed at both the Wanapum and Priest Rapids Dams. These capital improvements include the WFB, Priest Rapids Fish Bypass (PRFB), Advanced Hydro Turbine System (at Wanapum Dam), enhanced avian wire arrays (at both Wanapum and Priest Rapids Dams), enhanced predator removal program, and implementation of operating the turbines in "fish mode" at both dams. With these enhancements, a high level of survival (>95%) has been documented for yearling Chinook passing through the completed capital improvements at Wanapum and Priest Rapids Dams.

Table 2 **Number of tags that passed at each dam by route with the corresponding percentage of tags which were detected downstream in 2014. The percentage of tags listed for all routes reflects passage survival for all passage routes for yearling Chinook, including unknown passage location and gatewell dipped fish, however, fish with upstream movement during last detection were excluded.**

	Wanapum Dam		Priest Rapids Dam	
Passage Route	**Number Passed**	**Detected Downstream (%)**	**Number Passed**	**Detected Downstream (%)**
Wanapum Fish Bypass or Priest Rapids Fish Bypass	27	96.3	415	99.8
Spillway	99	97.0	293	98.0
Powerhouse	225	98.2	352	92.6

Per section 15.3 of the Salmon and Steelhead Agreement:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"…Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting these performance standards is achieved" and "when the parties determine that the performance standards have been achieved on a species-by-species basis, the NNI fund annual contributions for that species will be terminated."*

Grant PUD is achieving NNI for yearling Chinook at the PRP per Section 15.3 of the SSSA annual contributions into the NNI Fund for yearling Chinook were terminated in 2005. The next performance standard check-in for yearling Chinook evaluation is 2025 or 2026.

Sockeye

Grant PUD conducted two consecutive years of paired release-recaptured evaluations to estimate juvenile sockeye survival through the Wanapum and Priest Rapids developments in 2009 and 2010. The two-year arithmetic average performance standard for sockeye through the PRP was 91.6% (Skalski et al. 2009; Skalski et al. 2010).

As a result of high survival observed for juvenile sockeye, the PRCC agreed to defer the third year of juvenile sockeye survival evaluation until 2016, which would also serve as the initial five-year check-in for sockeye (SOA 2011-06). The PRCC also agreed that the 2012 through 2016, the NNI contribution for sockeye would be based on the current two-year survival average for sockeye. For 2017 (and beyond), the NNI contribution for sockeye would be based on a new three-year sockeye survival average, based on 2016 study results, if validated by the PRCC (SOA 2011-06).

In October 2014, the PRCC modified the juvenile sockeye salmon survival and behavior evaluation per SOA 2014-04. The schedule modification moves the third year of juvenile sockeye survival evaluation from 2016 to 2015.

Based on the results of the 2015 sockeye performance evaluation study, juvenile sockeye performance standards have also been achieved for the PRP. The three-year (2009, 2010, and 2015) arithmetic average performance standard for juvenile sockeye passage through the PRP is 91.7% (SE=0.015) (Skalski et al. 2009, Skalski et al. 2010, and Hatch et al. 2016 (Table 3). That 91.7% exceeds the required standard of 86.49%.

Table 3 Survival estimates and standard errors (SE) in parenthesis (development and total Project) for juvenile sockeye through the Priest Rapids Project for years 2009-2010 and 2015.

Year	Wanapum Development	Priest Rapids Development	Total Survival for Priest Rapids Project (Required Standard=86.49%)
2009	97.3% (SE=0.009)	94.6% (SE=0.011)	92.1% (SE=0.014)
2010	94.1% (SE=0.014)	96.8% (SE=0.014)	91.1% (SE=0.019)
2015	94.1% (SE=0.011)	97.5% (SE=0.00)	91.8% (SE=0.012)
3 Year Consecutive Average			**91.7% (SE=0.015)**

Per section 15.3 of the Salmon and Steelhead Agreement:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"…Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting these performance standards is achieved" and "when the parties determine that the performance standards have been achieved on a species-by-species basis, the NNI fund annual contributions for that species will be terminated."*

Grant PUD is achieving NNI for sockeye at the PRP per Section 15.3 of the SSSA annual contributions into the NNI Fund for juvenile sockeye were terminated. The next performance standard check-in for juvenile sockeye is 2025 and 2026.

Steelhead

Grant PUD completed the third consecutive year, for Project-wide juvenile steelhead survival evaluation in 2017. Based on the three consecutive arithmetic year average (2015-2017) performance standards for juvenile steelhead have been achieved (87.0%, SE=0.02, Skalski et al. 2018, Hatch et al. 2018 (Table 4).

Table 4 Survival estimates and standard errors (SE) in parenthesis (development and total Project) for juvenile steelhead through the Priest Rapids Project for years 2003-2005 and 2015-2017.

Year	Wanapum Development	Priest Rapids Development	Total Survival for Priest Rapids Project (Required Standard=86.49%)
2008	95.8% (SE=0.024)	86.4% (SE=0.023)	82.8% (SE=0.031)
2009	94.4% (SE=0.019)	88.1% (SE=0.021)	83.2% (SE=0.026)
2010	85.5% (SE=0.019)	90.4% (SE=0.017)	77.3% (SE=0.022)
3 Year Consecutive Average			**81.1% (SE=0.026)**
2015	85.5% (SE=0.017)	94.1% (SE=0.028)	83.7% (SE=0.027)
2016	93.04%*	93.04%*	86.6% (SE=0.032)
2017	N/A	N/A	90.8% (SE=0.017)
3 Year Consecutive Average (2015-2017)			**87.0% (SE- 0.020)**

* Priest Rapids Project total estimated survival divided by half.

Per section 15.3 of the Salmon and Steelhead Agreement:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"…Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting these performance standards is achieved" and "when the parties determine that the performance standards have been achieved on a species-by-species basis, the NNI fund annual contributions for that species will be terminated."*

Grant PUD is achieving NNI for steelhead at the PRP per Section 15.3 of the SSSA annual contributions into the NNI Fund for juvenile steelhead were terminated. The next performance standard check-in for juvenile sockeye is 2025 and 2026.

No-Net-Impact Fund Adjustments

To evaluate steady progress towards meeting performance standards and to adjust the NNI Fund, Grant PUD, in consultation with the PRCC, conducts performance standard evaluations. Based on these evaluations, performance standards for yearling Chinook, sockeye and steelhead have been achieved for the PRP.

Per section 15.3 of the Salmon and Steelhead Agreement:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"…Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting these performance standards is achieved" and "when the parties determine that the performance standards have been achieved on a species-by-species basis, the NNI fund annual contributions for that species will be terminated."*

Grant PUD is achieving NNI for yearling Chinook, sockeye, and steelhead at the PRP per Section 15.3 of the SSSA and therefore annual contributions into the NNI Fund yearling Chinook, sockeye, and steelhead has ended.

Performance standards for summer sub-yearling Chinook have not been achieved yet nor has the PRCC determined the best way to move forward to conduct survival evaluations. Life history strategies and current technology preclude the PRCC from conducting Project-wide survival evaluations on active summer sub-yearling migrates. Grant PUD continues to achieve NNI for summer sub-yearling Chinook via contributions into the NNI Fund, through hatchery compensation and habitat projects throughout the upper Columbia River Basin.

No-Net-Impact Fund Contributions

The total amount of annual contributions into the NNI Fund made by Grant PUD since 2006 is $23,184,622.22 (2006-2020). NNI Funds have been utilized by the PRCC to fund 35 separate projects ranging from predator removal, adult fish passage, habitat restoration, instream flow enhancements, avian predator evaluations, land acquisitions, fish screen monitoring, diversion assessment, and various research activities. The annual contribution of $599,007.99 was made into the NNI account prior to February 15, 2020.

Avian and Fish Predator Control

Grant PUD continues to implement avian and fish predator removal and control programs at the PRP. A total of 7,923 birds were hazed during 2020 of which 43% were Caspian terns. In addition, 522 piscivorous waterbirds were lethally removed during 2020.Grant PUD removed a total of 13,763 northern pikeminnow during 2020. Removal methods included set-lining (1,464), beach seining (7,298), and angling fishery (5,001).

Project Operations (Turbines and Bypasses)

The WFB was in full open operation (20 kcfs) from April 19 to June 15, 2020 for spring out-migrants and from June 16, 2020 to August 18, 2020 for summer migrants. The PRFB was operated from April 20 to June 15, 2020 for spring out-migrants and from June 16, 2020 to August 18, 2020 for summer migrants and was operated at a fixed flow volume of 27 kcfs. The exact flow volume is determined by forebay elevation. The Wanapum and Priest Rapids turbines were operated in “fish mode” for the same timeframes identified above.

Hatchery Program Implementation

Grant PUD has completed construction on Priest Rapids Hatchery, Nason Creek Acclimation Facility, and the Carlton Acclimation Facility, as well as provided cost-share funding to complete capital upgrades at facilities where Grant PUD production programs have been implemented. The total capital cost of the programs through 2020 was $64.7 million, with the most capital funding directed to renovate the Priest Rapids Hatchery (39%).

Estimated operations and maintenance investments, along with monitoring and evaluation investments, into Grant PUD’s production programs was approximately $7.7 million in 2020 and $107.5 million since 2005.

The combined total expenditures invested into Grant PUD hatchery production programs through 2020 was $172.6 million dollars. The fall Chinook and the White River spring Chinook program expenses comprised nearly half of those costs (25% and 16% respectively)

Habitat Program Implementation

The PRCC Habitat subcommittee is the primary forum for implementing and directing habitat protection and restoration measures for the PRP's anadromous fish programs covered under both the BiOp and SSSA. Since 2006, 119 total projects have been unanimously approved by one of two committees (PRCC Habitat subcommittee and PRCC) for funding using one of the three funding accounts: 601-NNI Fund, 602-Habitat Supplemental Fund, and 603-Habitat Conservation Fund. Of those, 74 are completed and 45 are currently active and underway.

As of the end of December 2020, $28,846,774 dollars have been spent on committee-approved projects since 2006. The total amount of unencumbered funds available for habitat projects approved by the PRCC and/or PRCC Habitat subcommittee through 2020 for all three accounts is $11,356,927.

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1.0 Introduction

Public Utility District No. 2 of Grant County, Washington (Grant PUD) owns and operates two hydroelectric dams on the Columbia River, Wanapum and Priest Rapids, know altogether as the Priest Rapids Hydroelectric Project (PRP), and is operated under the terms and conditions of the Federal Energy Regulatory Commission (FERC) Hydroelectric License No. P-2114 issued by FERC on April 17, 2008.[3]

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1.1 Purpose of the Report

This report provides a description of the activities related to the implementation of protection, enhancement, and mitigation measures required within the FERC license and issued orders, BiOps (NMFS and USFWS), and SSSA for the PRP completed during the calendar year January 1 through December 31, 2020. Although the Covid pandemic did impact day to day field activities (e.g. such as pikeminnow removal) Grant PUD, NOAA Fisheries and PRCC and PRCC subcommittees were able to implement environmental stewardship requirements. Information incorporated into this report is based upon activities occurring within the PRCC and related subcommittees (Hatchery and Habitat) associated with achieving performance standards for:

- Juvenile salmonids, juvenile and adult salmonids passage measures,
- Predator control programs,
- No Net Impact (NNI) and habitat funds, and
- Hatchery supplementation and monitoring and evaluation.

Specific details on the suite of activities covered by this report can be found in Sections 2 through 5 below.

1.2 Roles and Responsibilities of the Priest Rapids Coordinating Committee

As defined in the SSSA, the PRCC has the role and responsibility to coordinate the implementation of the adaptive management programs contained in the SSSA. Specific roles and responsibilities (but not limited to) identified within the SSSA include the following:

- Approve or modify annual Progress and Implementation (P&I) plans, approve and modify the Performance Evaluation Program, Review Performance Reports,
- Advocate decisions of the Committee in all relevant regulatory forums,
- Establish such subcommittees as it deems useful,
- Coordinate adaptive management programs contained in the SSSA including Hatchery and Habitat subcommittees (Section 5.1),
- Make decisions (except for the implementation of the anadromous fish activities set forth in Appendix A of the SSSA) related to the implementation of the SSSA (Section 5.4),
- Serve as a forum to coordinate the implementation of the SSSA and to consider issues that arise (Section 5.5.1),

[4] 139 FERC ¶ 62,236

- Assesses new information as it becomes available through the implementation of this Agreement or otherwise (Section 5.5.2),
- May from time to time recommend to FERC amendments to the new license to reflect the best available scientific information on means and measures to achieve the applicable performance standards for the PRP (Section 5.5.2),
- Coordinate as appropriate the design and implementation of research and monitoring programs as consistent with the SSSA (Section 5.5.3),
- Coordinate activities listed above, the sharing of data and information, and the conduct of other activities under the SSSA with related activities associated with other hydropower operations on the Columbia River in order to promote efficiencies and the use of best available scientific information and analysis in the implementation of the SSSA, including, but not limited to, participation in studies relating to the assessment of PRP related juvenile and adult delayed mortality (Section 5.5.3),
- Seek to resolve disputes at the subcommittee level (Section 6.3), and
- Conduct other business as may be appropriate for the efficient and effective implementation of these measures.

1.3 Priest Rapids Coordinating Committee

Grant PUD continues to support the PRCC per Terms and Condition 1.35 (T&C 1.35). Over the course of 2020, PRCC representatives participated in a total of 12 meetings, conference calls, and/or WebEx conferences. Meeting agendas and minutes for these meetings can be reviewed at PRCC Meeting Minutes. The PRCC Policy Committee did not meet in 2020.

There were no Statement of Agreement (SOA) presented to the PRCC for approval in 2020.

PRCC Hatchery Subcommittee 2020 meeting schedule and approved SOA's are found in Section 5.1. PRCC Habitat Subcommittee activities can be found in Section 6.0.

Table 5 Priest Rapids Coordinating Committee meetings, conference calls, and WebEx conferences conducted in 2020.

Date	Communication Type	Topic
1/29/2020	Conference Call	General Committee Business
2/25/2020	Monthly PRCC Meeting	General Committee Business
3/24/2020	Conference Call	General Committee Business
4/28/2020	Webinar	General Committee Business
5/26/2020	Microsoft Teams Meeting	General Committee Business
6/23/2020	Microsoft Teams Meeting	General Committee Business
7/28/2020	Microsoft Teams Meeting	General Committee Business
8/25/2020	Microsoft Teams Meeting	General Committee Business
9/22/2020	Microsoft Teams Meeting	General Committee Business
10/27/2020	Microsoft Teams Meeting	General Committee Business
11/24/2020	Microsoft Teams Meeting	General Committee Business
12/15/2020	Microsoft Teams Meeting	General Committee Business

1.4 Performance Evaluation Program

The 2008 NMFS BiOp (T&C 1.33) requires Grant PUD to prepare an annual summary report (Performance Evaluation Program) which reflects all activities and progress during the previous

calendar year. The purpose of this report is to provide a reliable technical basis to assess the degree to which Grant PUD is improving juvenile and adult passage survivals, habitat productivity improvements, and supplementation for the listed anadromous fishery resources affected by the PRP. This annual report is also required to include results of monitoring, modeling, or other analyses that take place in the calendar year to evaluate the degree to which the actions are likely to improve juvenile and adult survivals. In addition, where appropriate, the Performance Evaluation Program is supposed to measure and evaluate individual actions within each category, assess the contribution of the action to the desired objective, and provide a basis for identifying new options and priorities among those option for further progress in meeting objectives. Grant PUD believes that this report fulfills the requirement of T&C 1.33, as specific programs and updates to those programs are illustrated below in Sections 2 through 5.

Grant PUD staff also participates in several regional forums to discuss and share ideas on a broad spectrum of fish protections and enhancement issues. The forums include:

- Priest Rapids Coordinating Committee
- Priest Rapids Coordinating Committee – Hatchery Subcommittee
- Priest Rapids Coordinating Committee – Habitat Subcommittee
- Fall Chinook Working Group
- Priest Rapids Fish Forum
- Rocky Reach and Wells Habitat Conservation Plan – Hatchery Subcommittee
- Rocky Reach Fish Forum
- Priest Rapids Fish Forum Pacific Lamprey Sub-group(s)
- Columbia Basin Regional Pacific Lamprey Conservation and Tribal Summit
- Regional Lamprey and White Sturgeon Technical Workgroups
- Anadromous Fish Evaluation Program (AFEP)
- US Army Corps of Engineers Columbia River Basin Symposia
- Inland Avian Predation Working Group
- Fish Tagging Forum
- Washington/British Columbia Chapter, American Fisheries Society conferences (as presenters and session organizer)
- Western Division, American Fisheries Society conference (as presenters and officer of the Western Division)
- US Army Corps of Engineers year-end Total Dissolved Gas (TDG) monitoring meeting
- 100th Meridian Columbia River Basin Team for aquatic invasive species
- Mid-Columbia Spring Operations Meeting – Douglas PUD, Wenatchee, WA
- Grant PUD's annual invasive species (AIS) meeting
- Hatchery Evaluation Technical Team (HETT)

- Chief Joseph Hatchery Annual Program Review
- Salmon Recovery Conference (Presenter)
- Upper Columbia Science Conference Steering Committee
- Columbia River Basin Partnership Task Force
- Independent Scientific Advisory Board Review of Upper Columbia Spring Chinook Salmon (tours and presentations)
- Integrated Recovery Technical Advisory Group
- Upper Columbia Salmon Recovery Board (reports reviewer and contributors)
- Pacific Northwest Northern Pike Forum
- Bilateral Okanagan Basin Technical Working Group
- Okanagan Fry Release Ceremony
- Confederated Tribes of the Colville Reservation – First Salmon Ceremony

2.0 Priest Rapids Project

2.1 Progress in Achieving Performance Standards

Grant PUD is required to make steady progress towards achieving a minimum of 91 percent combined adult and juvenile salmonid survival performance standard at the Priest Rapids and Wanapum developments (i.e., each dam and reservoir), per section 2.9.6 of the 2008 BiOp and section 7.7 of the SSSA (2006).

The 91 percent standard includes a 93 percent development-level (reservoir and dam) juvenile performance standard. In 2008, NMFS recognized that it wasn't currently possible to measure the 91 percent combined adult and juvenile survival standard, so the focus of achieving performance standards at the PRP was on juvenile survival estimates. The product of each development's juvenile survival performance standard (93%) provides the survival performance standard of 86.49% (0.93 X 0.93) for the total Priest Rapids Project.

Over the last two decades, Grant PUD has conducted dam reservoir smolt survival evaluations, evaluating progress towards meeting a 93% juvenile development passage survival. This standard can be measured at each development individually, or as a composite of survival at the two developments. To evaluate steady progress toward achieving the 93% juvenile salmonid development survival requirement and to strive toward achieving passage performance standards.

Grant PUD, NOAA Fisheries and the PRCC are now able to measure the combined adult and juvenile survival through the Priest Rapids Project (91%), as data on returning adult Covered Species[5] originating above the Priest Rapids Project have become available (since 2005 and 2008). With the widespread use of PIT-tags, estimates of adult survival can now be generated for Covered Species passing through the Priest Rapids Project.

[5] Spring, summer and fall Chinook salmon, sockeye salmon, steelhead and coho.

These data on adult Covered Species can now be used to estimate the adult and juvenile combined survival and to determine if the 82.8% Project standard is being met (91% × 91% ≥ 82.8%) and determine if the No-Net-Impact standard has been achieved per the SSSA[6].

Information on estimated adult salmonid conversion rates through the Priest Rapids Project has been incorporated below. Currently, the PRCC is reviewing this information and the methodology used to develop the adult salmonid conversion rates.

2.1.1 Yearling Chinook

Three consecutive years of performance standard evaluations were conducted during 2003-2005 to determine Project-wide survival for yearling Chinook for the PRP (Table 6). The three-year consecutive arithmetic average of 86.6% exceeded the required standard of 86.49% per the 2008 NMFS Biological Opinions for the Priest Rapids Project (Anglea et al. 2003, Anglea et al. 2004a and 2004b, Anglea et al. 2005). Results were formally accepted and approved by the PRCC and NMFS on September 28, 2005.

Per the SSSA (Section 15.7.2 – Timing and Recalibration), the survival estimate for yearling Chinook that was originally scheduled to be re-evaluated at five-year intervals (next study would have been 2010) was postponed until 2014 because of concern over juvenile steelhead survival through the PRP. NMFS and PRCC agreed that the yearling Chinook evaluation originally scheduled for 2010 would occur in 2014 (SOA 2011-06).

Table 6 Survival estimates and standard errors (SE) in parenthesis (development and total Project) for yearling Chinook through the Priest Rapids Project for years 2003-2005 and 2014.

Year	Wanapum Development	Priest Rapids Development	Total Survival for Priest Rapids Project*
2003	N/A	N/A	86.6% (SE=0.0442)
2004	N/A	N/A	86.4% (SE=0.0309)
2005	N/A	N/A	86.9% (SE=0.0214)
3 Year Consecutive Average			**86.6% (SE=0.0322)**
2014[1]	94.5% (SE=0.013)	96.1% (SE=0.009)	90.8% (SE=0.0150)

* Performance Standard Requirement = 86.49%

[1] Required Check-in per Statement of Agreement 2011-06; Wanapum Drawdown

At the request of NMFS and PRCC, a yearling Chinook performance standard check was conducted in 2014 during the Wanapum fracture (drawdown) event (SOA 2014-02). Survival for yearling Chinook migrating through the PRP in 2014, when including survival estimate from the Wanapum Development (under drawdown scenario) was 90.8% (CI=95%; SE=0.015, Skalski et al. 2014). This is 4.3% above the required juvenile salmonid PRP passage survival standard of 86.49% (NMFS 2008), illustrating that survival standards were achieved during the Wanapum Drawdown.

Per Section 15.3 of the SSSA:

[6] No Net Impact is achieved when there is a minimum of 91% combined adult and juvenile survival rate for each Covered Species past each dam and through each reservoir (survival standard), and when Grant PUD implements 2% mitigation in the form of funding habitat restoration and conservation work in mid-Columbia tributary streams, and 7% mitigation in the form of hatchery supplementation, or alternate mitigation

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting those performance standards is achieved"* and *"when the parties determine that the performance standards have been achieved on a species-by - species basis, the NNI Fund annual contributions for that species will be terminated."*

Based on results from the yearling Chinook evaluation conducted in 2003–2005 and 2014 check-in, survival standards and NNI have been achieved per the 2008 NMFS BiOp and SSSA. As a result, annual contributions into the NNI Fund for yearling Chinook terminated in 2005. The next performance standard check-in for yearling Chinook evaluation is 2025–2026.

2.1.2 Juvenile Steelhead

The third consecutive year of a Project-wide steelhead survival evaluation was completed in 2017. The three consecutive arithmetic year average (2015 – 2017) performance standards for juvenile steelhead was 87.0%. (SE=0.02, Skalski et.al. 2018, Table 7). Results were formally accepted by the PRCC and approved by NMFS on December 22, 2017.

Per Section 15.3 of the SSSA:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting those performance standards is achieved"* and *"when the parties determine that the performance standards have been achieved on a species-by - species basis, the NNI Fund annual contributions for that species will be terminated."*

Per the 2008 NMFS BiOp and the SSSA performance standards NNI have been achieved. As a result, annual contributions into the NNI Fund for juvenile steelhead have ended. The next performance standard check-in for juvenile steelhead is 2025 – 2026.

Table 7 Survival estimates and standard errors (SE) in parenthesis (development and total Project) for juvenile steelhead through the Priest Rapids Project for years 2003 – 2005 and 2015 – 2017.

Year	Wanapum Development	Priest Rapids Development	Total Survival for Priest Rapids Project (Required Standard=86.49%)
2008	95.8% (SE=0.024)	86.4% (SE=0.023)	82.8% (SE=0.031)
2009	94.4% (SE=0.019)	88.1% (SE=0.021)	83.2% (SE=0.026)
2010	85.5% (SE=0.019)	90.4% (SE=0.017)	77.3% (SE=0.022)
3 Year Consecutive Average			**81.1% (SE=0.026)**
2015	85.5% (SE=0.017)	94.1% (SE=0.028)	83.7% (SE=0.027)
2016	93.04%*	93.04%*	86.6% (SE=0.032)
2017	N/A	N/A	90.8% (SE=0.017)
3 Year Consecutive Average (2015-2017)			**87.0% (SE- 0.020)**

* Priest Rapids Project total estimated survival divided by half.

2.1.3 Juvenile Sockeye

Two consecutive years of paired release-recapture evaluations to estimate juvenile sockeye survival through the Wanapum and Priest Rapids developments were conducted in 2009 and 2010. The two-year arithmetic average performance standard for sockeye through the PRP was 91.65 (Skalski et al. 2009, Skalski et al. 2010).

As a result of the high survival observed for juvenile sockeye, the PRCC agreed to defer the third year of juvenile sockeye survival evaluation until 2016, which would also sever as the initial five-year check in for sockeye (SOA 2011-06). The PRCC also agreed that for 2012 through 2016, the NNI contribution for sockeye would be based on the current two-year survival average for sockeye. For 2017, the NNI contributions for sockeye would be based on a new three-year sockeye survival average, based on 2016 study results, if validated by the PRCC (SOA 2011-06).

In October 2014, the PRCC modified the juvenile sockeye salmon survival and behavior evaluation per SOA 2014-04. The schedule modification moved the third year of juvenile sockeye survival evaluation from 2016 to 2015.

Based on the results of the 2015 sockeye performance evaluation study, juvenile sockeye performance standards have also been achieved for the PRP. The three-year (2009, 2010, and 2015) arithmetic average performance standard for juvenile sockeye passage through the PRP is 91.7% (SE=0.015) (Skalski et al. 2009b, Slakski et al. 2010 and Hatch et al. 2016) (Table 8). The 91.7% exceeds the required standard of 86.49%.

Table 8 Survival estimates and standard errors (SE) in parenthesis (development and total Project) for juvenile sockeye through the Priest Rapids Project for years 2009 – 2010 and 2015.

Year	Wanapum Development	Priest Rapids Development	Total Survival for Priest Rapids Project (Required Standard=86.49%)
2009	97.3% (SE=0.009)	94.6% (SE=0.011)	92.1% (SE=0.014)
2010	94.1% (SE=0.014)	96.8% (SE=0.014)	91.1% (SE=0.019)
2015	94.1% (SE=0.011)	97.5% (SE=0.00)	91.8% (SE=0.012)
3 Year Consecutive Average			**91.7% (SE=0.015)**

Per Section 15.3 of the SSSA:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting those performance standards is achieved"* and *"when the parties determine that the performance standards have been achieved on a species-by - species basis, the NNI Fund annual contributions for that species will be terminated."*

NNI for sockeye at the PRP has been achieved per the 2008 NMFS BiOp and the SSSA and therefore annual contributions into the NNI Fund for juvenile sockeye has been terminated. The next performance standard check-in for juvenile sockeye is 2025 – 2026.

2.1.4 Sub-yearling Chinook

In 2008 and 2009, Grant PUD conducted two pilot sub-yearling Chinook acoustic tag survival evaluations in the PRP area. Based on the results of the pilot evaluations, the PRCC agreed that life history strategies and technology and/or methodology was not available to conduct sub-yearling summer Chinook survival evaluation. Specific limiting factors identified at this time include battery life (related to active tags) and variety of life history strategies illustrated within a population within a population of sub-yearling Chinook.

In 2011, the PRCC agreed survival evaluations for sub-yearling Chinook would occur over a three-year consecutive timeframe starting in 2016 (per SOA 2011-06; 2016-2018). The PRCC also agreed they would determine the feasibility of conducting a sub-yearling Chinook survival evaluation in September 2015.

Per SOA 2015-03, the PRCC agreed to defer year-one (2016) of the sub-yearling Chinook survival evaluation but requested that a sub-yearling Chinook workshop occur prior to May 2016. After the workshop, the PRCC would determine next steps. Grant PUD, working in coordination with the Public Utility Districts of Chelan and Douglas counties, conducted a sub-yearling Chinook workshop June 21, 2016. The workshop agenda included the following topics:

1). Fish Passage Survival Model Updates
2). Snake River Chinook Salmon Life History Patterns
3). Sub-yearling Chinook Life History Diversities Observed in the Mid-Columbia
    a. Post-Emergent Behavior of Sub-yearling Chinook in the Wells Reservoir and Implications for the Measurement of Passage Survival through Wells Project.

b. Juvenile (and Adult) Sub-yearling Chinook Salmon Life History Information from the Okanogan River and Wells Pool
c. The Life History of Sub-yearling from the Entiat River
d. Comparing the Migration Patterns and Timing of Yearling Spring Chinook Salmon and Sub-yearling Summer Chinook Salmon through the Mainstem Columbia River Using Available PIT-Tag Data
e. The Life-History Strategies of Upper Columbia Summer/Fall Chinook as Determined by Scale Analysis of Returning Adults

4). Availability of Study Fish
a. Grant PUD Sub-yearling Survival and Behavior Pilot Studies: Application of Age 0 Fall Chinook Salmon
b. Sub-yearling Data from the Rocky Reach Juvenile Bypass System
c. Results of Wells Reservoir Fish Collection Studies

5). Tagging Effects and Available Tags and Detection Equipment
a. Barotrauma
b. Tag Hardware
c. Tagging Effects

The overall conclusion from the June 21, 2016 sub-yearling workshop was that, at the present time, due to limitations in tag technologies, sub-yearling life-history strategies and survival study model designs, a statistically valid Project-wide survival study for summer sub-yearling Chinook was not possible.

Based on the result of the workshop, Grant PUD presented a draft SOA (2016-05) for consideration by the PRCC to defer survival evaluations for sub-yearling summer Chinook to a timeframe in the future as had been done in the past (SOA's 2009-04, 2011-06, and 2015-03).

In January 2017, the PRCC agreed that Project-wide survival and behavior evaluations for sub-yearling Chinook are not possible due to the complex life history strategy they exhibited and the current technology limitations (SOA 2016-04). Under this SOA, the PRCC also agreed to defer Project-wide survival evaluations for sub-yearling Chinook until 2020. In the meantime, the PRCC would continue to evaluate and/or monitor study designs, tag technology, and life history information to better understand future Project-wide survival study feasibility after 2020 or before.

At the September 25, 2019 PRRC meeting, the PRCC agreed that Project-wide survival and behavior evaluations for sub-yearling Chinook is still not possible due to the complex life history strategy they exhibited and the current technology limitations (SOA 2019-01). Under this SOA, the PRCC agreed to defer Project-wide survival evaluations for the sub-yearling Chinook until the next scheduled Project-wide survival studies for yearling Chinook, steelhead, and sockeye in 2025 – 2026. In the meantime, the PRCC would continue to evaluate and/or monitor study designs, tag technology, and life history information to better understand future Project-wide survival study feasibility in 2025 or before.

2.1.5 Coho

In September 2007, the PRCC approved a 10-year SOA 2007-16 (2007 – 2017), which established Coho as a "Covered Species", per the definition within the SSSA. Under this SOA, the PRCC agreed to specific measures and items that Grant PUD implemented over the 10-year term of the SOA. This SOA expired in December 2017 and therefore in the interim the PRCC

will be defaulting to the language within the SSSA until a "new" SOA can be developed and approved by the PRCC. The specific language referenced above which states the following:

> *Compensation for Coho in the Wenatchee, Entiat, and Methow river basins will be assessed within six months following the signing of the Settlement Agreement, following the development of an anticipated long-term Coho hatchery program and/or the establishment of a threshold population of naturally reproducing Coho in the above three subbasins. The PRCC Hatchery Subcommittee shall make the determination as to whether a hatchery program and/or naturally reproducing population of Coho is present in any or all of three basins. Should the Hatchery Subcommittee determine the most appropriate means to satisfy NNI for the Wenatchee, Entiat, and Methow river basins. Programs to meet NNI for the Wenatchee, Entiat, and Methow river basins may include but are not limited to: 1) Provide operation and maintenance funding in the amount equivalent to 14% (7% per project) juvenile project passage loss or 2) provide funding for acclimation or adult collection facilities both in the amount equivalent to a total of 14% for the Priest Rapids Project. The programs selected to achieve NNI for the three subbasins will utilize an interim value of project survival, based upon the three-year average juvenile project mortality of 7% per each dam and reservoir. This interim value of total Project mortality will remain until specific passage and survival studies can be conducted and verified by the PRCC on Coho passing through the Priest Rapids Project, and until the evaluation of ongoing programs/populations in the Wenatchee, Entiat, and Methow river subbasins by the PRCC is accomplished.*

In January 2017, the PRCC agreed via SOA 2017-01 that survival estimate for yearling Chinook salmon would be used as a surrogate for Coho salmon survival. This surrogate survival would then be used to estimate NNI hatchery compensation for the upper Columbia Basin Coho salmon that enter the PRP. The PRCC and the PRCC Hatchery Subcommittee approved a SOA (SOA 2017-06) that confirmed that a presentation by the Yakama Nation addressed the evaluation requirement in SOA 2007-16.

On January 23, 2018, the PRCC approved a SOA that outlined Grant PUD's Coho obligation and future juvenile survival evaluation schedule for yearling Chinook, sockeye, and juvenile steelhead (SOA 2018-01). This SOA was amended on January 30, 2018 and approved by the PRCC on January 31, 2018. According to SOA 2018-01, Grant PUD will provide Coho hatchery compensation for the Upper Columbia at a rate equivalent to 14% (7% per development) to meet Grant PUD's No-Net-Impact Coho hatchery obligation. Fourteen percent will be the mortality rate through the 2032 recalculation.

2.1.6 Schedule

Table 9 illustrates the updated survival evaluation time for the various covered species. As discussed above, Grant PUD has achieved survival standards for yearling Chinook, sockeye, and steelhead. Per SOA 2018-01, the PRCC agreed that future survival evaluations for yearling Chinook, sockeye, and juvenile steelhead would occur in 2025 and 2026, and that the "five-year check-in" survival studies for the covered species would be changed to a "ten-year check-in" survival studies. SOA 2019-01 deferred summer sub-yearling Chinook survival evaluations until

2025/2026. Under SOA 2018-01, the PRCC agreed that Grant PUD Coho mitigation would be accomplished via hatchery compensation for 2018-2032.

Table 9 Performance standards survival evaluation schedule for covered species migrating through the Priest Rapids Project 2020 – 2026.

Species	2020	2021	2022	2023	2024	2025	2026
Spring Chinook	Standards Achieved					X[1]	
Steelhead	Standards Achieved					X[2]	
Sockeye	Standards Achieved						X[3]
Coho	Mitigation Achieved via SOA 2018-01						
Summer sub-yearling Chinook	X[4]	X[5]	X[6]	.	.	.	.

[1] Check-in for yearling Chinook per Statement of Agreement 2018-01. Study schedule may be modified per PRCC.
[2] Check-in for juvenile steelhead per Statement of Agreement 2018-01. Study schedule may be modified per PRCC.
[3] Check-in for sockeye per Statement of Agreement 2018-01. Study schedule may be modified per PRCC
[4-6] Year 1-3 of proposed summer sub-yearling Chinook evaluation

2.2 Adult Salmonid and Steelhead Conversion Rates

Grant PUD was able to estimate conversion rates for spring Chinook Salmon, summer Chinook Salmon, steelhead, and Sockeye Salmon migrating through the Priest Rapids project by using the University of Washington Data Access in Real Time (DART) PIT Tag Adult Returns Conversion Rate tool combined with queries of the Columbia Basin PIT Tag Information System (PTAGIS; Table 10). This was accomplished by developing detection histories from PTAGIS queries for 1) comparison to the DART results, and 2) use in the Cormack-Jolly-Seber (CJS) release-recapture model for estimating from 2006 to 2019.

This analysis was presented to the PRCC in September 2020 for review and comment. Although the PRCC is still reviewing the methodology used and determining how conversion rates may be used in the future, Grant PUD believes that it represents an accurate, quick, and efficient means for estimating conversion rates through the Priest Rapids Project.

Table 10 Estimated Conversion Rates using two methodologies for Covered Species migrating through the Priest Rapids Project 2006 – 2019.

Species/Run	Grant PUD Conversion Rate Method	CJS Model Conversion Rate Method
	Conversion Rate	Conversion Rate
Spring Chinook	0.993	0.984
Sockeye Salmon	0.919	0.928
Summer Chinook	0.997	0.998
Steelhead	0.981	0.987

2.3 No-Net Impact

The PRCC and Grant PUD recognized that the performance standards for the PRP may not be achieved for certain stocks via 2003 PRP operations. The purpose of the NNI Fund was to provide the PRCC with additional financial capacity to undertake measures to improve survival of juvenile salmonids prior to the time when the PRP attains applicable juvenile project survival standards.

Per Section 15.3 of the SSSA:

> *"NNI Fund is intended to provide near-term compensation for annual survivals that are less than the survival objectives in the performance standards for the Project for spring Chinook, steelhead, summer Chinook, and sockeye."*

Section 15.3 further states

> *"Grant PUD will reduce its annual NNI Fund contributions as progress toward meeting those performance standards is achieved"* and *"when the parties determine that the performance standards have been achieved on a species-by - species basis, the NNI Fund annual contributions for that species will be terminated."*

To evaluate steady progress toward meeting performance standards and to adjust the NNI Fund, Grant PUD, in consultation with the PRCC, conducts performance standard evaluations. Based on these evaluations, performance standards for yearling Chinook, juvenile sockeye and juvenile steelhead have been achieved for the PRP. Based on Section15.3 of the SSSA annual contributions into the NNI Fund for yearling Chinook, sockeye, and steelhead have been terminated.

Life history strategies and current technology preclude the PRCC from conduction Project-wide survival evaluations on active summer sub-yearling migrants.

The total amount of annual contributions into the NNI Fund made by Grant PUD since 2006 is $23,184,622.22 (2006 – 2020). NNI Funds have been utilized by the PRCC to fund 35 separate projects ranging from predator removal, adult fish passage, habitat restoration, instream flow enhancements, avian predator evaluations, land acquisitions, fish screen monitoring, diversion assessment, and various research activities. The annual contribution made into the NNI account prior to February 15, 2020 was $599,007.99.

2.4 Description of Turbine Operating Criteria and Protocols

Project turbines are operated in a protocol referred to as "Fish Mode" and also "Ganging Units" during the juvenile salmonid out-migration season (typically mid- to late-April through mid- to late-August), based on smolt index counts conducted by WDFW at the Rock Island Smolt Monitoring Station, in order to maximize turbine passage survival rates of juvenile salmonids. Fish Mode was the result of using Hill Curves, Theoretical Avoidable Losses calculations, turbine discharge rates, head, and fish survival curves (based on 1996 and 2005 balloon-tag evaluations of salmonid smolts through the turbines) to determine the operating range of the turbines and maintain a minimum fish survival rate of 95 percent.

For Wanapum Dam, this means an operating flow range of 11.8 to 15.7 thousand cubic feet per second (kcfs) per turbine, and for Priest Rapids Dam, turbine units are operated between 9.0 to 17.4 kcfs. Upon further investigation of the issue concerning smolt-passage survival through turbines, it was determined that passage survival rates for out-migrating juvenile salmonids were influenced, not only by how a turbine is operated (i.e. Fish Mode), but also how the dam's powerhouse, overall, is operated. This determination led to the concept of "ganging" turbine units in conjunction with operating turbines in Fish Mode. Ganging units is defined as concentrating operating turbines into blocks of adjacent units, thus reducing the edge-effect in regard to predation by fish and birds on salmonid smolts as smolts exit a turbine's draft tube (LGL Limited, 2003).

When turbines are required, ganged units are operated first and shutdown last because it has been demonstrated that juvenile salmonids are drawn to turbines closest to the spillway, and that their survival is highest when passing through blocks of turbines being operated in Fish Mode.

Turbines furthest from the spillways (Unit 1 at Wanapum and Unit 10 at Priest Rapids) are the first turbines to discontinue operation during daylight hours when the powerhouses are operating at less than full capacity during juvenile and adult fish-migration seasons. The discharge from these turbines may adversely affect adult salmonids' ability to efficiently locate the entrances to the adult fishways adjacent to these turbine discharges.

2.4.1 Turbine Operations and Inspection Schedule

Turbines are operated as needed for producing electricity and do not have an operation season or schedule. Turbines are inspected as necessary based on the number of hours operated and other associated stresses.

2.5 Description of Spillway Operating Criteria and Protocols

The Wanapum Fish Bypass (WFB) was designed to operate at five different flow volumes: 20 kcfs, 15 kcfs, 10 kcfs, 5 kcfs and 2.5 kcfs. In the past ten years, the WFB has been operated at 20 kcfs during the downstream migration of juvenile salmonids, with the exception of 2014 during the Wanapum fracture incident. During the outmigration flows through the WFB ranged between 3-5 kcfs due to forebay elevations associated with the emergency drawdown.

During 2020, the WFB was operated at 20 kcfs during the entire juvenile salmonid outmigration (April 19 – August 18, 2020). When inadvertent spill occurred, water was passed through the tainter gates as agreed upon by the PRCC spill representatives.

Non-turbine surface-spill passage route at Priest Rapids Dam began on April 20, 2020 through the Priest Rapids Fish Bypass (PRFB). The PRFB was operated at ~27 kcfs during the downstream migration of juvenile salmonids through the entire fish spill season (April 0-August 18, 2020).

The fish-spill periods were closely matched with the juvenile migration timing, with greater than 98% of the yearling spring out-migrants passing during the spring fish-spill period between April 19 and June 15th, 2020 (FPC 2020). The combined spring and summer fish-spill periods from April 19 through August 18 encompassed greater than 98% of the entire 2020 outmigration (FPC 2020).

Grant PUD, in consultation with the PRCC fish-spill representatives, use the smolt index counts from the Rock Island Smolt Monitoring Station to determine when annual spring fish-spill at both developments is initiated (before 2.5 percent of the juvenile spring migrants have passed the Project - typically mid- to late-April) and summer fish-spill is terminated (when over 95.0 percent of the summer juvenile migrants have passed; typically mid- to late-August). Typically, the end of the spring fish-spill overlaps with the beginning of the summer fish-spill, providing continuous fish-spill from April to August.

2.5.1 Spillway Operation and Inspection Schedule

The spillways are operated on the schedule outlined above (spill only being thru the two fish bypasses, unless additional hydraulic capacity is needed, at which time the tainter-gates are used for additional spill) during the juvenile salmonid out-migration season and are operated on an as-needed basis during the remainder of the year. Inspections typically occur during the late

summer/early fall low river-flow period, with any necessary maintenance occurring during the low river-flow winter months when the tainter gates are unlikely to be needed.

2.6 Description of Sluiceway Operating Criteria and Protocol

Historically, the sluiceway at Wanapum Dam was used to provide an adult salmonid fallback route when the WFB is closed at the end of the juvenile salmonid out-migration season, typically in mid- to late-August. The WFB serves as the adult salmonid fallback route while it is in operation. In 2018, the Wanapum sluiceway was damaged and taken out of service and not available for adult fallback. The WFB is now used for adult fallback instead and has approval from the PRCC. The WFB remains open, at a flow setting of 2.5 kcfs, until November 15 of each year. The sluiceway at Priest Rapids Dam is un-pinned and then operated as a surface-spill sluiceway following the end of the salmonid out-migration, typically in mid to late-August, to provide an adult salmonid fallback route, and remains fully open for adult fallback until November 15 of each year.

2.6.1 Sluiceway Operation and Inspection Schedule

The sluiceways are operated on the schedule outlined in the above section. Inspections occur during the non-operation periods.

Construction activity for the PRFB was completed on April 1, 2014, which included the modification of tainter gate 22 to operate as a “sluice-gate” when needed. Modified gate 22 (of the PRFB) is operated from the end of juvenile fish-spill (mid-August) until –November 15 for adult salmon/steelhead fallback. Gate 22 was used for adult steelhead fallback in 2019.

2.7 Adult Fishways Operating Criteria, Protocol, and Schedule

Fishway ladders are operated with a water depth over weirs of 1.0-1.2 ft. Debris from trash racks and picketed leads is quickly removed from ladder exits when water surface differentials exceed 0.5 ft., or as debris begins building up at the exit from the fish ladder. All submerged orifices and overflow weir crests are cleared of debris prior to the adult fish migration season and are kept free of debris during the fish-passage season. Fishway entrances are operated with a head differential range of 1.0 to 2.0 ft.

Grant PUD operates the fishways within the criteria ranges outlined above, and targeted heads are maintained whenever possible. When targeted heads cannot be maintained, the fishways are operated at maximum capable output to meet entrance and channel flow requirements.

Collection channel transport velocities of 1.5 to 4.0 feet per second (fps) (target 2.0 fps) are maintained through the powerhouse collection channels and through the lower end of the fish ladders. All collection channel orifice gates remain closed during the adult fish-passage season, per agreement with the PRCC.

Fishway inspections are conducted by a project operator at least once per day (walk-through) to ensure that fish facilities are operating within criteria limits. A daily log of the inspections is compared with the computerized printout to assure correct calibration of the fishway control system. At the discretion of NMFS or Fish Passage Center (FPC), at least one inspection of the fishways is conducted by one of these agencies each month during the adult fish-passage season (April 15–November 15).

During the 2019passage season, District staff began investigating the use of handheld laser measuring devices to verify water elevations during monthly ladder inspections. These efforts were continued in 2020 and will be continued into 2021.

Monthly ladder inspections occurred at Wanapum and Priest Rapids dams on April 22, May 30, June 25, July 23, August 21, October 2 and October 31 of 2020. Inspection results are made available to Grant PUD, and best efforts are made to resolve identified issues in a timely manner.

2.7.1 Left Bank Adult Fishway at Wanapum Dam

The left-bank adult fishway at Wanapum Dam is comprised of a powerhouse collection channel and the connecting east-shore ladder. The ladder has two slotted fish entrances (SE1 and SE2) but only one (SE2) is kept open. The collection channel consists of 20 leaf-gate orifices (OG1-20). The SE3 entrance is now located at the OG-20 gate slot at the west end of the collection channel, and it will remain open during the adult-passage season. All collection channel orifice gates remain closed during the adult passage season. The auxiliary water at Wanapum Dam is comprised of a combination of gravity flow originating from the forebay through two inline valves, and pumped water from two turbine driven pumps drawing water from the tailrace. Both gravity and pumped water empty into the attraction water supply channel before being directed into left-bank diffusion chambers (LDC) in the powerhouse collection channel (LDC27-50), junction pool (LDC24-26), and ladder (LDC2-23). Butterfly valves control auxiliary water to LDC25-50 and chimneys control auxiliary water to LDC2-24. At the ladder exit, butterfly valve LV7 provides forebay gravity water to diffusion chamber LDC1. Grant PUD operates the diffusion chambers to maintain the ladder within required fishway criteria during the fish passage period.

2.7.2 Right Bank Adult Fishway at Wanapum Dam

The fishway, adjacent to the spillway, has three fish entrances (REW1, RSE2 and REW3) but only one (RSE2) is used. REW2 was changed to a slotted entrance (RSE2) in 1996, while REW1 remains as a backup mechanical gate. REW3 faces the spillway and is bulkheaded. Right-bank auxiliary water at Wanapum Dam is supplied by the gravity supply conduit through two inline butterfly valves fed by the forebay. The lower diffusion chambers (RDC25-32) are fed by individual butterfly valves from the attraction water supply channel. Water is provided to the remaining lower ladder diffusion chambers (RDC2-24) by attraction water supply channel chimney overflow. The upper ladder diffusion chamber RDC1 is fed by the forebay through butterfly valves RV9 and 10. Grant PUD operates the diffusion chambers to maintain the ladder within required fishway criteria during the fish passage period.

2.7.3 Fishway Inspection and Dewatering

Dewatering of the fishways for inspection and maintenance is conducted during the periods of minimum fish migration. To shorten the ladder shutdown periods, dewatering operations are carefully planned in advance. A schedule for the inspection and maintenance is worked out in cooperation with the PRCC, PRFF, and the FPC. The required frequency of the dewatering for maintenance is determined from Grant PUD's experience gained through yearly inspections.

During all dewatering that may involve fish handling, trained personnel are present to provide technical guidance and assure sound fish handling. Every effort is made to remove fish prior to the system becoming fully dewatered. All adult anadromous species recovered are released upstream of the dam. Any juvenile anadromous species recovered are released below the dam.

2.7.4 Normal Winter Maintenance (December 1 – March 31)

The fishways may be dewatered to allow annual maintenance of fish facility equipment, including pumps, diffuser gratings, valves, and orifice and entrance gates as necessary to assure their readiness during the adult fish-migration period. All fishway dewaterings are recorded and a report is completed by the project biologist or technician. Fish biologists or technicians are present at all dewaterings to assure proper fish handling procedures are followed.

2.7.5 Scheduled Maintenance

Maintenance which requires dewatering, or that will have a significant effect on fish passage, is done during the winter maintenance period of December 1 through March 31. Maintenance of facilities that does not affect fish passage may be conducted during the rest of the year.

Concurrent outages of both fishways are avoided whenever possible to provide an upstream fish passage route at the dams at all times. When facilities are not being maintained during the winter maintenance period, they are operated according to the normal operating criteria, unless otherwise coordinated with NMFS, FPC, PRCC, and the PRFF.

2.7.6 Unscheduled Maintenance

Unscheduled maintenance that significantly impacts the operation of a fish-passage facility is coordinated with FPC, NMFS, PRCC, and the PRFF. The decision on whether to dewater the ladder and make repairs during the fish passage season or wait until the winter maintenance period is made after consultation with the FPC, NMFS, PRCC, and the PRFF. If part of a fish-passage facility malfunctions or is damaged during the fish-passage season and the facility can still be operated within criteria without any detrimental effects on fish passage, repairs are not conducted until the winter maintenance period or until minimal numbers of fish are passing the dam. If part of a facility that may significantly impact fish passage is damaged or malfunctions, it is repaired as soon as possible.

2.8 Total Dissolved Gas Abatement

On July 13, 2018, the WDOE approved Grant PUD's *Final Summary of Total Dissolved Gas Monitoring within the Priest Rapids Hydroelectric Project – Year 10 Report* (Year 10 Report; Grant PUD 2018), in which Grant PUD demonstrated that it had fully implemented the conditions of the 401 WQC associated with total dissolved gas (TDG), had achieved reasonable compliance with the TDG water quality standards, and the operation of the Project is protective of the aquatic uses within the Project. The Year 10 Report included provisions consistent with Section 6.4.11(f) of the 401 WQC, which includes providing WDOE with a compliance gas abatement plan (GAP) for review and approval by October 31 of the applicable year. The compliance GAP will be updated every 5 years for the remainder of the Project license (starting in 2019) and will include any applicable information on new or improved technologies and a review of any additional reasonable and feasible gas abatement options. In addition, a compliance analysis of the previous 10 years of TDG data will also be completed every 5 years concurrent with the 5-year compliance GAP, which will help demonstrate Grant PUD's ability to consistently achieve compliance with the provisions of TDG water quality standards.

The 5-Year GAP provided details on operational and structural measures Grant PUD will continue to implement during the 2019-2023 fish-spill seasons, which are intended to help ensure that Project operations continue to meet a similar level of compliance as demonstrated in the Year 10 Report.

Operational abatement measures that will be implemented in 2019-2023 included minimizing involuntary spill by scheduling maintenance operations based on predicted flows and attempting to maximize turbine flows by setting minimum generation requirements to power purchasers. Operational abatement measures also included the participation in regional operator's meetings to discuss regional TDG abatement measures, coordination of regional spill amounts and locations, and implementation of preemptive spill to avoid periods of high involuntary spill. In addition, Grant PUD consulted with WDOE (when necessary) on any non-routine operational changes that may have affected TDG, as well as manage fish-spill programs to meet TDG water quality standards through coordination with the PRCC. The PRCC approved SOA 2016-02 that suspended biological (smolt) monitoring for the purpose of gas bubble trauma (GBT) monitoring during "non- survival studies" years within the Project. Fixed-site monitoring will continue.

Structural TDG abatement measures include operation of both the Wanapum and Priest Rapids Fish Bypasses (WFB and PRFB), which are both designed to safely pass juvenile out-migrating salmonids while minimizing TDG uptake (Hendrick et. al 2009 and Keeler 2016). The installation of the advanced turbine systems at Wanapum Dam has been completed, with the final unit installed in October of 2013. Additionally, in accordance with the Terms and Conditions contained in the 401 WQC (WDOE 2007) Grant PUD conducted TDG evaluations with all 10 advanced turbines in operation in October of 2013 in accordance with the Wanapum Dam Advanced Turbine Total Dissolved Gas Evaluation (see Keeler 2012), to determine the impact, if any, the operation has on TDG. Results from these evaluations are presented in Keeler (2014) and were submitted to the WDOE/PRCC and the FERC on December 13, 2013 and February 20, 2014, respectively.

Compliance monitoring for TDG occurred at Grant PUD's fixed-site monitoring stations (FSM stations). TDG data was collected on an hourly basis throughout the year and was reported to Grant PUD's water quality web-site (Grant PUD: Water Quality).

Grant PUD strives to meet TDG standards, as well achieve juvenile and adult salmonid and steelhead fish passage and survival standards for the Project, all while meeting regional energy loads and demands. Grant PUD attempted to reduce TDG when feasible by implementing operational TDG abatement measures, including attempting to maximize turbine flows by setting involuntary spill caps and minimum generation requirements (and thus maximizing turbine flows and reducing involuntary spill when feasible), participation in regional spill/project operation meetings, , and continuing to preemptively spill based on anticipated high flow/low power load time periods. Examples of structural abatement measures include the construction of spillway deflectors at Wanapum Dam (2000), the construction of the WFB (2008), and the PRFB (2014). Grant PUD believes that it is implementing the most current reasonable and feasible measures to reduce elevated TDG levels that occur during the fish-spill season.

2.8.1 Short-term Total Dissolved Gas Modifications

New for 2020, intended to help aid in fish passage, the WDOE implemented a short-term modification to the spring fish-spill season (April 1 to June 30) for Columbia River dam operators. This short-term modification offers the option for dam operators to increase spill during the spring fish-spill season to the following TDG levels:

- 125 %SAT in the tailrace of the dam spilling water for fish (based on the average of the twelve highest consecutive hourly readings in a 24-hour period)

- 126 %SAT maximum standard in the tailrace of the dam spilling water for fish (based on the average of any two consecutive hourly readings in a 24-hour period)
- The forebay compliance TDG standard for the next downstream dam is removed during the spring fish-spill season (April 1 to June 30)

To comply with the above modified TDG standards, dam operators are required to provide WDOE with an approved biological monitoring plan to measure impacts of fish (both salmonid and native species) to increased TDG conditions throughout the spring fish-spill season. Grant PUD opted into this short-term TDG modification for the spring fish-spill season in 2020 and will submit a monitoring plan for 2021 to comply with the TDG modifications set forth by the WDOE.

2.9 Avian Predation Control and Wanapum and Priest Rapids Dams

Grant PUD is required to implement and fund an avian predation control program at the Priest Rapids Project (T&C 1.9 & 1.19; NMFS 2008a). The overall goal is to reduce avian-related mortalities to salmon and steelhead populations affected by the Project. A specific measure identified includes installation of avian arrays/wires across the Wanapum and Priest Rapids powerhouse tailrace area and assure/maintain them in good condition to exclude avian predators. Arrays at both facilities were completed prior to the 2009 smolt out-migration and Grant PUD maintains a cooperative work agreement with the United States Department of Agriculture Wildlife Services (Wildlife Services) to repair, replace and maintain avian wire arrays at both developments. Wildlife Services also collects data to evaluate the avian predator control program.

2.9.1 Avian Predator Control Methods in 2020

Grant PUD has entered into a five-year cooperative work agreement with Wildlife Services to conduct bird hazing and other wildlife control duties. Wildlife Services hazed birds with pyrotechnics to remove the threat of avian predation on out-migrating smolts away from the developments seven days a week for approximately 16 hours per day during peak salmonid out-migration.

Piscivorous waterbirds were lethally removed when hazing actions were unsuccessful at deterring foraging birds. Four Wildlife Services crews worked two shifts, seven days per week, at Wanapum and Priest Rapids dams during the day beginning on April 20, 2020 through June 7, 2020. From June 8, 2020 through June 19, 2020, two Wildlife Services crews worked eight-hour shifts, five days per week at Wanapum and Priest Rapids dams.

During the 2020 avian control effort, 7,923 birds were hazed, 43% of which were Caspian terns (*Hydroprogne caspia*). A total of 522 piscivorous waterbirds were lethally removed during 2020. Table 10 shows the overall season results.

Table 11 Total control actions made be Wildlife Services through Priest Rapids Project, mid-Columbia, 2020.

		Hazed		Lethally Removed	
Common Name	**Scientific Name**	**Wanapum**	**Priest Rapids**	**Wanapum**	**Priest Rapids**
Caspian tern	*Hydroprogne caspia*	268	3,128	0	0
Common merganser	*Mergus merganser*	244	236	8	23
Double-crested cormorant	*Phalacrocorax auritus*	66	153	3	5
Gull, California	*Larus californicus*	449	1,083	24	222
Gull, Herring	*Larus argentatus*	107	81	0	0
Gull, Ring-billed	*Larus delawarensis*	907	1,201	62	175

2.9.2 Avian Control Efforts Proposed in 2021

As a continuation of current five-year cooperative work agreement with USDA APHIS WA personnel will continue conducting bird hazing efforts in both tailrace and forebays of Wanapum and Priest Rapids dams in 2021.

2.10 Northern Pikeminnow Removal at Wanapum and Priest Rapids Dams

Grant PUD is required to implement and fund a northern pikeminnow removal program at the Project (T&C 1.10 & 1.18; NMFS 2008a). The long-term program goal is aimed at reducing juvenile salmon and steelhead mortality associated with predation by northern pikeminnow at the Project improving juvenile passage survival.

2.10.1 Efforts in 2020

During the 2020 fishing effort, 13,763 northern pikeminnow were removed by the following methods:

- 1,464 in the set-line fishery,
- 7,298 in the beach seine fishery, and
- 5,001 in the angling fishery.

The average length of northern pikeminnow removed in 2020 varied between fisheries. The average length for the set-line fishery was 277 mm ± 68 mm (n = 288). Northern pikeminnow caught in the beach seine fishery ranged from 12.7 mm to 76 mm (0.5 in ~ 3 in) with an average of 31.75 mm (1.25 in). The average length of northern pikeminnow removed in the angling fishery was 348 mm ± 72 mm (n = 913).

2.10.2 Efforts in 2021

Grant PUD will continue to utilize set-lines, beach seines, angling and electrofishing as proven, cost effective, methods for pikeminnow removal in 2021.

2.11 Adult Fish Counting

Grant PUD is required to maintain the adult fish-counting equipment at both developments to provide reliable fish count information and submit annual reports for inclusion in regional databases (T&C 1.2; NMFS 2008). The annual Fish Passage report for 2020 was submitted to the US Army Corps of Engineers in February 2021. The video fish-counting (VFC) system

configuration at each dam has digital video cameras in each fishway streaming data to digital video recorders (DVRs) at each dam. These DVRs are networked and accessed by fish counters via PCs from the fish-counting room at Wanapum Maintenance Center. Data from the DVRs are played back in fast forward mode on the PCs, and fish are identified and counted by the fish counters via a separate tallying program. At the end of each day, fish counts from Priest Rapids and Wanapum dams are posted to Grant PUD's web page Grant County PUD Fish Counts. The Project fish-counting season runs April 15 through November 15, annually.

Grant PUD continues to investigate ways in which to improve fish counting accuracy and efficiency, particularly with equipment, system design, and staff recommendations. There were no significant data-accuracy problems but because of the different working conditions subject to staff as a result of COVID-19, the usual quality control tests were not administered in 2020. There was minimal DVR malfunction throughout the season however, the electronic technicians were able to keep the VFC equipment operational to avoid any data loss.

3.0 Wanapum Dam

Wanapum Dam consists of a 14,680-acre reservoir and an 8,637-foot-long by 186.5-foot-high dam spanning the Columbia River. The dam consists of left and right embankment sections; left and right concrete gravity dam sections; a left bank and right bank fish passage structure, each with an upstream fish ladder; a gated spillway; an intake section for future generating units; a downstream fish top-spill bypass structure in one of the unused intake sections (unit No. 11); and a powerhouse containing 10 vertical shaft integrated Kaplan turbine/generator sets with a total authorized capacity of 1,038 MW.

3.1 Wanapum Dam Fish Bypass

The Wanapum Fish Bypass (WFB) was completed in early 2008 and began operation during the start of the annual fish-spill program on April 30, 2008 (Figure 1). The WFB was designed to operate at different flow volumes (20, 15, 10, 5 and 2.5 kcfs). As reported in the past, when tailwater drops below an elevation of 488.0', the outflow from the WFB (at 20 kcfs) becomes unstable and starts to undulate, causing a condition that is believed to be less conducive for migrating juvenile smolts and also possibly producing greater TDG. At this lower tailwater elevation, when the outflow from the WFB is reduced, this undulating jet (of water) is returned to a surface-skimming flow, which is better for fish passage. Grant PUD, in consultation with the PRCC, agreed to maintain the Wanapum tailwater elevations to the best of its abilities to stay within the range of 488.0 to 498.0 feet during the salmonid out-migration season during non-extreme river condition periods. During the 2018 salmonid smolt out-migration, the WFB was operated continuously at 20 kcfs.

Figure 1 Photograph of Wanapum Dam Fish Bypass facility, looking downstream, mid-Columbia, WA.

3.2 Wanapum Dam Advanced Hydro Turbines

On October 2, 2003, and supplemented on April 5 and May 28, 2004, Grant PUD filed an application to amend its license for the Project seeking authorization to replace the 10 turbines at the Wanapum Development. The Advanced Turbine replacement was proposed to provide increased power and hydraulic capacity, equal or improved survival of juvenile salmon passing through the units, and improved water quality by reducing the amount of spill over the dam during periods of high flows. The decision criteria for proceeding with the replacement of the remaining nine units over the next eight years was based on whether the Advanced Turbine testing results demonstrated equal or better survival than the existing turbines. Pursuant to FERC's July 23, 2004 Order, Grant PUD installed and tested an Advanced Turbine at Unit 8.

Consistent with the requirements of the BiOp and related FERC Order, a study was designed and conducted to test the hypothesis that survival of Chinook salmon smolts through a new Advanced Turbine would be equal to, or greater than, passage survival through an existing unit. On October 11, 2005, Grant PUD filed a report on the results of biological testing of the first installed Advanced Turbine unit, and in December 2005, FERC authorized continued installation of Advanced Turbines at the Wanapum Development (FERC 2005). Grant PUD completed the Advanced Turbine Upgrades at Wanapum Dam putting the tenth turbine into operation in October 2013.

Sections 6.4.4(b) and 6.4.9 of the Project's 401 WQC (WDOE 2007), as well as Section II of the individual 401 WQC (WDOE 2004) for the Advanced Turbine installation project, required Grant PUD to conduct a field study to evaluate TDG after the installation of the tenth Advanced Turbine to determine the effect, if any, the Advanced Turbines have on TDG below Wanapum Dam. Article 401(a)(17) of the FERC License (FERC 2008) required FERC approval of the study plan prior to implementation. Grant PUD conducted TDG evaluations with all 10 advanced turbines in operation in October of 2013 in accordance with the Wanapum Dam Advanced Turbine Total Dissolved Gas Evaluation (see Keeler 2012), to determine the impact, if any, the operation has on TDG. Results from these evaluations were presented in Keeler 2014 and distributed to the WDOE/PRCC and the FERC on December 13, 2013 and February 20, 2014, respectively.

Previous data (collected in 2008) indicated that the steelhead survival point estimate of passage through the Wanapum powerhouse was 95.2% (all turbines combined and based on the percentage of tags detected downstream that passed through the powerhouse). Survival estimates in 2009 and 2010 for juvenile steelhead indicated were 92.9% and 91.4% respectively. Survival estimates for sockeye passing through the powerhouse was 96.2% in 2009 and 92% in 2010. See Section 2.1.1 through 2.1.5 for further details related to survival on individual species.

3.2.1 Description of Turbine Operating Criteria and Fishery Operations

Per Term and Condition 1.8 (NMFS 2008), Grant PUD operates the Wanapum turbines in a protocol referred to as "Fish Mode" and also "Ganging Units" during the juvenile salmonid out-migration season (typically mid- to late-April through mid- to late-August), based on smolt index counts conducted by WDFW at the Rock Island Smolt Monitoring Station in order to maximize turbine passage survival rates of juvenile salmonids. Fish Mode was the result of using Hill Curves, Theoretical Avoidable Losses calculations, turbine discharge rates, head, and fish survival curves (based on 1996 and 2005 balloon-tag evaluations of salmonid smolts through the turbines) to determine the operating range of the turbines and maintain a minimum fish survival rate of 95 percent. For Wanapum Dam, this means an operating range of 11.8 to 15.7 kcfs per turbine, and for Priest Rapids Dam, turbine units are operated between 9.0 to 17.4 kcfs.

Recent investigation of smolt passage survival through turbines determined that passage survival rates for out-migrating juvenile salmonids was influenced not only by turbine operation (i.e. "Fish Mode"), but by powerhouse operation. These determinations led to the concept of "ganging" turbine units in conjunction with operating turbines in fish mode. "Ganging units" is defined as concentrating operating turbines into blocks of adjacent units, thus reducing the "edge-effect" that may increase predation risks to smolts as they exit the turbine draft tube and enter the tailrace. Thompson et al. (2012) results showed that a high concentration of northern pikeminnow, along with some walleye and bass (smallmouth and largemouth), exist in the immediate tailrace of Wanapum Dam and are actively foraging on smolts. Turbines furthest from the spillways (Unit 1 at Wanapum and Unit 10 at Priest Rapids) are the first turbines to discontinue operation during daylight hours when the powerhouses are operating at less than full capacity during juvenile and adult fish-migration seasons. The discharge from these turbines may adversely affect adult salmonids' ability to efficiently locate the entrances to the adult fishways

3.3 Wanapum Fish Spill

The 2020 fish-spill season began on April 19, 2020 and concluded on August 18, 2020 The fish-spill periods were very closely matched with the juvenile migration timing, and greater than 98% of the yearling spring out-migrants passed during the spring fish-spill period between April 19 and June 15. The combined spring and summer fish-spill periods from April 19–August 18 encompassed greater than 98% of the entire 2020 outmigration.

During 2020, the intent was to pass all non-turbine out-migrating salmonids and steelhead through the WFB; however involuntary spill occurred during some of the out-migration season which resulted in spill through the spillway at Wanapum Dam.

Grant PUD has replaced all of the Wanapum Dam spillway Tainter gate seals as part of the Wanapum Dam Interim Spill Regime Evaluation required under Section 6.2(1) of the WQC and Article 11 of the NMFS and USFWS's Section 18 fishway prescriptions, (all of which have been adopted into Article 406 of the FERC license; FERC 2008). Tainter gate seals are believed to be

a potential source for juvenile salmonids mortality during spillway passage. Although the Spillway is currently operated during high flow conditions with inadvertent flow, it is a non-turbine passage route alternative in the event the WFB is not operational. Grant PUD received approval by FERC in February 2012 to begin modifications. During scheduled maintenance outages, the current 2-inch protruding bolts will be recessed into the seals.

Grant PUD originally anticipated having all twelve of the Wanapum gate seals replaced by spring 2018. However, due to the Wanapum fracture (during 2014), determination of proper trunnion alignment during the design phase, lack of bidders during the first bid attempt, and discovery of internal trunnion misalignment and internal trunnion cracking this project has been delayed. Grant requested an extension of time to complete this work, and the extension of time was granted (by FERC) on February 7, 2018, although delayed, Grant PUD has completed all (12) of the gate seals as of this date.

In consultation with the PRCC fish-spill representatives, smolt index counts from the Rock Island Smolt Monitoring Station are used to determine when annual spring fish spill at both developments is initiated (before 2.5% of the juvenile spring migrants have passed the Project – typically mid- to late-April) and also when summer fish spill is terminated (when over 95% of the summer juvenile migrants have passed; typically mid- to late-August). The end of the spring fish spill typically overlaps with the beginning of summer fish spill, providing continuous fish spill from April to August.

The spillways are operated (if needed) on the schedule outlined above during the juvenile salmonid out-migration season and are operated on an as-needed basis during the remainder of the year. Inspections typically occur during the late summer/early fall low river-flow period, with any necessary maintenance occurring during the low river-flow winter months when the tainter gates are unlikely to be needed.

4.0 Priest Rapids Dam

Priest Rapids Dam consists of a 7,725-acre reservoir and a 10,103-foot-long by 179.5-foot-high dam spanning the Columbia River. The dam consists of left and right embankment sections; left and right concrete gravity dam sections; a left and right fish passage structure, each with an upstream fish ladder; a gated spillway section; and a powerhouse containing 10 vertical shaft integrated Kaplan turbine/generator sets with a total authorized capacity of 855 MW.

4.1 Priest Rapids Fish Bypass

The Priest Rapids Fish Bypass (PRFB) was completed in April 2014 and began operation during the start of the annual fish-spill program on April 18, 2014 (Figure 2). The PRFB was designed to operate at a fixed-flow volume of 27 kcfs, with exact flow volume determined by forebay elevation. During 2014, acoustic tag technology was used to evaluate approach, behavioral and survival estimates for juvenile steelhead and yearling Chinook as they approached and passed through the PRFB. Along with survival estimates for salmonid and steelhead smolts using the PRFB as a passage route, the FPE of the PRFB was determined.

4.2 Primary Juvenile Passage Options/Priest Rapids Fish Spill/Spill Program

During the 2020 smolt out-migration season, the PRFB was operated to pass juvenile salmonids and steelhead. The PRFB was designed to operate at a fixed-flow volume of 27 kcfs. Fish-spill began on April 20 and ended on August 18, 2020. Involuntary spill was passed through the remaining spillway gates at Priest Rapids. Grant PUD, in consultation with NMFS and the

PRCC, using near real-time TDG and flow information to adjust/modify spill patterns as necessary

Figure 2 Priest Rapids Fish Bypass in operation, April 2014.

4.3 Priest Rapids Turbine Operation

In 2016, Grant PUD collected information on Fish Passage Efficiency (FPE) for juvenile steelhead passing through the Priest Rapids turbines and derived a survival estimate for passing via the turbines. Based on detection histories, FPE for steelhead passing through the powerhouse was 37.4% for juvenile steelhead. Passage survival for steelhead passing through the Priest Rapids turbines was 93.1%%. The FPE of steelhead through the Priest Rapids powerhouse was 37.4% in 2016 (Hatch et al., 2017). Overall survival at Priest Rapids Dam ("concrete') based on point estimates was 97.7%.

Term and Condition 1.16 of the BiOp (adapted from Action 18, NMFS 2004), requires Grant PUD to operate the Priest Rapids turbines in non-cavitation mode and run at least two adjacent turbines at any one time. These turbine operations are in place for 95% of the juvenile spring migration (based on index counts at Chelan PUD's Rock Island Dam) and coordinated with the upstream projects. Grant PUD starts monitoring (Rock Island index counts) on or before April 1 of each year and non-cavitation turbine mode operations is initiated before 2.5% of the spring migration has passed. Non-cavitation turbine mode operations are concluded after 97.5% of the spring migration has passed, or on June 15, whichever occurs first.

Currently, Grant PUD is in the process of installing "in-kind" Kaplan turbines at Priest Rapids Dam. As of this date, the 3rd turbine has been upgraded. Each turbine takes approximately 14 months per upgrade, so the expected completion date for the Priest Rapids Dam turbine in-kind replacement project is 2028.

4.4 Adult PIT-Tag Detection

Per Term and Condition 1.19 (NMFS 2008), Grant PUD maintained and operated the PIT-tag detection system at Priest Rapids Dam. The PI- tag detection system was established in the Priest Rapids Dam fishways in spring 2003.

Priest Rapids Dam has two adult fishways, each with multiple non-overflow weirs in the uppermost sections. The adult PIT-tag detection system at Priest Rapids Dam is designed to detect upstream migrating fish bearing an ISO FDX-B PIT-tag (134.2 kHz). The PIT-tag detection system plans and specification document states the system is designed to be 95% efficient for the detection of Digital Angel's PIT-tag model TX1400ST or "supertag". Each fishway has two detection weirs located within the non-overflow sections (Figure 3). Each detection weir has two completely submerged orifices for fish passage equipped with PIT-tag antennae mounted to the upstream face of each orifice. Each antenna is controlled by a Digital Angel FS1001A Stationary Transceiver (Richmond & Anglea, 2008). In 2016, Grant PUD replaced a faulty antenna and upgraded each antenna with Digital Angel FS2020 Stationary Transceiver.

In addition to the antennae in the adult fishways, there are three antennae installed at the head of the sorting flume within the Off Ladder Adult Fish Trap (OLAFT). Only fish that have been trapped and pass through the sorting flume are interrogated by this antenna array. The adult fishways' PIT-tag detection system is functional during all times the adult fishways are passable to fish. The OLAFT's PIT-tag detection system is available only when the trap is being operated. All interrogation data collected at Priest Rapids Dam are uploaded to the Pacific States Marine Fisheries Commission's PIT-tag Information System (PTAGIS) web page, https://www.ptagis.org/ Biomark, Inc. of Boise, ID remotely monitors the detection system for functionality and performs periodic maintenance checks on site. All detection data reported within this report were obtained from the PTAGIS web site.

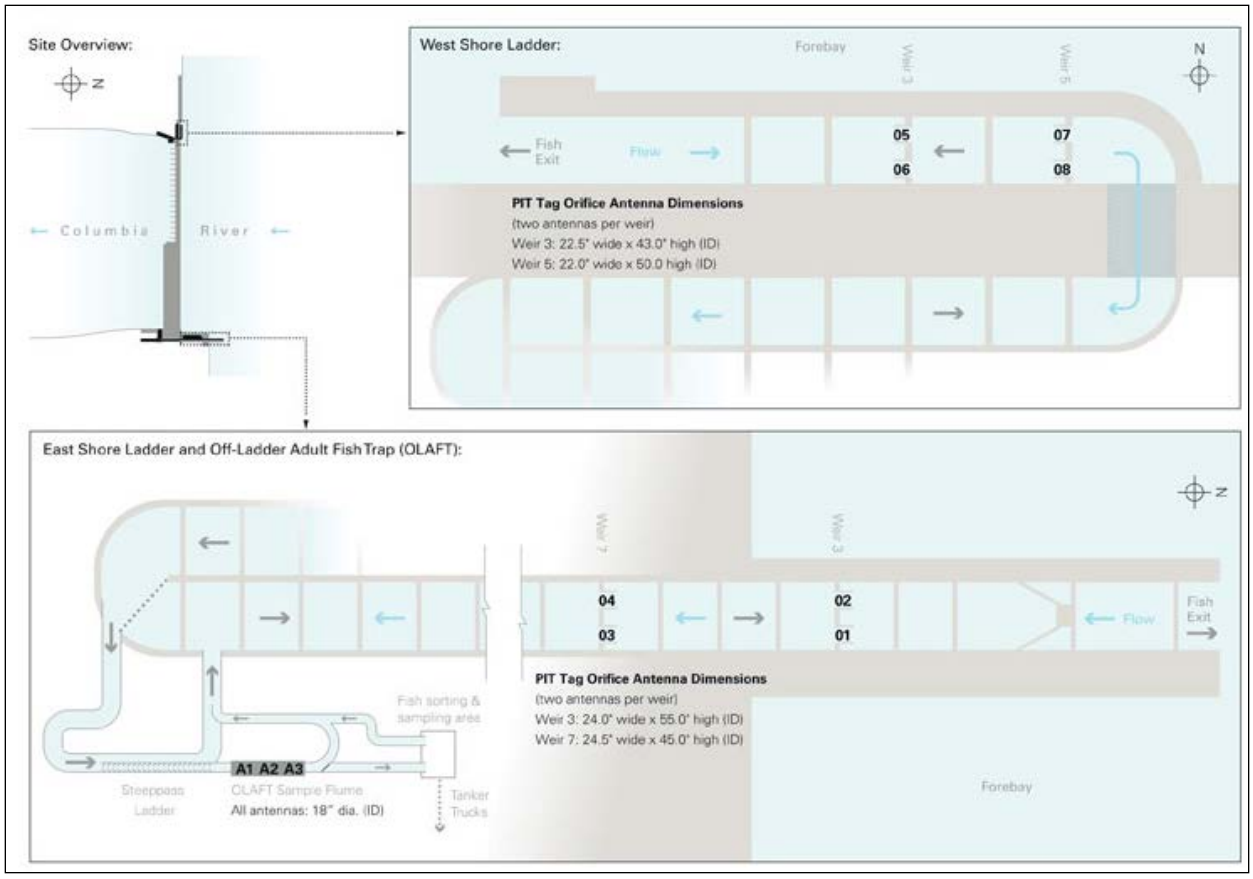

Figure 3 Plan view of upper regions of the fishway at Priest Rapids Dam showing location of PIT-tag detection antennae and associated identification number.

A total of 32,243 PIT-tag detections were observed at Priest Rapids Dam in 2020. Of these detections, 9,004 were from unique tags within six species of fish. Species of fish carrying PIT tags identified at Priest Rapids Dam in 2020 were Chinook Salmon, Coho Salmon, steelhead trout, Sockeye Salmon, Pacific lamprey, and northern pikeminnow. All detections and associated fish species are summarized in Table 11.

In 2020 the Pacific Northwest National Laboratory (PNNL) estimated adult salmonid passage survival from Priest Rapids Dam to Rock Island Dam using a Cormack-Jolly-Seber (CJS) release-recapture model for PIT-tagged individuals from 2006 to 2019. Using the CJS model, conversion rates were estimated to be 0.984 (SE = 0.005) for spring Chinook , 0.998 (SE = 0.003) for summer Chinook , 0.928 (SE = 0.007) for sockeye salmon, and 0.987 (SE = 0.003) for steelhead (Harnish 2020).

Table 12 Summary of PIT-tag detection at Priest Rapids Dam in 2020.

Species	Quantity PIT tags detected
Chinook Salmon	3639
Coho Salmon	2034
Sockeye Salmon	2068
Steelhead trout	1255
Pacific lamprey	1
Northern pikeminnow	7
Total	**9004**

4.5 Adult Fish Trap (Off Ladder Adult Fish Trap – OLAFT)

The Yakama Nation collected sockeye salmon at the trap beginning on June 24, 2020 and continued working Monday through Friday through July 14, 2020. Bioanalysts staff sampled steelhead for Chelan PUD's stock-assessment program beginning on July 3, 2020 and typically operated the trap on Mondays, Wednesdays, and Fridays of each week through October 23, 2020. Safety protocols to avoid COVID-19 infection were in place throughout the season. Because of the risks of COVID-19 infection, the Yakama Nation elected not to send staff to sample and PIT-tag adult coho salmon for the mid-Columbia Coho Reintroduction Program. Instead, Bioanalysts staff completed the work using PIT-tags from the Yakama Nation. Bioanalysts staff sampled and PIT-tagged coho salmon from September 9 through October 23, 2020. Of note, the trap was closed because of COVID-19 sequestration of Priest Rapids Dam from October 7 through 18, 2020. The OLAFT was completely dewatered and winterized for the season on November 10, 2020.

5.0 Hatchery Mitigation Programs

Grant PUD implements 11 hatchery programs as mitigation for the Project effects on anadromous salmon and steelhead that pass through the Project area or are affected by Project operations. Under the 2006 SSSA, Grant PUD agreed to achieve and maintain "no-net-impact" from the Project on steelhead; spring, summer and fall Chinook; Sockeye; and Coho salmon. In part, Grant PUD accomplishes this objective through hatchery propagation. The substantive requirements of the SSSA were incorporated into the WQC conditions, NMFS and USFWS Section 18 prescriptions, and NMFS' 2008 terms and conditions to the incidental take statement for endangered salmon and steelhead. Grant PUD's FERC license requires implementation as defined in these documents and in the Hatchery and Genetic Management Plans (HGMPs) and Artificial Propagation Plans (APPs) required by License Article 401(a)(4).

5.1 Priest Rapids Coordinating Committee Hatchery Subcommittee

The 2008 NMFS BiOp and SSSA were adopted by FERC and FERC requires Grant PUD to continue to support the Priest Rapids Hatchery Subcommittee (PRCC HSC). This includes provision of sufficient facilitation, administration, and clerical support. This committee is the primary forum for implementing and directing supplementation measures for the Project's anadromous fish program. The PRCC HSC is comprised of NMFS, USFWS, WDFW, CCT, YN, CTUIR and Grant PUD.

In 2020, the PRCC HSC and the Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees (HCs) continued to implement a single, joint hatchery committee meeting to review hatchery topics that were of interest to Douglas, Chelan, and Grant PUDs. The joint PRCC HSC – HCP-HC held twelve meetings; January and February were in person meetings, but the remaining 2020 meetings were held as virtual meetings due to COVID-19 restrictions on in-person gatherings. Approval of documents such as broodstock collection plans, annual reports, and monitoring and evaluation implementation plans were completed during 2020. Meeting minutes and statements of agreement for all years can be viewed at PRCC HSC SOAs

Table 13 Priest Rapids Coordinating Committee Hatchery Subcommittee 2020 meeting schedule.

PRCC Hatchery Subcommittee	January 15, 2020	Meeting
PRCC Hatchery Subcommittee	February 19, 2020	Meeting
PRCC Hatchery Subcommittee	March 18, 2020	Conference Call
PRCC Hatchery Subcommittee	March 20, 2020	Meeting
PRCC Hatchery Subcommittee	April 21, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	May 20, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	June 17, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	July 15, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	August 19, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	September 16, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	October 21, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	November 18, 2020	Microsoft Teams Meeting
PRCC Hatchery Subcommittee	December 16, 2020	Microsoft Teams Meeting

5.2 Planning Documents Summary

All hatchery planning documents, and associated M&E plans have been approved by the PRCC HSC and FERC, and Section 10 permits have been issued by NMFS (Table 13). NMFS issued a 13-year Section 10 take permit for the White River and Nason Creek spring Chinook programs in July 2013 and the permit was amended in June 2015 to include new ways of collecting and spawning broodstock for the Nason Creek spring Chinook program. Grant PUD obtained its last Section 10 take permit for Grant PUDs unlisted hatchery programs (e.g., summer and fall Chinook salmon) in 2019. Grant PUD now has NMFS Section 10 coverage for all hatchery programs with an ESA nexus.

Table 14 Hatchery planning documents.

Document	Approved by PRCC Hatchery Subcommittee	Submitted to NMFS for approval*	Approved by FERC	NMFS approval/ESA take permit
White River spring Chinook salmon (HGMP)	Aug. 20, 2009	Sept. 15, 2009	Feb. 7, 2012	July 3, 2013
Nason Creek spring Chinook salmon (HGMP)	Aug. 20, 2009	Sept. 15, 2009	Feb. 7, 2012	July 3, 2013, amended June 2015
Methow spring Chinook salmon (APP)*	Sept. 16, 2010	June 30, 2009	Dec. 14, 2011	March 6, 2017
Okanogan spring Chinook salmon (APP)*	Sept. 23, 2010	Sept. 30, 2009	Dec. 14, 2011	Complete, held by CCT
Wenatchee summer Chinook salmon (HGMP)	Sept. 17, 2009	Sept. 30, 2009	Nov. 15, 2011	Complete
Methow summer Chinook salmon (HGMP)	Sept. 17, 2009	Sept. 30, 2009	Nov. 15, 2011	Complete
Okanogan summer Chinook salmon (APP)*	Dec. 16, 2010	Sept. 30, 2009	Oct. 13, 2011	Complete, held by CCT
Fall Chinook salmon (HGMP & M&E)	Oct. 22, 2009	June 30, 2009	Feb. 7, 2012	Complete
Sockeye salmon (HGMP)	April 22, 2010	Sept. 30, 2009	Nov. 15, 2011	NA
Coho salmon (APP)*	Oct. 11, 2010	Aug. 31, 2009	Oct. 13, 2011	Complete, held by YN
Steelhead trout (APP)*	Sept. 23, 2010	Sept. 30, 2009	Dec. 14, 2011	Complete, held by CCT
Monitoring and Evaluation Plan covering all programs	Aug. 20, 2009	June 30, 2009	Approved as part of individual HGMP/APP filings.	M&E activities are covered in each species permit above

*APPs are explanatory documents that explain the relationship between GPUDs responsibilities within a larger program covered by an HGMP submitted to NMFS by others.

5.3 Program Operations Summary

The supplementation programs implemented or funded by Grant PUD include four spring Chinook programs (White River, Nason Creek, Methow River, and Okanogan River), three summer Chinook programs (Wenatchee, Methow, and Okanogan rivers), the upper Columbia fall Chinook program, sockeye program, Coho program, and steelhead program. Grant PUD has achieved production requirements for all the programs through direct or cost-shared development and/or modernization of existing facilities, including completion of construction of acclimation facilities for the Nason Creek spring Chinook and Methow summer Chinook programs. The production requirements for the programs were recalculated in 2012 by the PRCC-HSC (SOA 2012-01) and subsequently approved by FERC on November 1, 2013 (P-2114-263). Current production numbers can be found in Table 14.

5.3.1 Steelhead

Originally listed as endangered in 1997, the status of UCR steelhead has changed several times. The upper Columbia distinct population segment (DPS) for steelhead was listed as threatened by

NMFS as of August 15, 2011. This DPS includes all naturally spawned anadromous steelhead populations below natural and man-made impassable barriers in streams in the Columbia River Basin upstream from the Yakima River, Washington, to the U.S.-Canada border, as well as six artificial propagation programs: the Wenatchee River, Wells Hatchery (in the Methow and Okanogan rivers), Winthrop National Fish Hatchery, Omak Creek, and the Ringold steelhead hatchery programs. Under T&C 1.25 (NMFS 2008), Grant PUD is required to consult with the PRCC HSC (subject to NMFS approval) to develop an APP to rear 100,000 yearling UCR steelhead for release in the UCR basin. The PRCC HSC has agreed that Grant PUD's annual steelhead compensation responsibilities may be met, in part, by funding the Colville Tribes' (CCT) steelhead program in the Okanogan Basin. The steelhead are reared at the Douglas PUD owned and operated Wells Hatchery.

Since 2005, Grant PUD has funded releases of yearling steelhead smolts into the Methow and Okanogan basins, and co-funded monitoring and evaluation (M&E) activities as part of its mitigation requirement. Grant PUD finalized a long-term agreement with Douglas PUD to use new infrastructure, developed at the Wells Hatchery as part of an overall re-design and modernization of the facility, to provide capacity for the steelhead program. Through the agreement, Grant PUD provided capital for spawning, incubation, and rearing infrastructure for its 100,000 steelhead smolt programs. Broodstock are primarily collected at the weir in Omak Creek to support the development of a locally-adapted Okanogan steelhead program, but other trapping locations are used as needed. A portion of the locally-adapted program is spring-acclimated in two 20-foot diameter, circular vessels located on Omak Creek near the St. Mary's Mission. The raceway previously used for acclimation at the site was converted to a sediment settling basin for the circular vessels. Each vessel has capacity to rear 10,000 steelhead smolts. A 60 by 100-foot building was constructed over the circular raceways and other equipment in December 2020, with the purpose of providing more protection and security during fish acclimation. A power outage on April 11, 2020 occurred at the St. Mary's acclimation site, resulting in a mortality event of approximately 5,000 steelhead. The root cause was determined to be a failure in the transfer switch of the backup diesel generator located on site. An incident report was filed with NOAA Fisheries and a corrective action plan was developed by CCT. Fortunately, the program was still able to achieve the release target to meet program objectives. A full accounting of fish releases associated with the program can be found in Table 14.

Table 15 Approximate number of salmon and steelhead released through Grant PUD's hatchery mitigation programs.

	Spring Chinook				Summer Chinook			UCR Fall Chinook	Sockeye	Coho[4]	Steelhead
Year	**White River**	**Nason Creek**	**Methow**	**Okanogan**	**Wenatchee**	**Methow**	**Okanogan**				
2000								5,156,000			
2001								5,119,100			
2002								5,041,060			
2003	1,536	8,956						5,071,640			
2004	2,589	4,244						5,114,560			
2005	2,096							4,899,835	795,630		100,000
2006	1,639							5,180,752	602,870		101,379
2007	63,779		152,451					5,024,634	644,252	1,561,768	127,819
2008	281,677		150,509					4,548,306	385,724	1,509,093	128,415
2009	131,843		109,488					5,067,926	703,189	1,424,578	95,505
2010	41,603		187,865					5,064,043	383,633	1,443,480	97,393
2011	112,596		210,336					5,081,184	392,040	1,297,974	117,963
2012	18,850		186,029					5,271,247	364,946	1,529,678	84,420
2013	105,000		185,687					5,091,902	573,738	1,501,323	65,970
2014	97,713	225,000	181,050		181,816	197,391	92,831	5,600,000	0	1,484,636	108,914
2015	42,780	225,479	158,141	130,207	171,177	188,834	129,417	5,490,844	767,437	1,158,565	109,214
2016	0	229,594	159,161	96,283	194,833	167,615	113,388	5,599,543	202,164	1,097,563	125,041
2017	0	243,127	191,115	173,085	191,233	177,762	179,078	5,374,672	2,918,500	912,974	105,265
2018	0	233,471	150,277	138,443	180,338	209,490	242,498	6,159,454	806,864	1,312,566	117,126
2019	0	231,859	150,893	89,147	175,349	143,594	169,257	5,600,000	2,710,815	1,652,881	99,469
2020	0	206,508	142,270	21,963	147,497	216,363	181,442	5,918,105	423,180	2,018,845	99,829
TOTAL	**903,701**	**1,608,238**	**2,315,272**	**649,128**	**1,242,243**	**1,301,049**	**1,107,911**	**110,474,807**	**12,674,982**	**19,905,924**	**1,683,722**
Target[1]	*75,566*	*149,114*	*134,126*	*110,000[2]*	*182,000*	*200,000*	*278,000[3]*	*5,599,504*	*1,143,000*	*373,000[5]*	*100,000*
5Yr Ave	0	228,912	158,743	103.784	177,850	182,965	177,133	5,730,355	1,412,305	1,398,966	109,346

[1] Targets are current, recalculated production requirements per SOA 2013-01.
[2] Targets based on Grant PUD's percentage of the overall production goal for Okanogan spring Chinook at the Chief Joseph Hatchery.
[3] Targets based on Grant PUD's percentage of the overall production goal for Okanogan summer Chinook at the Chief Joseph Hatchery.
[4] Release numbers reflect full Coho program releases of the full Coho Reintroduction Program. Grant PUD's program is a proportion of the total.
[5]Targets based on Grant PUD's percentage of the overall production goals for the Yakama Nation's Coho reintroduction program.

5.3.2 Upper Columbia River Spring Chinook Salmon

UCR spring Chinook covered under this T&C (1.26; NMFS 2008) are listed as Endangered (FR Vol. 64, No. 56, March 24, 1999). This Evolutionarily Significant Unit (ESU) includes all naturally spawned populations of spring Chinook salmon in all river reaches accessible to spring Chinook salmon in Columbia River tributaries upstream of Rock Island Dam and downstream of Chief Joseph Dam in Washington, excluding the Okanogan River. Hatchery propagation of the White River, Nason Creek, Chiwawa River, Twisp River, Methow River, and Chewuch River spring Chinook stocks is included in the ESU.

5.3.2.1 White River Spring Chinook Program

Under T&C 1.27 of the 2008 NMFS BiOp (NMFS 2008), Grant PUD is required to implement the White River spring-run Chinook salmon program. The program, which included the possible development of rearing and acclimation facilities with the capacity to produce 150,000 yearling smolts, was reduced to 74,556 during the 2013 hatchery recalculation. In 1997, a spring Chinook captive broodstock program was initiated for the White River population as an emergency effort to reduce the risk of extinction. Under the captive brood program, juveniles were transferred each March from Little White Salmon National Fish Hatchery (LWSNFH) to temporary tanks placed on Grant PUD-owned property at mile two of the White River (Figure 4) and in net pens in Lake Wenatchee. The program was expected to transition to traditional adult-based supplementation at the captive-brood program's planned sunset in 2016. However, in 2012 resource co-managers determined that an adult-based supplementation program as required was not feasible, due primarily to the inability to collect sufficient broodstock to support the 74,556 smolt program and associated risks to other populations. As a result, members of the PRCC Policy Group and PRCC approved recommendations to cease the captive brood program through broodyear 2026, when a decision whether to construct a permanent facility or restart a hatchery program for the White River will be made (SOA 2013-01). The final egg collection for the first-generation portion of the captive-brood program occurred in 2009 and the last group of fish were to be released in 2016. However, because of a severe outbreak of bacterial kidney disease in the adult broodstock in summer 2014, the PRCC-HSC decided to euthanize all remaining broodstock prior to the 2014 spawn. As a result, broodyear 2013 fish released in 2015 were the program's last year-class of the program. Grant PUD will continue to monitor spring Chinook salmon in the White River to meet the objectives of Grant PUD's M&E Plan. Because the program was discontinued in 2015, no fish releases have occurred within the White River spring Chinook program since 2015. Grant PUD's total mitigation of 223,670 Wenatchee Basin spring Chinook is being met through increased releases from Grant PUD's Nason Creek program. Table 14 shows the numbers of White River spring Chinook salmon released annually.

Figure 4 White River portable acclimation site for spring Chinook salmon.

5.3.2.2 Nason Creek Spring Chinook Program

The Nason Creek spawning aggregate is also within the UCR spring Chinook salmon ESU. Under T&C 1.28 (NMFS 2008), Grant PUD is obligated to implement artificial propagation for spring Chinook salmon in Nason Creek. A spring Chinook captive-broodstock program was initiated for the Nason Creek population in 1997 in an effort to reduce the risk of extinction. Improvement in adult escapement in Nason Creek has reduced the near-term risk of extinction, so the captive-broodstock program was discontinued. Currently, an adult-based supplementation program is being implemented with the intent to increase abundance of naturally spawning spring Chinook salmon in Nason Creek. The program, originally intended to produce 250,000 yearling smolts, was reduced to 149,114 during the 2013 recalculation and combined with the 74,556 White River program. The current Wenatchee River spring Chinook program total of 223,670 yearling smolts is comprised of 125,000 conservation and 98,670 safety net fish and is fully met under the Nason Creek spring Chinook program operations. Any shortfalls that occur in the Nason Creek program through 2026 will be met through other hatchery alternatives as agreed to by the PRCC HSC. This has occurred through production of additional spring Chinook salmon in the Chiwawa spring Chinook salmon program. An Order approving these program changes was issued by FERC on November 1, 2013 (P-2114-263).

The Nason Creek Section 10 ESA take permit was amended in 2015 to allow for the collection and compositing of natural-origin broodstock at Tumwater Dam from the Nason or Chiwawa spawning aggregate. Since then, broodstock goals have been met by collecting immigrating adults from the adult ladder at Tumwater Dam.

Adult holding, spawning, egg incubation, and initial rearing for the Nason Creek spring Chinook program occurs at the Eastbank Hatchery. Sub-yearling spring Chinook juveniles are transferred from Eastbank Hatchery to Nason Creek Acclimation Facility (Figure 5) for overwinter

acclimation in October. Fish are released the following spring, typically in early April. Annual release numbers, locations and stock origins can be found in Table 14.

Figure 5 Nason Creek Acclimation Facility.

5.3.2.3 Methow Spring Chinook Program

Methow spring Chinook are included in the UCR spring Chinook salmon ESU. Grant PUD and Douglas PUD entered two long-term agreements, first in 2004, and again in 2013. The agreements enabled Grant PUD to utilize excess rearing capacity at the Methow Fish Hatchery to rear the Methow spring Chinook program. The PRCC HSC and the Chelan/Douglas PUD HCP agreed upon the initial framework regarding current and future plans for Douglas PUD to raise mitigation and study fish for Grant PUD in 2004. In 2014, the PRCC and PRCC HSC approved Grant PUD's request to rear up to 201,000 spring Chinook per year at Douglas PUD's Methow Hatchery from 2014 - 2024. The 2013 recalculation of the program reduced Grant PUD's Methow spring Chinook salmon to 134,126 beginning with brood year (BY) 2012.

Broodstock collection primarily occurs at Wells Dam from the beginning of May through June. Fish are transferred into the Methow Hatchery and spawned. Juvenile fish are reared at the facility through yearlings and then released from the facility or transferred to the Twisp acclimation pond or other acclimation sites for final acclimation and release in the spring. Annual release numbers can be found in Table 14.

5.3.2.4 Okanogan Spring Chinook Program

Okanogan Basin spring Chinook are a portion of Grant PUD's spring Chinook hatchery compensation requirements. Program requirements are satisfied through an agreement with the

PRCC HSC to release 110,000 smolts into the Okanogan Basin annually from the Chief Joseph Hatchery. The hatchery is operated by the Colville Confederated Tribes (CCT) and funded by the Bonneville Power Administration (BPA) and Grant, Douglas, and Chelan PUDs.

Grant PUD signed a Memorandum of Understanding with BPA, Chelan PUD, Grant PUD, and CCT in 2007, with the intent to fund the Chief Joseph Hatchery through a cost-share agreement. In 2010, a tri-party agreement with BPA, CCT, and Grant PUD was signed allocating funds for the construction and operation of the Chief Joseph Hatchery. Grant PUD funded 18.3% of the proposed construction costs for the facility (up to $10 million USD). Additionally, Grant PUD committed to funding 18.3% of the annual operation, maintenance, repair, and replacement expenses of the facility. Chief Joseph Hatchery was completed in 2013 and has an annual production target of 2.9 million spring and summer Chinook salmon.

Chief Joseph Hatchery currently rears an integrated, ESA-listed spring Chinook population using a Methow Composite stock from the Winthrop National Fish Hatchery. The 200,000 fish program is 100% coded-wire tagged and released into the Okanogan River from the Riverside Acclimation Pond. A segregated yearling spring Chinook program originally from the Leavenworth stock is now being collected, spawned, incubated, reared, and released at the Chief Joseph Hatchery. These fish are adipose fin clipped and tagged per management objectives. Permit number 18928 was issued by NMFS for the integrated program, which was designated a 10(j) experimental population for the reintroduction of spring Chinook salmon into the Okanogan Basin. In addition, the hatchery rears a non-ESU listed, segregated Leavenworth/Carson stock program that is 100% adipose fin-clip marked and released directly into the Columbia River from Chief Joseph Hatchery. The 2020 spring Chinook salmon released from the Chief Joseph Hatchery, taken from the 2018 brood year did not meet program objectives because of a malfunctioning chiller that contaminated the hatchery supply water and increased mortality to incubating fry. A temporary chiller was acquired to finish the season and a permanent replacement chiller has been installed. This modification is expected to resolve the issue and program target releases are expected to be met in the future. Annual release numbers can be found in Table 14.

5.3.3 Fall Chinook Program

As part of Grant PUD's Fall Chinook Protection Program under the SSSA, Grant PUD was required to develop and implement a comprehensive Fall Chinook Protection Program for the fall Chinook salmon population in the mid-Columbia region affected by the Project. The Program was comprised of the following components: Program Performance Standards, a Passage Program for the Project, the HRFCPPA, and a Fall Chinook APP (HGMP) as described in the SSSA, including facility improvements to the Priest Rapids Hatchery.

Artificial propagation goals are met at Priest Rapids Hatchery, located on the Columbia River near Mattawa, WA. Original requirements included the production of 5 million fall Chinook smolts as mitigation for spawning areas inundated by Project reservoirs, 1 million fall Chinook sub-yearling smolts to achieve NNI, and 1 million fry to compensate for impacts of flow fluctuations within the Hanford Reach. The requirements for the NNI portion of the program were recalculated to 325,543 sub-yearling smolts by the PRCC HSC in early 2012, and due to the anticipated low survival of fry released into Project reservoirs, the PRCC HSC agreed to convert Grant PUD's annual 1 million fry obligation to sub-yearling smolt releases of 273,961 in 2013 (SOA 2013-07). Grant PUD's current total fall Chinook obligation is 5,599,504 sub-

yearling smolts released annually. These mitigation revisions were approved by FERC on November 1, 2013 (P-2114-263).

Grant PUD, in consultation with the PRCC, developed the Priest Rapids Hatchery facilities improvements as outlined in Section 9.6 of the SSSA. The design for the renovated facility included capacity to rear the approximately 5.6 million fish program plus additional capacity for additional smolts. The facility, which produces both Grant PUD's current mitigation requirements, and 1.7 million smolts and 4.1 million eyed-eggs for the U.S. Army Corp of Engineers John Day Mitigation program was completed in 2014. Priest Rapids Hatchery is a full life-cycle facility, so all life-stages necessary to produce the program, from brood collection to acclimation and release, occur within the hatchery grounds (Figure 6). Additionally, natural origin broodstock integration goals into the program are met through broodstock collection efforts at the Off-Ladder-Adult-Fish-Trap (OLAFT) on the Priest Rapids left-bank fish ladder through 2019, and through volunteer hook-and-line efforts to collect wild, spawning adults in the Hanford Reach of the Columbia River. Annual release numbers can be found in Table 14.

Figure 6 Priest Rapids Hatchery incubation room.

5.3.3.1 Hanford Reach Fall Chinook Protection Program

The 2019-2020 flow protection program began on October 15, 2019 with the implementation of the reverse load factoring. Spawning ground surveys were conducted on Vernita Bar during October 20, October 27, November 3, and November 24, 2019. A peak count of 185 redds were observed on November 24. The 16th highest redd was in the 60-65 kcfs elevation zone, setting the Critical Elevation for the 2019 – 2020 season at 65 kcfs.

During most of the Spawning Period river temperatures in the Hanford Reach were well below normal, however by the time of egg Hatch river temperatures had returned to normal. River temperatures during the remainder of the protection were near normal, with a few short warm periods in January, February, and April and a cooling trend in May through the end of the season. The overall result of the temperature pattern was near normal protection period dates. On Vernita Bar, spawn timing was typical of previous years.

Hatch in the 36-50 kcfs zone occurred on December 4, 2019 and in the above 50 kcfs on December 16, 2019. Emergence in the 36-50 kcfs elevation zone occurred on March 10, 2020 and in the above 50 kcfs zone on March 29, 2020. During the entirety of the Post-Hatch and Emergence Periods discharge at the USGS Gage was maintained above the required Protection Level Flow.

During the Emergence and Rearing Periods, the March and April discharge from Priest Rapids Dam were well below average flows from 1995 – 2019. By May, discharge from Priest Rapids Dam had increased to well above normal conditions. During the 94 days of the 2020 Emergence and Rearing periods, Grant PUD met all the flow constraints established with the HRFCPPA.

The 2020 weekend minimum discharge constraints began on the weekend of April 18 and continued through the weekend of May 10. On all four of the CJAD II weekends the minimum constraints were met.

Flow management operations during the 2019 – 2020 season were highly successful. This continues the trend of high performance that began with the 2006 brood year and is significantly greater than the historical mean under the HRFCPPA.

More information about this program is contained in Graf et al. (2020), a report that was reviewed by members of the Fall Chinook Working Group.

Protections for fall Chinook salmon for the 2020-2021 protection season began on October 15, 2020 and will continue through May or June 2021. There was a total of 201 redds counted in the index area during the final redd count and the distribution of those redds resulted in a Critical Elevation of 65 kcfs. Minimum discharge protections have been maintained through the writing of this report. Protections for BY 2020 will continue into 2021 and will be reported in the 2021-2022 FERC report.

5.3.4 Upper Columbia River Summer Chinook Salmon

The objective of the Summer Chinook Protection Program is to achieve NNI from the operations of the Project on summer Chinook salmon populations that pass through the Project. Grant PUD's original summer Chinook mitigation obligation was for artificial propagation of 833,000 juvenile salmonids on an annual basis. This number was recalculated to 659,816 by the PRCC HSC in 2012 and approved by FERC on November 1, 2013 (P-2114-263). These fish are divided for release into the Wenatchee, Methow, and Okanogan rivers.

5.3.4.1 Wentachee Summer Chinook Program

Grant PUD Wenatchee summer Chinook objectives are met through a partnership with Chelan PUD to produce 181,816 fish at Eastbank Hatchery on the Columbia River and with final acclimation and release taking place at Dryden Pond on the Wenatchee River.

Adult summer Chinook are collected for broodstock from the run-at-large at the right and left-bank traps at Dryden Dam, and at Tumwater Dam when weekly quotas cannot be achieved at

Dryden Dam. If natural-origin broodstock collection falls short of expectation, hatchery-origin adults can be collected to make up the difference. Adult summer Chinook are spawned and reared at Eastbank Fish Hatchery. Juvenile summer Chinook are transferred from the hatchery to Dryden Acclimation Pond in March and released from the pond in late April to early May.

Grant PUD had requested consideration of overwinter facility modifications of Chelan PUD's Dryden Acclimation Facility, which triggered an intensive feasibility assessment, specifically around the limitations associated with meeting the Wenatchee River Total Maximum Daily Load (TMDL) requirements for phosphorus. As a result of the feasibility assessment, Chelan PUD does not support modification of the Dryden Acclimation Facility to allow overwinter acclimation activities. This decision led the HSC to agree that continuing to pursue overwintering at Chelan PUD's Dryden Acclimation Facility (per SOA 2009-09) was not feasible for the foreseeable future (SOA 2016-01). Grant PUD will continue to rear Wenatchee summer Chinook at the Eastbank Hatchery, with spring acclimation occurring at the Dryden Acclimation Pond. Annual release numbers can be found in Table 14.

5.3.4.2 Methow Summery Chinook Program

Grant PUD Methow summer Chinook objectives are met through a long-term hatchery sharing agreement with Chelan PUD to produce 200,000 smolts at Eastbank Hatchery located on the Columbia River near Wenatchee, WA. Overwinter acclimation objectives have been met through development, design, and construction of an overwinter acclimation facility, owned by Grant PUD and located at the Chelan PUD Carlton Pond site on the Methow River. Construction of Grant PUD's Carlton Acclimation Facility was completed in 2014.

Broodstock for the program is collected at Wells Dam under a long-term hatchery sharing agreement between Douglas PUD and Grant PUD. Adult holding, spawning, egg incubation, and initial rearing occurs at Eastbank Hatchery, then transferred to the Carlton Acclimation Facility for overwinter acclimation. The facility is currently operated by Douglas PUD. Overwinter acclimation occurs from October through release the following spring, typically in April. Annual release numbers can be found in Table 14.

5.3.4.3 Okanogan Summer Chinook Program

Okanogan summer Chinook program requirements are satisfied through an agreement with the PRCC HSC to release 278,000 smolts into the Okanogan basin or Columbia River annually from the Chief Joseph Hatchery. The hatchery is operated by the Colville Confederated Tribes (CCT) and funded by the BPA and Grant, Douglas, and Chelan PUDs.

As previously discussed for the Okanogan spring Chinook program, Grant PUD signed a cost share agreement with BPA and the CCT to share construction and operational costs for the Chief Joseph Hatchery. Grant PUD agreed to fund 18.3% of the proposed construction (up to $10 million USD) and annual operation, maintenance, repair, and replacement for the facility, and 18.3% of the monitoring and evaluation expenses for the spring and summer Chinook programs.

Chief Joseph Hatchery currently rears an integrated Okanogan summer Chinook program that is acclimated in Similkameen (designed for 250,000 fish) and Omak (275,000 fish) ponds prior to release into the Okanogan River. Integrated program (natural-origin) broodstock is collected from the Okanogan River weir and via purse seine collection in the Columbia River. Fish released in the integrated program are 100% adipose clipped and CWT tagged. The Okanogan weir was installed on August 27, 2020 and operated for 27 days, allowing the capture of all 84

natural-origin broodstock for the integrated program. A segregated (hatchery) program is also reared at Chief Joseph Hatchery. Segregated program broodstock is collected through returns to the hatchery. The juvenile summer Chinook smolts are 100% adipose clipped, 100,000 are marked with CWT, and they are released from acclimation sites or directly from the hatchery into the Columbia River. Current and historical annual release numbers can be found in Table 14.

5.3.5 Sockeye Salmon Program

The objective of the Sockeye Protection Program is to achieve NNI from the operations of the Project on sockeye populations in the mid-Columbia region affected by the Project. The Protection Program, developed in consultation with the PRCC, includes a requirement to provide 7% compensation through an Artificial Propagation Program. Grant PUD's overall sockeye requirement is to artificially propagate up to 1,143,000 sockeye smolts, currently released into the Okanagan Basin in British Columbia, Canada.

Recognizing that the Okanogan River, with its nursery/rearing lakes located in British Columbia, would have the greatest potential for successful, long-term sockeye mitigation opportunities, the PRCC HSC, agreed that Grant PUD could meet its sockeye obligations through funding of Okanagan Nation Alliance's (ONA) experimental program to reintroduce sockeye into Skaha Lake in British Columbia. In 2010, the PRCC HSC agreed to extend the program an additional five years (SOA 2010-08). In 2011 Grant PUD entered into a long-term agreement with the Okanagan Nation Alliance (ONA) to co-fund construction of the Penticton Sockeye Hatchery in Penticton, B.C. and fund facility operations and maintenance and a monitoring and evaluation program. The 12-year Skaha Reintroduction Sockeye Program concluded with the 2016 broodyear smolt outmigration. The final evaluation indicated there were no outstanding issues or risks identified with the reintroduction program, so beginning with broodyear 2018 the program shifted into a hatchery production phase.

Construction of the Penticton Sockeye Hatchery was completed in 2014 with capacity to rear eight million sockeye eggs and includes a fully functioning laboratory that supports hatchery operations and monitoring and evaluation sample analyses for fish health, disease, biometrics, and ageing. The hatchery and laboratory are operated by ONA as part of the 12-year reintroduction program of sockeye salmon to Skaha Lake.

The reintroduction program is going through many changes. For example, as part of program expansion, fry have been released into Okanagan Lake and preparations are being made to produce effective passage into Okanagan Lake through Penticton Dam. In addition, methods to collect adults for broodstock that are returning to the hatchery outfall at Shingle Creek are being considered. Current and historical annual release numbers can be found in Table 14.

5.3.6 Coho Protection Program

A Coho salmon reintroduction program intended to develop locally adapted, naturally spawning populations from lower Columbia River stock is being implemented in the Wenatchee and Methow river basins by the Yakama Nation. Funding provided by Grant PUD and other partners involved with the Mid-Columbia Coho Restoration Program, is being used by the Yakama Nation to develop and operate facilities to support the program.

In 2007, Grant PUD entered into a 10-year funding agreement with the Yakama Nation to assist in development of the program. This $7.4 million agreement funded the Coho Reintroduction

Program for the period 2007 - 2017. In 2017, Grant PUD entered into a new 15-year funding agreement with the Yakama Nation for continued O&M and M&E of the reintroduction program for the period 2018 – 2033. The PRCC HSC approved SOA 2018-01, which stated that through the $13,955,992 funding agreement with the Yakama Nation, Grant PUD is fulfilling its Coho mitigation obligation.

Adult broodstock is collected at Dryden and Tumwater Dams for the Wenatchee Basin portion of the program. Although Dryden Dam had been the primary source of brood collection in the past, Tumwater Dam has become increasingly significant as program collections shift toward incorporating more upper basin returning adults, which have successfully ascended Tumwater Canyon to Tumwater Dam. Due to low adult returns in some years, however, the program has sometimes relied on the OLAFT at Priest Rapids Dam for broodstock collection.

After collection, adults are transported to the Leavenworth National Fish Hatchery where they are spawned. Eggs are incubated at both the Leavenworth National Fish Hatchery and the Yakama Nation operated Peshastin Incubation Facility. After initial incubation, the eyed-eggs from both incubation facilities are transported to Willard National Fish Hatchery between early December and early January for long-term rearing until they reach the pre-smolt stage. At the smolt stage, fish are transferred from the Willard National Fish Hatchery back to the Wenatchee Basin for acclimation and release at remote sites in Beaver Creek and Nason Creek.

Adult broodstock for the Methow Basin portion of the program is collected primarily at Wells Dam. Wells Dam is used as the primary collection location to ensure representative samples of hatchery origin adults from all acclimation sites and natural-origin fish from throughout the basin are obtained. Supplementary broodstock collection occurs at Winthrop National Fish Hatchery and rely on volitional swim-ins to the hatchery holding pond and adult collection weir. Adults collected for broodstock are transported and spawned at Winthrop National Fish Hatchery. Juvenile Coho salmon are held on station until released into acclimation ponds the following spring.

Coho salmon redds and carcasses have been observed in the Wenatchee and Methow rivers and harvest has been provided because of the Coho program, however, the extent to which natural production is occurring is less clear.

5.4 Monitoring and Evaluation Summary

Monitoring and Evaluation activities continued for all hatchery programs currently implemented by Grant PUD (Table 15). A revised five-year M&E Plan for upper Columbia species was approved by the PRCC HSC in April 2013 (Hillman et al. 2013) and subsequently updated and approved in 2017 (Hillman et al. 2017) and other updates more recently. A formal update of the M&E plan will occur in 2021. Annual M&E implementation plans were approved for all of Grant PUD hatchery programs in 2019 and 2020. A long-term M&E reporting format and schedule was approved by the PRCC HSC in 2017. Annual hatchery M&E reports were distributed to the PRCC HSC for review and finalized in 2020 and early 2021 (Hillman et al. 2020; Snow et al. 2020; Richards and Pearsons 2021). Grant PUD has been working with others to complete comprehensive reports of M&E programs that will be finalized in 2021. Grant PUD has also invested in studies to help improve the performance of hatchery programs. These studies help inform topics such as optimal size-targets and growth of fish reared in the hatchery, optimal release time, and provide additional tools to improve imprinting.

Table 16 Monitoring and evaluation activities for Grant PUD hatchery programs, partially and fully funded by Grant PUD. The span years that activities were conducted in each cell.

Program	Brood Collection	Spawning	Tagging	Release	Juvenile Abundance	Redd Surveys	Carcass Recoveries
White River spring Chinook salmon	97-09	01-13	04-15	02, 04-15	07-20	97-20	97-20
Nason Creek spring Chinook salmon	98-99*, 13-20	02-03*, 13-20	04-05*, 14-20	04-05*, 15-20	07-20	98-99*, 14-20	98-99*, 14-20
Methow spring Chinook salmon	96-99*, 05-20	96-99*, 05-20	01-20	02-20	02-20	96-20	96-20
Okanogan spring Chinook salmon	13-20	14-20	15-20	15-20	NA	18-20	18-20
Wenatchee summer Chinook salmon	13-20	13-20	13-20	14-20	14-20	14-20	14-20
Methow summer Chinook salmon	13-20	13-20	13-20	14-20	14-20	14-20	14-20
Okanogan summer Chinook salmon	13-20	13-20	13-20	14-20	13-19	13-20	13-20
Fall Chinook salmon	98-20	98-20	98-20	98-20	98-20	10-20	10-20
Sockeye salmon	04-12, 14-20	04-12,14-20	04-13, 15-20	04-13,15-20	04-20	04-20	04-20
Coho salmon	05-20	05-20	06-20	06-20	06-20	06-20	06-20
Steelhead trout (Methow)	05-12	05-12	05-12	05-12	05-12	05-12	05-12
Steelhead trout (Okanogan)	06-20	06-20	07-20	07-20	07-20	07-20	07-20
*Part of the captive brood program							

5.5 Program Cost Summary

Grant PUD has completed construction on Priest Rapids Hatchery, Nason Creek Acclimation Facility, and the Carlton Acclimation Facility, as well as provided cost-share funding to complete capital upgrades at facilities where Grant PUD production programs have been implemented. The total capital cost of the programs through 2020 was $64.7 million, with the most capital funding directed to renovate the Priest Rapids Hatchery (39%) (Table 16).

Estimated operations and maintenance and monitoring and evaluation investments into Grant PUD's production programs was approximately $7.7 million in 2020 and $107.5 million since 2005 (Table 17).

The combined total expenditures invested into Grant PUD hatchery production programs through 2020 was $172.6 million dollars. The fall Chinook and the White River spring Chinook program expenses comprised nearly half of those costs (25% and 16% respectively).

Table 17 Estimated capital dollars invested in support of Grant PUD's hatchery mitigation.

	Spring Chinook				Summer Chinook			UCR Fall Chinook	Sockeye	Coho	Steelhead
	White River	Nason Creek	Methow	Okanogan	Wenatchee	Methow	Okanogan				
2000-2010	$1,192,934	$1,200,936	$0	$2,173,494	$665,945	$677,929	$6,026,506	$457,703	$0	NA	$25,242
2011	$1,282,984	$393,551	$0	$39,518	$58,141	$80,400	$109,572	$2,044,281	$0	NA	$8,376
2012	$281,025	$502,910	$0	$451,142	$300,269	$660,498	$802,030	$9,613,911	$453,737	NA	$10,619
2013	$0	$5,714,051	$0	$0	$2,185	$3,677,041	$0	$9,690,605	$2,397,663	NA	$114,920
2014	$0	$1,105,390	$0	$0	$0	$186,781	$0	$1,719,387	$1,981,335	NA	$4,258,733
2015	$0	$0	$0	$37,042	$0	$0	$96,981	$519,435	$0	NA	$0
2016	$0	$1,314,439	$0	$0	$0	$246,441	$0	$663,470	$0	NA	$26,324
2017	$0	$46,869	$0	$0	$0	$10,846	$0	$125,864	$0	NA	$1,169
2018	$0	$47,296	$0	$0	-$337,827	$25,233	$0	$112,247	$0	NA	$418,232
2019	$0	$20,956	$0	$0	$21,572	$19,107	$0	$125,252	$0	NA	$0
2020	$0	$75,687	$0	$0	$75,687	$364,161	$0	$0	$0	$0	$304,833
TOTAL	**$2,756,943**	**$10,422,084**	**$0**	**$2,701,196**	**$785,972**	**$5,948,436**	**$7,035,089**	**$25,072,154**	**$4,832,735**	**$0**	**$5,168,448**

NOTE: All costs are estimates only and likely to be underestimates; Grant PUD staff labor and travel expenditures are not included.

Table 18 Estimated dollars invested in support of Grant PUD's hatchery mitigation operations, maintenance, and monitoring.

	Spring Chinook				Summer Chinook			UCR Fall Chinook	Sockeye	Coho	Steelhead
	White River	Nason Creek	Methow	Okanogan	Wenatchee	Methow	Okanogan				
2000-2010	*$18,796,051*	*$334,672*	*$3,625,491*	*$0*	*$0*	*$0*	*$0*	*$7,102,664*	*$2,614,380*	*$1,395,057*	*$2,543,266*
2011	$1,115,380	$103,962	$691,546	$0			$0	$724,359	$553,915	$665,274	$320,786
2012	$1,128,561	$79,808	$1,027,507	$0	$148,978	$125,038	$0	$922,045	$604,921	$486,637	$564,508
2013	$1,512,759	$57,146	$1,328,496	$79,085	$367,721	$339,752	$199,869	$918,078	$669,206	$249,215	$585,295
2014	$1,114,999	$316,699	$1,215,709	$185,523	$532,077	$600,284	$485,734	$988,727	$883,536	$1,402,149	$676,779
2015	$453,530	$834,597	$696,366	$224,282	$696,065	$783,042	$587,212	$1,465,290	$1,155,905	$221,737	$1,205,172
2016	$111,032	$507,289	$701,630	$125,668	$537,972	$521,198	$329,021	$962,900	$1,135,106	$875,340	$173,234
2017	$226,270	$747,713	$1,326,683	$203,832	$648,049	$616,730	$533,670	$1,196,380	$1,093,849	$729,641	$915,459
2018	$185,799	$918,484	$1,008,808	$164,611	$980,373	$765,021	$430,983	$1,497,016	$1,091,104	$762,217	$957,900
2019	$178,466	$797,246	$1,028,879	$230,712	$545,239	$478,934	$604,046	$1,141,336	$999,427	$948,370	$1,111,499
2020	$66,439	$933,077	$920,845	$215,171	$706,057	$803,601	$563,357	$1,027,383	$1,016,533	$750,573	$746,814
TOTAL	**$24,889,287**	**$5,630,695**	**$13,571,960**	**$1,428,884**	**$5,162,531**	**$5,033,600**	**$3,733,891**	**$17,946,178**	**$11,817,882**	**$8,486,209**	**$9,800,712**

NOTE: All costs are estimates only and likely to be underestimates; Grant PUD staff labor and travel expenditures are not included.

6.0 Priest Rapids Coordinating Committee Habitat Subcommittee

The PRCC Habitat Subcommittee is the primary forum for implementing and directing habitat protection and restoration measures for the Project's anadromous fish programs covered under both the Biological Opinion and the SSSA. Under the provisions of these mandates and obligations, three funds were created by Grant PUD (Section 6.2). Since January 2005, the PRCC Habitat Subcommittee has met monthly to undertake and oversee the planning and implementation of the necessary program elements to support habitat protection and restoration programs. The committee operates on consensus regarding decisions directly linked to project management.

FERC requires Grant PUD to continue to support the PRCC Habitat Subcommittee. This includes provision of sufficient facilitation, administration, and clerical support. Minutes are recorded and approved by the PRCC Habitat Subcommittee. One traditional meeting, one conference call, and eight virtual meetings were held by the PRCC Habitat Subcommittee members during calendar year 2020 (Table 18). Agendas and meeting minutes are available at Grant PUD's website.

Table 19 Priest Rapids Coordinating Habitat Subcommittee 2020 Meetings.

PRCC Habitat	January 9, 2020	Meeting
PRCC Habitat	February 24, 2020	Conference Call
PRCC Habitat	April 9, 2020	Microsoft Teams Meeting
PRCC Habitat	May 14, 2020	Microsoft Teams Meeting
PRCC Habitat	June 11, 2020	Microsoft Teams Meeting
PRCC Habitat	July 9, 2020	Microsoft Teams Meeting
PRCC Habitat	August 13, 2020	Microsoft Teams Meeting
PRCC Habitat	October 8, 2020	Microsoft Teams Meeting
PRCC Habitat	November 12, 2020	Microsoft Teams Meeting
PRCC Habitat	December 10, 2020	Microsoft Teams Meeting

Since 2006, 119 total projects have been unanimously approved by one of two committees for funding using one of the three funding accounts: 601-NNI Fund, 602-Habitat Supplemental Fund, and 603-Habitat Conservation Fund. Of those, 74 are completed and 45 are currently active and underway. As of the end of December 2020, $28,846,774 dollars have been spent on committee-approved projects since 2006. The total amount of unencumbered funds available for habitat projects approved by the PRCC and/or PRCC Habitat subcommittee through 2020 for all three accounts is $11,356,927. Figure 7 below shows a breakdown of the type of different projects that have been committee-approved, that are either completed or still ongoing.

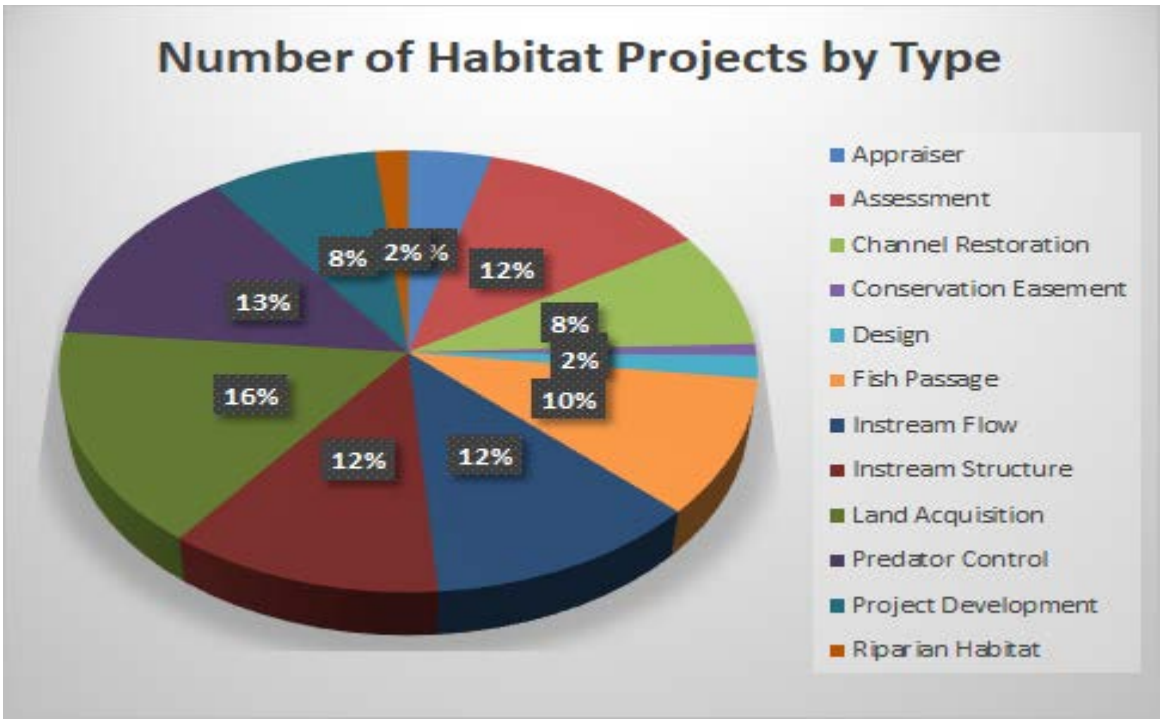

Figure 7 The total amount of projects (categorized by type) that have been approved by the Priest Rapids Coordinating Committee and Priest Rapids Coordinating Hatchery Subcommittee.

6.1 Habitat Plan

Grant PUD, in consultation with the PRCC Habitat Subcommittee, developed a draft habitat plan for Chinook salmon and steelhead affected by operation of the Project, as required under the 2004 and 2008 Biological Opinions issued by NMFS, and the 2006 SSSA. This plan was developed to shepherd the development and implementation of the protection and restoration programs that promote the rebuilding of self-sustaining and harvestable populations of Chinook salmon and steelhead, and to mitigate for a portion of unavoidable losses resulting from Project operations. This plan was submitted to FERC on June 30, 2009 and received FERC approval on March 5, 2010. As required by Grant PUD's license (Article 401(a)(3)), this plan is now being updated and finalized in consultation with the PRCC Habitat Subcommittee. A guidance document was also produced, reviewed, and approved by the PRCC in 2014 that provides more direction as to the supporting roles to each respective committee.

6.2 Habitat Account

Grant PUD allocates annual funds to a Priest Rapids Habitat Conservation Account in order to finance tributary or mainstem habitat projects to benefit UCR spring Chinook and UCR steelhead (Habitat Fund – BiOp). The SSSA requires additional allocations related to projects identified in the Project Habitat Plan for non-listed species (Habitat Supplemental Fund), and projects to help achieve juvenile survival standards (NNI Fund). Deposits to these accounts occur annually on February 15, concurrent with the filing of this annual FERC report. Expenditures from the NNI Fund occur in consultation with the PRCC, and expenditures of the Habitat Supplemental and Habitat BiOp funds are in consultation with the PRCC Habitat Subcommittee (Table 19). The 2021 annual contribution made into the NNI account was $599,007.99. The 2021

annual deposit into the Habitat Supplemental was $1,178,253.18, while the contribution into the Habitat BiOP fund was $420,898.46. The total expenditures spent on habitat projects in 2020 for the three funding accounts was $1,655,904.

Table 20 Priest Rapids Coordinating Committee account balances and expenditures as of December 31, 2020.

Account	Beginning Balance	Expenditures	Remaining Balance
No Net Impact Fund	$5,651,210	$653,681	$4,997,529
Habitat Supplemental Fund	$8,143,026	$507,617	$7,635,409
Habitat Fund (BiOp)	$2,097,354	$494,607	$1,602,747
Total	**$15,891,589**	**$1,655,904**	**$14,235,685**

7.0 Consultation

Grant PUD distributed a draft of the 2020 Calendar Year Activities Under Priest Rapids Hydroelectric Project report consistent with the requirements of Article 401(a)(1) Downstream Passage Alternatives Action Plan, Article 401(a)(2) Progress and Implementation Plan, Article 401(a)(3) Habitat Plans, Article 401(a)(4) Artificial Propagation, Hatchery and Genetic Management, and Monitoring and Evaluation, Article 401(a)(8) Priest Rapids Dam Alternatives Spill Measures Evaluation Plan and Article 404 Fishery Operations Plan to the PRCC for review on March 3, 2021 to the members of PRCC which includes the NMFS, USFWS, WDFW, CCT, YN, and Umatilla (represented by CRITFC) for a 30 day comment and review period.

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