

VIA ELECTRONIC FILING

March 21, 2014

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

RE: P-2114-WA - Priest Rapids Hydroelectric Project, Wanapum Dam Spillway Monolith No.4 – Request for approval of Interim Fish Passage Operations Plan.

Dear Ms. Bose,

Attached for your approval please find Public Utility District No. 2 of Grant County, Washington's (Grant PUD's) Interim Fish Passage Operations Plan (IFPOP), which has been developed in response to the recent draw down of the Wanapum Dam Reservoir.

Background

As you are aware via Grant PUD's daily telephone conference calls with your Portland Regional Office since February 25, 2014 and with the Washington D.C. office of the Division of Dam Safety and Inspections (D2SI) since February 26, 2014, it has been necessary to draw down the reservoir behind Wanapum Dam to relieve loading on the damaged spillway monolith no. 4. Based on hydraulic model studies, alignment surveys and visual observations, the damaged monolith has stabilized at an operating elevation between 541' and 545' m.s.l.. Per letter dated March 10, 2014 from Mr. Kevin Marshall to your Portland Regional Office, and response letter dated March 11, 2014 from Mr. Douglas Johnson of your Portland Regional Office, Grant PUD is currently restricted to this operating range until further investigations and repair options can be approved and implemented.

Discussion

At these reduced operations elevations, the adult fish ladders at Wanapum Dam are currently inoperable. Designs have been developed to modify the exits of the left and right bank adult fish ladders at Wanapum Dam to provide safe passage during low-water conditions. Conceptual designs for installation of these modifications are included in the IFPOP. In the event safe ladder passage cannot be restored at both Wanapum and Rock Island dams in time for the 2014 migration of adult anadromous salmon and steelhead, a contingency plan for trapping and transporting adults from the Priest Rapids Dam Off-Ladder Adult Fish Trap (OLAFT) to a pre-determined point upstream has been developed. Procedures and protocols for this operation are also included in the IFPOP.

The schedule for the implementation of the IFPOP is included in the IFPOP, as are adaptive management provisions.

Request

Grant PUD respectfully requests FERC approval of the IFPOP, which will temporarily modify the Priest Rapids Project fishways to assure safe adult fish passage while the Wanapum Dam reservoir is operated at reduced elevations. Note that IFPOP has undergone consultation via the Priest Rapids Coordinating Committee (PRCC), as well as emergency consultation under Section 7 of the Endangered Species Act (ESA). The IFPOP was distributed to the PRCC on March 17, 2014. Comments were received from members of the PRCC, NOAA, and the USFWS; these comments were incorporated into the final IFPOP, and a comment response table is included in Appendix C of the IFPOP. NOAA also provided recommended conservation measures as part of the ongoing emergency ESA consultation process, and those are included in Appendix D of the IFPOP. While the USFWS provided comments and recommendations related to the IFPOP, they have stated that they will issue a response with regard to the ongoing emergency ESA consultation process for bull trout at a later date; Grant PUD will forward any recommended conservation measures that USFWS provides to FERC. A record of all correspondence to date is provided in Appendix D of the IFPOP.

FERC staff with questions on the IFPOP should be directed to Tom Dresser at 509-754-5088, Ext. 2312. Thank you for your review!

Sincerely,



Ross Hendrick
License Compliance Manager

Enclosures: Interim Fish Passage Operations Plan

CC: PRCC
Jeff Krupka – USFWS
Scott Carlon – NOAA

Interim Fish Passage Operations Plan

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

The Public Utility District No. 2 of Grant County, Washington
30 C Street SW
Ephrata, Washington 98823

March 21, 2014

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, known collectively as the Priest Rapids Project (Project), and is operated under the terms and conditions of the Federal Energy Regulatory Commission (FERC) Hydroelectric Project License No. P-2114 issued by FERC on April 17, 2008.

Grant PUD operates the Project through the coordinated operation 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 Project. These agreements include the Hanford Reach Fall Chinook Protection Program Agreement, the Hourly Coordination Agreement, and the Priest Rapids Project Salmon and Steelhead Settlement Agreement (SSSA). 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 reference in the license) of the Biological Opinion (BiOp) of the Priest Rapids Project issued by the National Marine Fisheries Service (NMFS) for its effects on anadromous salmon, the Clean Water Act Section 401 Water Quality Certification (WQC) issued by the Washington State Department of Ecology (WDOE), and the BiOp for the Priest Rapids Project issued by the United States Fish and Wildlife (USFWS) regarding the effect of the Project on bull trout.

The upstream fish passage facilities at Wanapum Dam consist of two fish ladders (left and right bank), entrance channels, and attraction water facilities. The ladders consist of a series of 10 ft. long pools. Each pool is one foot higher than the preceding pool, from tailwater to forebay, yielding a slope of one on ten. The ladders are 16 feet wide with 6 feet high fixed weirs separating the pools. Each fixed weir has two five-foot-wide overflow sections separated by a six-foot-wide non-overflow section and two 18 inch square submerged orifices at the base. Water flow down each ladder is 70 cfs, consisting of 40 cfs over the weirs and 30 cfs through the orifices. Migrating fish may either swim over the top of the weir or through the orifices.

On February 27, 2014 a horizontal fracture was discovered in the spillway monolith #4 at Wanapum Dam. The fracture opened a crack on the upstream face of the structure approximately 2 inches high by the width of the spillway monolith at 65 feet. Grant PUD immediately initiated its Emergency Action Plan (EAP; level B) and began to draw the Wanapum Reservoir down in a steady controlled state.

On March 2, 2014, Grant PUD fisheries staff conducted fish removal and salvage activities within the Wanapum right bank ladder in anticipation of the ladder becoming inoperable. The Wanapum left bank ladder was previously dewatered for routine annual maintenance.

As of March 4, 2014, the Wanapum Reservoir has been lowered to a safe operating elevation range between 545 feet and 541 feet. As a result of the drawdown, the fish ladder exits at Wanapum Dam are dewatered, preventing upstream migrating fish from passing Wanapum Dam. The fish ladder entrances at Wanapum remain operational, due to the tailwater elevation. At an elevation of 562 feet, the Wanapum Dam fish ladders exits would be able to be operated within criteria and without modifications.

Both fish ladders at Priest Rapids Dam are operational and were not impacted as a result of the Wanapum Reservoir drawdown. At this time, the right-bank ladder at Priest Rapids Dam is dewatered due to normal annual maintenance, while the left-bank ladder is watered up.

To address fish passage at Wanapum Dam as a result of the necessary Wanapum Reservoir drawdown, Grant PUD has developed an Interim Fish Passage Operations Plan (IFPOP), which is intended to provide upstream passage for adult salmonids, steelhead, bull trout and Pacific lamprey through or around the Priest Rapids Project. The IFPOP includes elements which have been developed in parallel; (1) restore upstream passage at Wanapum Dam fishways and (2) trap and haul from the Priest Rapids Off-Ladder Adult Fish Trap. Both elements require design, fabrication, and installation prior to the upstream migration of adult salmonids. The scheduled timeline for operation is April 15, 2014.

Development of the IFPOP occurred in consultation with the NMFS, USFWS and Priest Rapids Coordinating Committee (PRCC). The PRCC is made up of representatives from NMFS, USFWS, Washington Department of Fish and Wildlife (WDFW), Yakama Nation (YN), the Colville Confederated Tribes (CCT) and Grant PUD.

The IFPOP will be adaptively managed, as needed, via consultation with the PRCC, NMFS, and USFWS. Grant PUD expects that this will occur as new issues are identified as it relates to the interim actions contained within this plan, as well as it may relate to anadromous salmonids or other resident species.

Grant PUD proposes to implement the IFPOP under the same adaptive management principles that were incorporated into the Priest Rapids Salmon and Steelhead Settlement Agreement (SSSA). As defined in the SSSA, adaptive management is an active systematic process for continually improving management policies and practices by sequential learning from the outcomes of operational programs. Adaptive management employs management programs that are designed to experimentally compare selective policies or practices by evaluating alternative hypotheses about the system being managed. The sequence of adaptive management steps include: (1) problem assessment, (2) project design, (3) implementation, (4) monitoring, (5) evaluation, and (6) adjustment of future decisions.

Adaptive management is not considered complete until the planned management actions have been implemented, measured and evaluated and the resulting new knowledge has been fed back into the decision-making process to aid in future planning and management. The fundamental objective of adaptive management with respect to IFPOP is to achieve the best possible adult upstream passage based on the emergency situation at hand.

Table of Contents

1.0	Introduction.....	1
2.0	Emergency Modifications at the Wanapum Dam Fishways.....	2
3.0	Proposed Interim Actions At the Priest Rapids Off-Ladder Adult Fish Trap.....	3
4.0	Adult Salmonid Passage PIT-Tag Detection Infrastructure.....	4
4.1	Priest Rapids Off Ladder Adult Fish Trap.....	5
4.2	Priest Rapids Dam.....	5
4.3	Wanapum Dam	6
4.4	Rock Island Dam.....	6
5.0	Adult Salmonid Passage Monitoring and Evaluation	6
5.1	McNary to the Priest Rapids Off Ladder Adult Fish Trap.....	6
5.2	Priest Rapids Dam to Rock Island Dam and other locations	7
6.0	Pacific Lamprey Passage PIT-Tag Detection Infrastructure	9
6.1	Pacific Lamprey Passage Monitoring and Evaluation	9
7.0	Consultation	9
8.0	Adaptive Management	9

List of Figures

Figure 1	Decision matrix used to determine the necessity to implement collection (trap) and haul measures from the Priest Rapids Dam Off-Ladder Adult Fish Trap to upstream release locations.	4
Figure 2	Proposed modifications at the Priest Rapids Off-Ladder Adult Fish Trap to facilitate the water-to-water transfer of adult salmonids to a transport vessel.	5
Figure 3	Proposed PIT-tag array detection points used to evaluate potential migration delays for adult salmonids associated with extended operation of the Priest Rapids Off-Ladder Adult Fish Trap and fishway modifications at Wanapum and Rock Island dams.	8
Figure 4	Travel times of Chinook salmon between McNary Dam and Priest Rapids Dam for years 2003-2013.	8

List of Tables

Table 1	PIT-tag interrogation sites that will be monitored to determine upstream passage rates for adult salmonids.	7
Table 2	Travel time (TT) in days for PIT-tagged adult Chinook salmon (CH), Sockeye salmon (SK), and steelhead (ST) detected at Priest Rapids and Rock Island dams	

in 2013. No PIT-tag interrogation station existed at Wanapum Dam in years prior to 2014. Data represent in table were queried from PRAGIS on March 20, 2014. 7

Table 3 Median travel time (TT) in days for radio tagged adult Chinook salmon (CH) and Sockeye salmon (SK) detected at Priest Rapids and Wanapum dams in 1997. Data was reported by Peery et al. 1997. 7

Table 4 Agency, Tribal and Interested Stakeholder Communications and Consultation Related to the Wanapum Fish Passage and Interim Fish Passage Operation Plan. 10

List of Appendices

Appendix A Wanapum Fish Ladder Weir – Draft Sketches A-1

Appendix B Trap and Transport Protocol for Adult Salmon, Steelhead, and Migratory Bull Trout Collected at the Priest Rapids Off Ladder Adult Fish Trap B-1

Appendix C Agency and Tribal Representative Comments/Recommendations Summary Response Table for Interim Fish Passage Operation Plan C-1

Appendix D Received Agency and Tribal Representative Comments and Recommendation under ESA Consultation for Wanapum Fishway Modifications and Trap and Transport Protocols D-1

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, known collectively as the Priest Rapids Project (Project), and is operated under the terms and conditions of the Federal Energy Regulatory Commission (FERC) Hydroelectric Project License No. P-2114 issued by FERC on April 17, 2008.

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Both fish ladders at Priest Rapids Dam are operational and were not impacted as a result of the Wanapum Reservoir. At this time, the right bank ladder at Priest Rapids Dam is dewatered due to

normal annual maintenance. The left-bank fish ladder at Priest Rapids Dam is currently watered up and operating within criteria.

This Interim Fish Passage Operations Plan (IFPOP) provides a description of emergency actions that Grant PUD will be implementing during the fish passage season at the Priest Rapids Project. These emergency actions are intended to facilitate the continued upstream migration of adult salmonids, steelhead, bull trout and Pacific lamprey. Information incorporated into the IFPOP is the result of emergency ESA consultation with the NMFS and USFWS and in consultation with the Priest Rapids Coordinating Committee (PRCC) and includes specific information related to the following:

- Wanapum Dam fishways modifications;
- Priest Rapids Off Ladder Adult Fish Trap modifications;
- Contingency Protocol for Trap and Transport;
- Adult Salmonid Passage Monitoring and Evaluation;
- Adult Pacific lamprey Monitoring and Evaluation.

2.0 Emergency Modifications at the Wanapum Dam Fishways

To restore adult fish passage at the Wanapum left and right bank fishways exits, weir boxes (16 ft. x 7 ft.) will be installed near the exit of each ladder and supplied with approximately 40 cfs of water via four electric pumps at each ladder (n=8). The weir boxes will have a false weir designed to attract fish from the ladder pools (Appendix A - Figures 1-6). It is estimated that the weirs will direct approximately 90% of the flow down the fish ladder (35 cfs), while the remaining 10% of the flow will be used to provide water upstream for the fish exit flume (5 cfs). An adjustable weir has also been incorporated into the design to allow for adjustment of the amount of water that is pumped into the fish ladder versus into the forebay chute (Appendix A - Figures 1-6). All corners will be radiused or bull nosed to limit potential injury to adult fish as a result of sharp edges. Silicone will also be added in areas that may be difficult to radius or to fill in gaps. Lamprey passage plates will also be added on either side of the weir to facilitate adult lamprey passage.

It is expected that after ascending to the false weir, fish will swim or jump over the weir and enter a flume which will return them to the Wanapum forebay near the normal fishway exit. The flume will be constructed of marine plywood and will be lined fiber reinforced plywood to reduce risk or injury. As currently designed, adult fish will enter the Wanapum forebay at a height of approximately 13 feet – 15 feet (Appendix A - Figures 1-6).

Per discussions with the NMFS, USFWS and PRCC; Grant PUD will also develop a chute that would deliver adult fish closer to the water surface (Appendix A - Figures 1-6). The chute is currently in the design phase and would not be available for installation until later in the fish passage season (mid-May to June), due to the complexity of design and necessary fabrication timeline. Grant PUD will proceed with the flume alternative and will continue to consult with NMFS, USFWS and PRCC on the design and fabrication of the chute, as well as the need to install the chute at a later date after it has been fabricated and delivered on site.

In the forebay control section of the upper ladder, flow typically passes through two 18" x 38" orifices. The proposed operation will block off one orifice in each weir wall. In the lower section

of the ladder only a couple inches of flow will occur over each weir, and both weir orifices will flow full as they do during normal operations. Most fish historically have shown to pass through the orifices in normal passage mode, and therefore Grant PUD is not anticipating any passage issues in this area.

The lower fish ladder attraction system (for each ladder) will continue to operate normally and will continue to provide attraction flow. This system is not impacted by the Wanapum Reservoir drawdown. Grant PUD is anticipating that both the Wanapum left and right bank ladders will be operated on April 15, 2014, barring any unforeseen circumstances.

To facilitate adult Pacific lamprey passage at both the Wanapum left and right bank ladders, plating will be added to both sides of the false weir. In addition, ramps have been added to the design that approach and extend over the weir and all corners will be radius to reduce impacts to fish/lamprey passage. The ramp design incorporated into the weir is the same design that has been used to successfully pass adult lamprey within the Priest Rapids and Wanapum fishways.

Please refer to Section 6.0 below for further discussion on adult Pacific lamprey passage, monitoring and evaluation.

3.0 Proposed Interim Actions At the Priest Rapids Off-Ladder Adult Fish Trap

If adult fish ladders are impassable at Wanapum Dam or Rock Island Dam (Public Utility District No. 1 of Chelan County owned facility; Chelan PUD), Grant PUD proposes to operate the Priest Rapids Dam Off-Ladder Adult Fish Trap (OLAFT) to collect and transport adult migrating fish at Priest Rapids Dam starting April 15, 2014. A decision matrix is included to determine the necessity to implement collection (trap) and haul measures from the Priest Rapids Dam OLAFT to upstream release locations (Figure 1).

To facilitate collection at the OLAFT, both the right and left bank fish ladders would be shut down during this operation (as is commonly done during routine operation) and fish passage will be diverted to the left bank and through the OLAFT. All fish ascending the ladder will be diverted through the collection facility into holding tanks designed to transport and release adult fish (adult fish transport trucks). Fish will then be transported to pre-determined location(s), either in the Wanapum or Rock Island reservoirs for release.

Designing modifications at the OLAFT will facilitate a water-to-water transfer of fish from the facility to the holding and transport tanks. A PVC transport chute will facilitate transfer and is currently being designed and installed to direct fish directly to the transport vessels to eliminate the need to physically handle the fish.

Modifications at the OLAFT consists of extending the existing flume downstream of a false weir, transitioning the flume into a pipe, and a pipe turn of approximately 150° to allow for direct loading of fish (Figure 2). A second design is also being developed that would allow routing of fish via a wye gate to an anesthetic tank. This second adaptation will not be completed until late-June early July.

A PIT-tag detection system located in the OLAFT will detect all tagged fish prior to being diverted and no fish anesthesia is anticipated to occur for this work. Grant PUD is anticipating that design modifications will be completed by April 14, 2014.

A detailed plan discussing run-timing, staffing requirements at the OLAFT, transport protocols, fish health monitoring and release location have been included and can be reviewed in Appendix B.

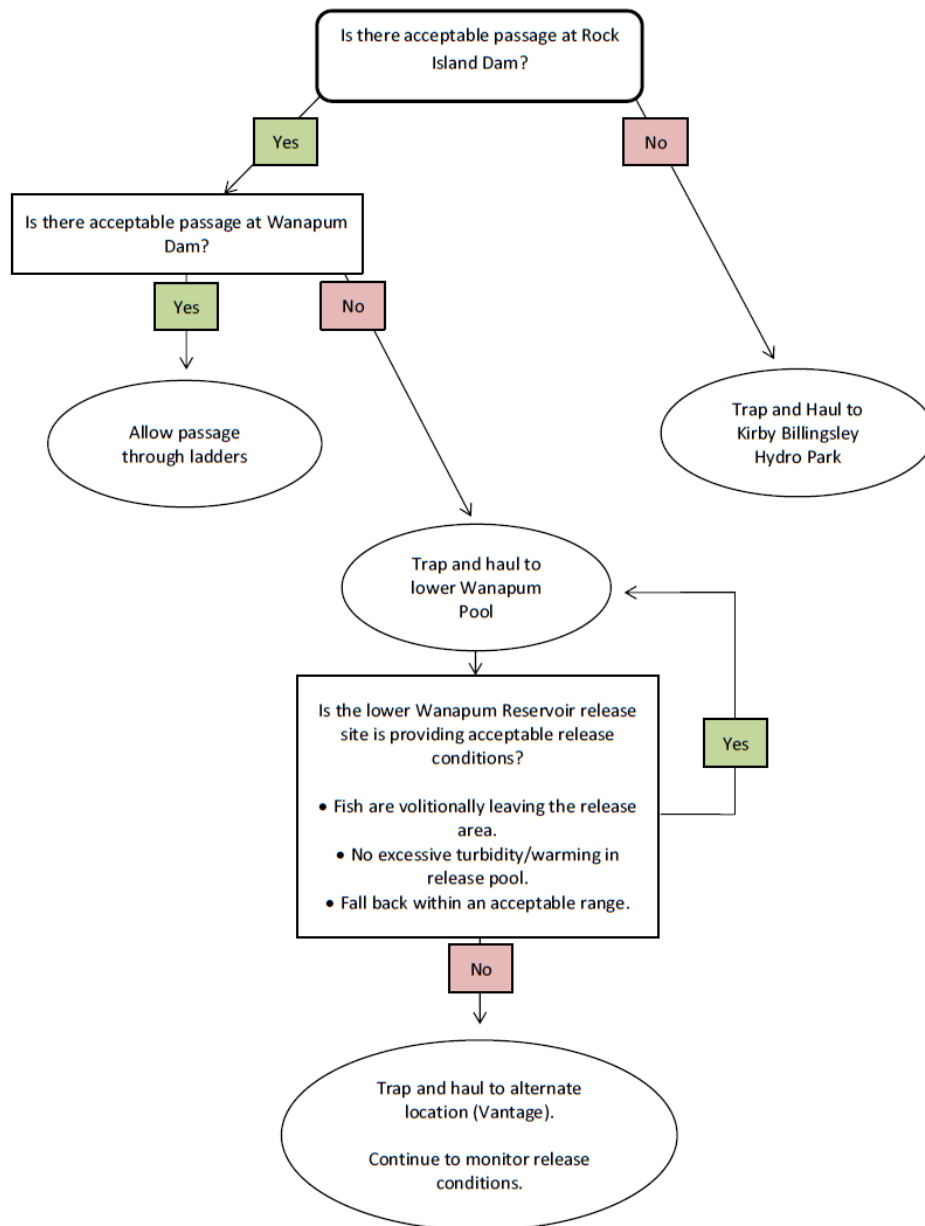


Figure 1 Decision matrix used to determine the necessity to implement collection (trap) and haul measures from the Priest Rapids Dam Off-Ladder Adult Fish Trap to upstream release locations.

4.0 Adult Salmonid Passage PIT-Tag Detection Infrastructure

The section below provides a summary of PIT-tag detection capabilities at the Priest Rapids Project (Priest Rapids OLAFT, Priest Rapids Dam, and temporary PIT-tag array at Wanapum Dam) and Rock Island, a Chelan PUD owned and operated facility.

4.1 Priest Rapids Off Ladder Adult Fish Trap

At the Priest Rapids OLAFT, three antennae are installed at the head of the sorting flume. Only fish that have been trapped and pass through the sorting flume are interrogated by this antenna array. The adult PIT-tag detection system at Priest Rapids OLAFT is designed to detect upstream migrating fish bearing an ISO FDX-B PIT-tag (134.2 kHz). 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, <http://test.ptagis.org/ptagis/index.jsp>.

4.2 Priest Rapids Dam

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 also designed to detect upstream migrating fish bearing an ISO FDX-B PIT-tag (134.2 kHz). The PIT-tag detection 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. 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. All interrogation data collected at Priest Rapids Dam are uploaded to the Pacific States Marine Fisheries Commission's PTAGIS web page, <http://test.ptagis.org/ptagis/index.jsp>.

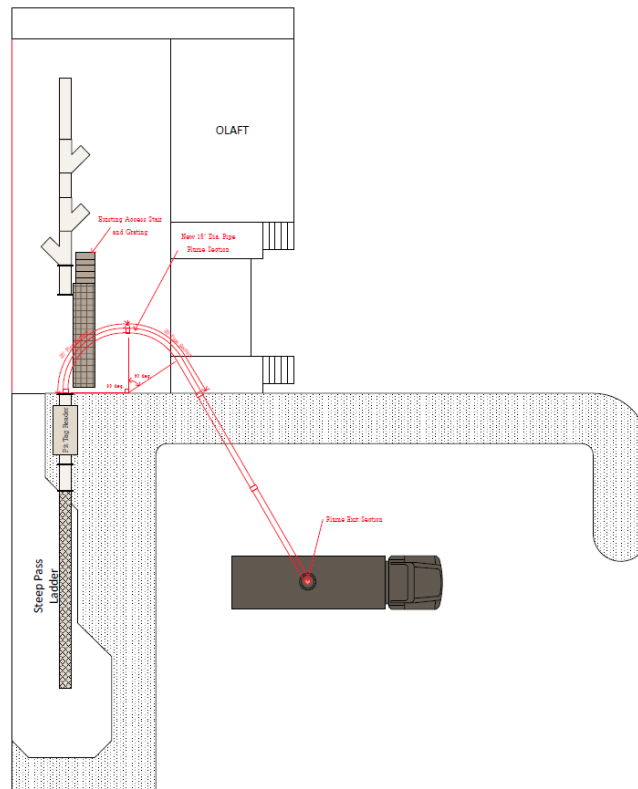


Figure 2 Proposed modifications at the Priest Rapids Off-Ladder Adult Fish Trap to facilitate the water-to-water transfer of adult salmonids to a transport vessel.

4.3 Wanapum Dam

Grant PUD will install a temporary PIT-tag array in each of the fishways at Wanapum Dam (left and right bank). Antennas will be constructed of two inch or four inch pipe and will be installed on the upstream side of each sampled orifice. This will allow for the construction of smaller simple antennas, which is necessary due to the limited fabrication time. The antennas would be secured to the wall and floor using custom lean-in/lead-out ramps that secure the antenna and also reduce the hydraulic impact of the antenna. The antennas would extend off the floor two inch or four inch depending on the material used for antenna construction.

Each antenna will be connected to an IS1001 reader and the IS1001s for each ladder would be connected to IS1001-Master Controllers (IS1001-MC). The IS1001 reader will be capable of decoding ISO compliant FDX-B and HDX tags (Full Duplex, FDX and Half Duplex, HDX). The IS1001-MC, which stores the diagnostic and tag detection from the connected readers and the buffer would be downloaded manually, written to an attached external flash drive, or retrieved remotely via cell phone, Ethernet, or Fiber Optic connection. All interrogation data collected at Wanapum Dam will be uploaded to the Pacific States Marine Fisheries Commission's PTAGIS web page, <http://test.ptagis.org/ptagis/index.jsp>.

4.4 Rock Island Dam

The PIT-tag detection system at Rock island includes four coils/antennas installed in each fishway (left bank, middle, and right bank). The coils are mounted on baffles (orifice passage only; two orifices per baffle) in the upper sections of each fishway. PIT-tag data are uploaded automatically every three hours to PTAGIS web page, <http://test.ptagis.org/ptagis/index.jsp>.

5.0 Adult Salmonid Passage Monitoring and Evaluation

Upstream migrating salmonids that were previously implanted with FDX PIT-tags will be monitored at interrogation sites along their migration route. As tagged fish move upstream into the mid-Columbia they will pass Priest Rapids Dam, Wanapum Dam and Rock Island Dam in succession and be detected on PIT receivers installed at the fishways of each location. PIT-tag receivers are also located at upstream tributaries above Rock Island Dam.

Once collected, data will be uploaded to a centralized database system for PIT tagged fish in the Columbia River, PTAGIS. Data are uploaded at varying intervals by each mainstem Columbia River dam, but the standard period for uploads is at least daily. Data collected at a majority of the upstream tributaries are also uploaded on a daily basis but sometimes longer (weekly/monthly) at a few of the more remote locations (Table 1). Data from the temporary PIT receivers at Wanapum Dam will be collected manually if an automated process for sending the data to PTAGIS cannot be established during the study period.

5.1 McNary to the Priest Rapids Off Ladder Adult Fish Trap

Specifically between McNary Dam and to Priest Rapids Dam, Grant PUD proposes to evaluate migration delays at Priest Rapids Dam by monitoring the travel time of PIT-tagged fish from McNary Dam to the OLAFT. Travel time of Chinook salmon during trap and transport activities will be compared with historical migration data (2003-2013; Figure 4). If a ten-fish rolling average travel time exceeds seven days (the historical 75% exceedance travel time), managers will be notified and alternative trapping operations will be considered.

Table 1 PIT-tag interrogation sites that will be monitored to determine upstream passage rates for adult salmonids.

Site Location	RKM	PTAGIS Upload Frequency	Operator
Priest Rapids Dam	638	Every 3 hours	GCPUD
Wanapum Dam	668	Daily	GCPUD
Rock Island Dam	730	Every 3 hours	CCPUD
Upstream Tributaries	Various	Variable	Various

5.2 Priest Rapids Dam to Rock Island Dam and other locations

Queries of PTAGIS data will be created to export detections of Chinook salmon, Sockeye salmon, and Steelhead between Priest Rapids Dam and Rock Island Dam as well as upstream tributary detection sites. The queries will be set up to export data automatically from PTAGIS. A process will be created to import the PTAGIS detection data, including a basic QA/QC automated process to ensure the detection data represents fish migrating upstream.

After processing, travel times from Priest Rapids Dam to Wanapum Dam to Rock Island Dam will be calculated (see example data from 2013 in Table 2). Results will be provided daily for migration times between the projects and weekly for migration times to upstream tributaries. Travel times will be compared to historical reference and more recent data available on PTAGIS (Table 3). Comparisons will be made to determine if the travel times in 2014 are similar to or different from past years.

Grant PUD is also exploring opportunities to increase the number of PIT-tagged adult salmonids by providing tags to researchers in the lower Columbia (e.g. at Bonneville Dam) and at the OLAFT. Figure 3 illustrates the detection locations that Grant PUD would propose to use, to evaluate potential migration delays on a near-real time basis.

Table 2 Travel time (TT) in days for PIT-tagged adult Chinook salmon (CH), Sockeye salmon (SK), and steelhead (ST) detected at Priest Rapids and Rock Island dams in 2013. No PIT-tag interrogation station existed at Wanapum Dam in years prior to 2014. Data represent in table were queried from PRAGIS on March 20, 2014.

Species	Qty detected at Priest Rapids	Qty detected at Rock Island	Median TT (days)	
			% Detected	PR to RI
CH	4106	2769	67.4%	3
SK	1062	944	88.9%	3
ST	2853	2189	76.7%	4

Table 3 Median travel time (TT) in days for radio tagged adult Chinook salmon (CH) and Sockeye salmon (SK) detected at Priest Rapids and Wanapum dams in 1997. Data was reported by Peery et al. 1997.

Species	Median TT (days)	
	PR to WAN	Qty
CH	0.5	100
SK	0.8	170

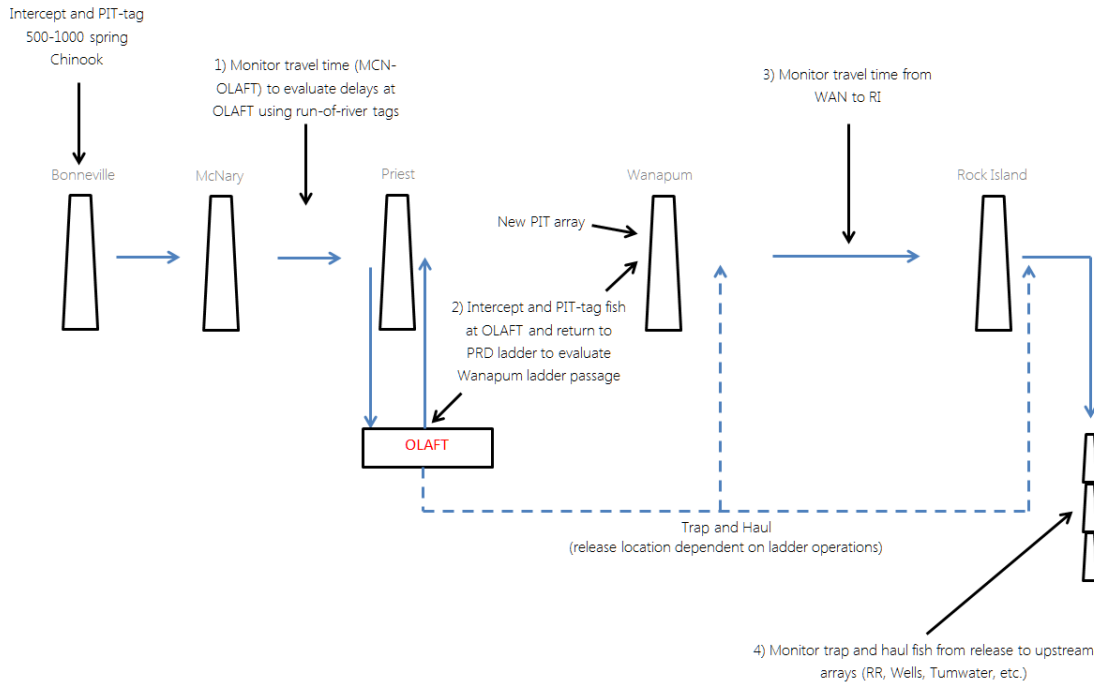


Figure 3 Proposed PIT-tag array detection points used to evaluate potential migration delays for adult salmonids associated with extended operation of the Priest Rapids Off-Ladder Adult Fish Trap and fishway modifications at Wanapum and Rock Island dams.

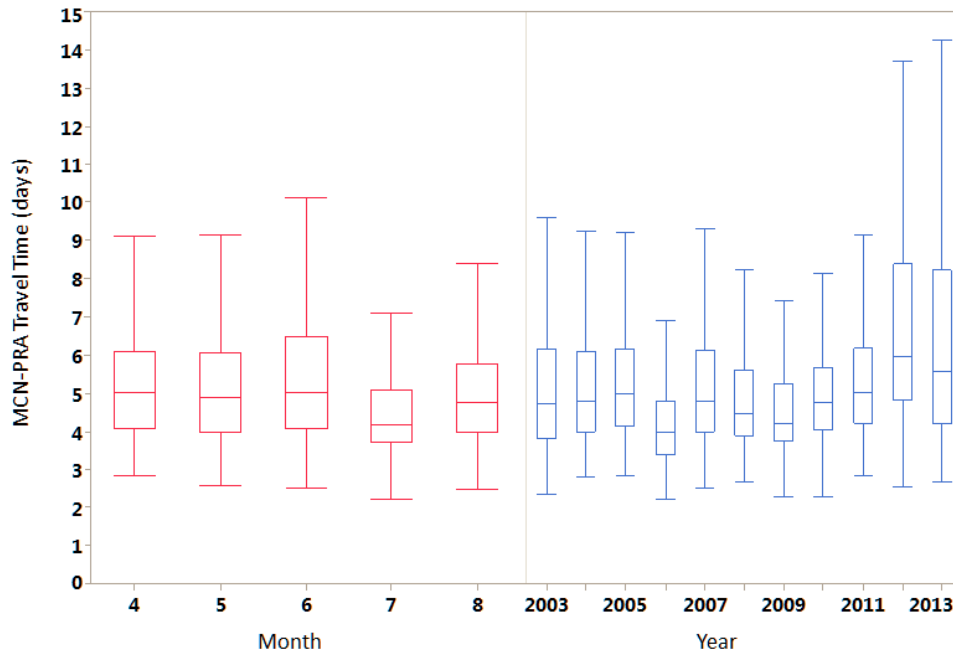


Figure 4 Travel times of Chinook salmon between McNary Dam and Priest Rapids Dam for years 2003-2013.

6.0 Pacific Lamprey Passage PIT-Tag Detection Infrastructure

Grant PUD has HDX PIT-tag telemetry equipment and receivers installed in the fish ladders at Priest Rapids and Wanapum dams at 20 strategic locations. This includes the following at both Wanapum and Priest Rapids dam;

- just inside entrances;
- at the terminus of pools which constitute the beginning of a fishway section with diffusion grating;
- pools which constitute the end of a fishway section with diffusion grating;
- downstream of count stations;
- upstream of count stations; and
- at fishway exits.

6.1 Pacific Lamprey Passage Monitoring and Evaluation

Grant PUD proposes to continue to operate the HDX-PIT arrays to assess passage metrics (passage efficiency, fallback, sequence timing, etc.) at the Priest Rapids Project (both Wanapum and Priest Rapids dams). Monitoring activities for in-river adult lamprey would begin in May 2014 and continue until the seasonal migration of lamprey appears to have ceased (approximately November 15). Telemetry data will be downloaded from HDX PIT readers weekly and stored into a relational database for analyses.

Grant PUD also proposes that further discussion on the potential impacts or delay to adult Pacific lamprey passage as a result of the Wanapum Dam fishway modifications needs to occur within the Priest Rapids Fish Forum. Grant PUD also expects that these discussions and potential passage solutions would occur prior to the migration season for Pacific lamprey.

7.0 Consultation

On February 28, 2014, Grant PUD initiated communication with NMFS, USFWS, PRCC and other interested regional stakeholders. This communication occurred via phone, conference calls and/or meetings and related directly to the fish passages issues at Wanapum Dam, the IFPOP, as well as general updates associated with the fracture at Wanapum Spillway monolith #4. Table 4 summarizes these phone conversations, conference calls, meetings and/or emails. Specific comments and recommendations received from NMFS, USFWS and PRCC on the IFPOP have been included in Appendix C. Within the same Appendix Table (Appendix C), Grant PUD has also included its responses in regards to received comments and recommendations and has included many of these suggested recommends directly into the IFPOP or the contingency trap and trap protocol included with Appendix B of this document. Received correspondence from agency and tribal representatives has been included in Appendix D.

8.0 Adaptive Management

The IFPOP will be adaptively managed, as needed, via consultation with the PRCC, NMFS, and USFWS. Grant PUD expects that this will occur within the PRCC as new issues are identified as it relates to the interim actions contained within this plan.

Grant PUD proposes to implement the IFPOP under the same adaptive management principles that were incorporated into the Priest Rapids SSSA. As defined in the SSSA, adaptive

management is an active systematic process for continually improving management policies and practices by sequential learning from the outcomes of operational programs. Adaptive management employs management programs that are designed to experimentally compare selective policies or practices by evaluating alternative hypotheses about the system being managed. The sequence of adaptive management steps include: (1) problem assessment, (2) project design, (3) implementation, (4) monitoring, (5) evaluation, and (6) adjustment of future decisions. Adaptive management is not considered complete until the planned management actions have been implemented, measured and evaluated and the resulting new knowledge has been fed back into the decision-making process to aid in future planning and management. The fundamental objective of adaptive management with respect to IFPOP is to achieve the best possible adult passage based on the emergency situation at hand.

The Grant PUD, NMFS, USFWS and the PRCC have been utilizing this approach over several decades and included such approach in the issued 2004 & 2008 NMFS Biological Opinions, SSSA, Water Quality Certification, the FERC License and Orders. Key examples of application of the approach include implementation of juvenile salmonid behavior and survival evaluations, calculation of NNI Funds, predator control programs, planning, designing, prototype testing, construction and biological testing as it relates to the Wanapum Future Unit Bypass (WFUB), design and current construction of the Priest Rapids Fish Bypass (PRFB), and implementation of the various hatchery and habitat programs.

Table 4 Agency, Tribal and Interested Stakeholder Communications and Consultation Related to the Wanapum Fish Passage and Interim Fish Passage Operation Plan.

Date	Communication Type	Topic	Entity Contacted
2/28/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam	NMFS
2/28/2014	Phone Conservation	Overview on details and issues related to Wanapum and fish passage.	USFWS - ES
3/3/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam	NMFS
3/4/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam/Emergency ESA Consultation	NMFS
3/4/2014	Phone Conservation	Coordination with Chelan PUD on fish passage issues at Rock Island and Wanapum Dam	Chelan PUD
3/5/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam/Emergency ESA Consultation	NMFS
3/6/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam	Confederated Tribes of the Colville Reservation – Senior Policy Representative
3/6/2014	Conference Call	PRCC/HCP representatives and a multitude of other regional stakeholders (50-75 individuals) on 3/06/2014. Provide overview of Wanapum Spillway, adult and juvenile passage and Hanford Reach.	PRCC ¹ , Wanapum Band, Bonneville Power Administration, CRITFC, Washington State Governors Office and ~25

¹ Members of the Priest Rapids Coordinating Committee include National Marine Fisheries Service, US Fish and Wildlife Service, Washington Department of Fish and Wildlife, Yakama Nation and Confederated Tribes of the Colville Reservation

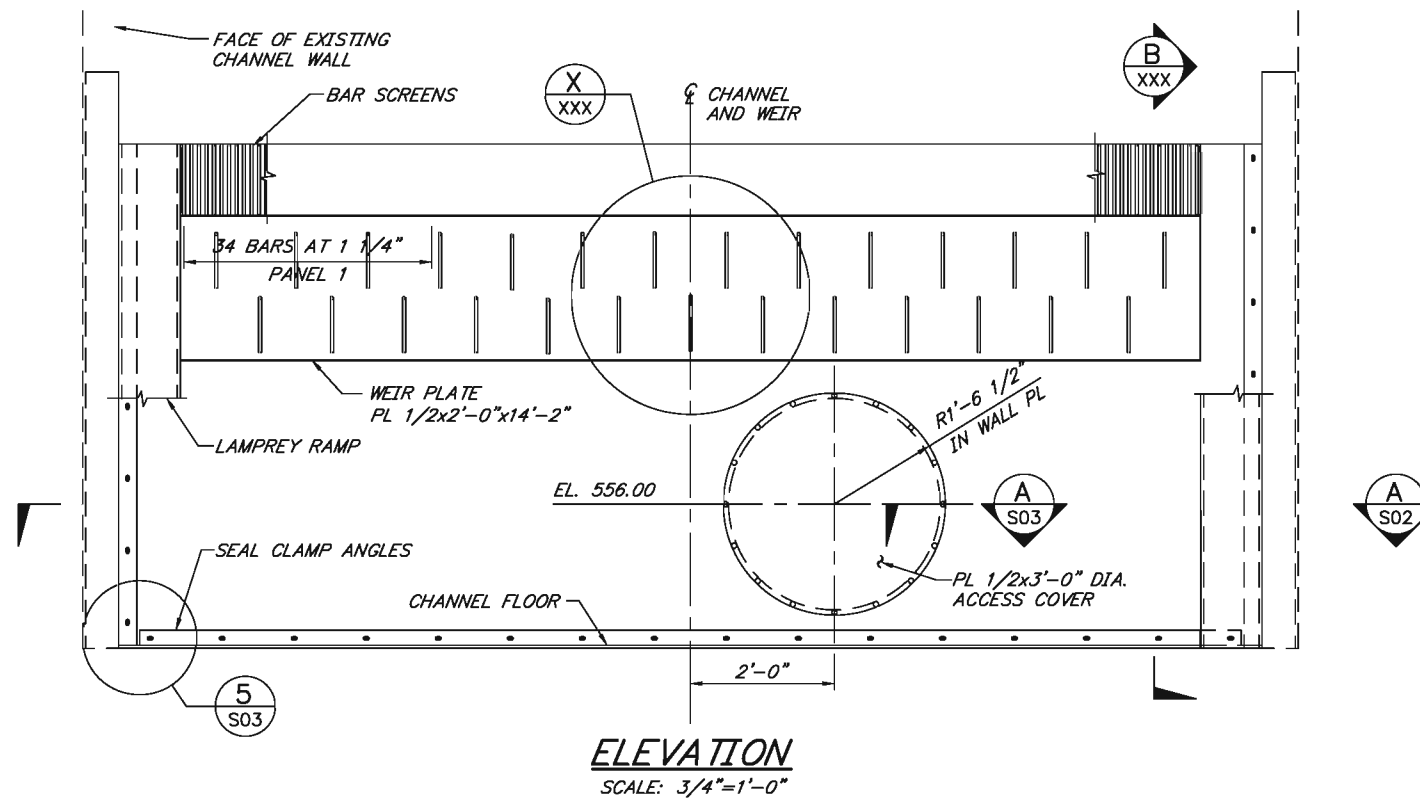
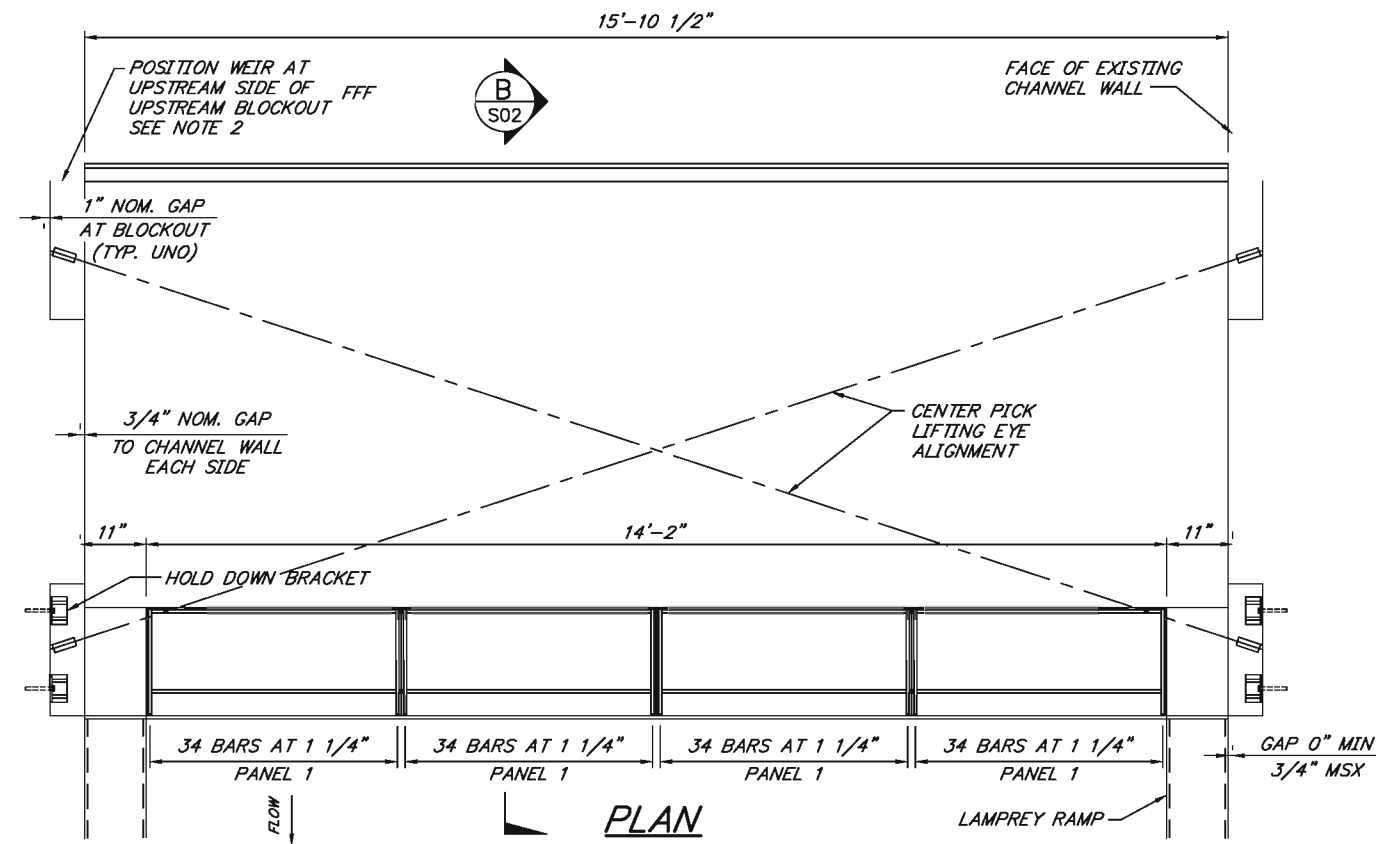
			regional stakeholders
3/6/2014	Conference call	Survival and behavior for the Priest Rapids reservoir and bypass and Wanapum fish passage.	PRCC
3/7/2014	Phone Conservation	Coordination with Chelan PUD on fish passage issues at Rock Island and Wanapum Dam	Chelan PUD
3/10/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam/Emergency ESA Consultation	NMFS
3/10/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam/Emergency ESA Consultation	Yakama Nation
3/10/2014	Phone Conservation	Coordination with Chelan PUD on fish passage issues at Rock Island and Wanapum Dam	Chelan PUD
3/10/2014	Phone Conservation	Coordination with Chelan PUD on fish passage issues at Rock Island and Wanapum Dam/Emergency ESA Consultation	Chelan PUD
3/11/2014	Meeting	Coordination with Chelan PUD on Fish passage issues at Rock Island and Wanapum Dam	Chelan PUD
3/12/2014	Conference Call	Coordination on Emergency ESA Consultation	NMFS & USFWS
3/13/2014	Conference Call	Coordination and process discussion on Emergency ESA Consultation	NMFS, USFWS and FERC-DHAC staff
3/14/2014	Conference Call	Overview of fish passage issues at Wanapum Dam/Emergency ESA Consultation	PRCC
3/14/2014	Phone Conservation	Overview of fish passage issues at Wanapum Dam/Emergency ESA Consultation	NMFS
3/14/2014	Emails	Recommendations and Comments related to Wanapum fish passage modifications	NMFS
3/17/2014	Email	Recommendations and Comments related to Wanapum fish passage modifications	USFWS
3/17/2014	Conference Call	Overview of fish passage issues at Wanapum Dam, Priest Rapids Off Ladder Trap and Haul	PRCC and Habitat Conservation Plan representatives, Fish Passage Center & CRITFC.
3/18/2014	Meeting	Overview of fish passage issues at Wanapum Dam, Priest Rapids Off Ladder Trap and Haul	Wanapum Band
3/18/2014	Conference Call	Overview of fish passage issues at Wanapum Dam, Priest Rapids Off Ladder Trap and Haul	Bonneville Power Administrative Representative
3/18/2014	Emails	Comments received on draft Interim Fish Passage Operation Plan	PRCC

Appendix A
Wanapum Fish Ladder Weir – Draft Sketches

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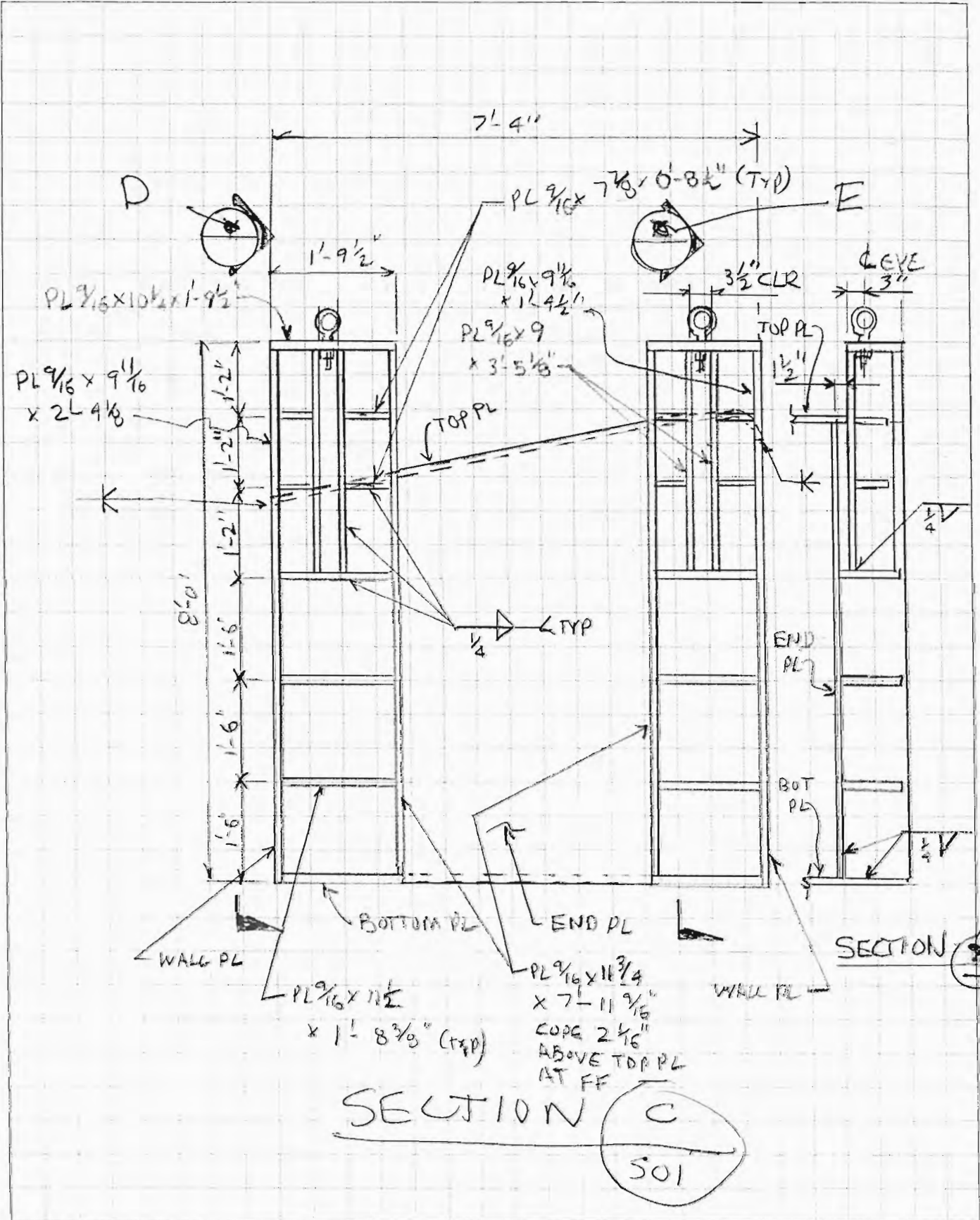


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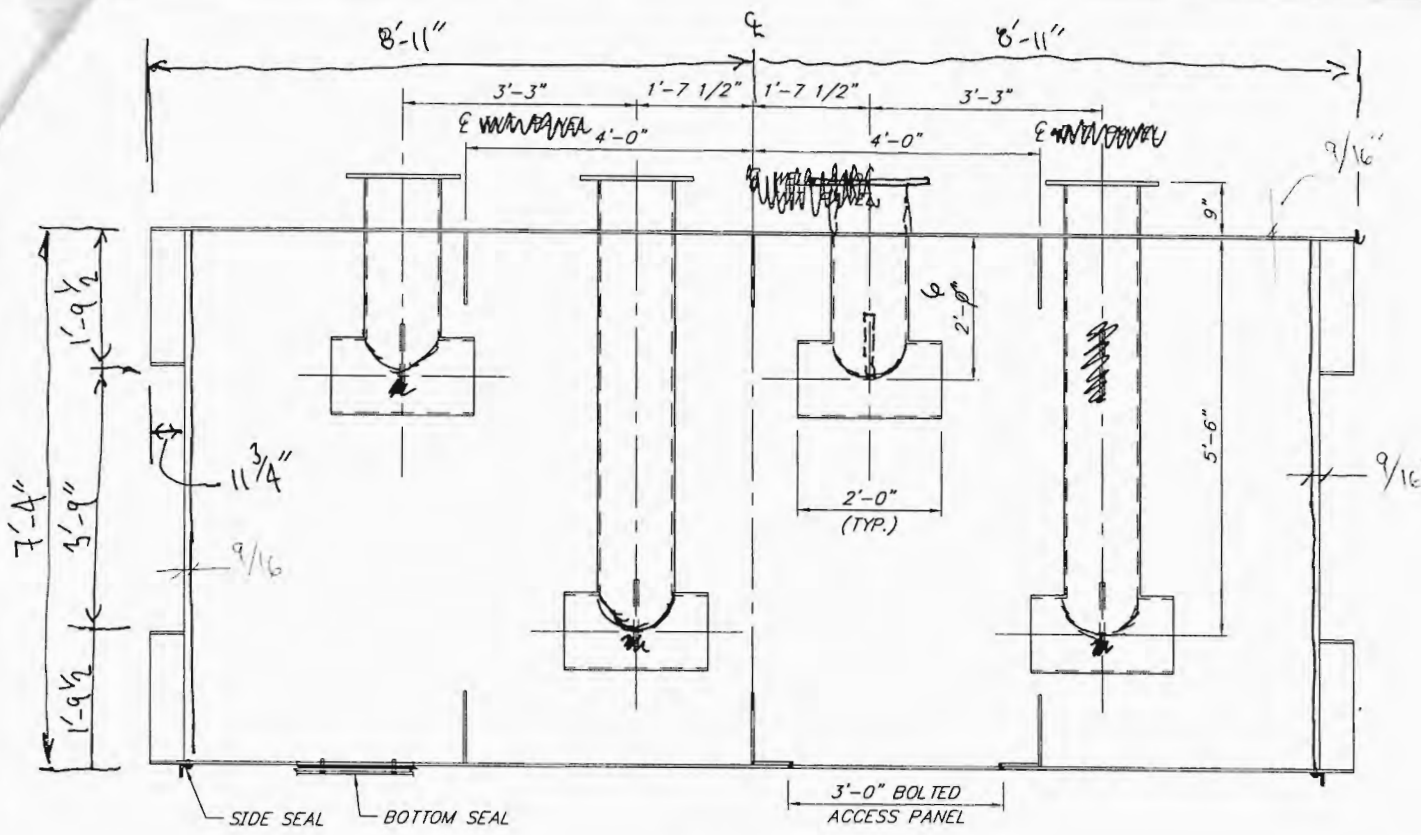


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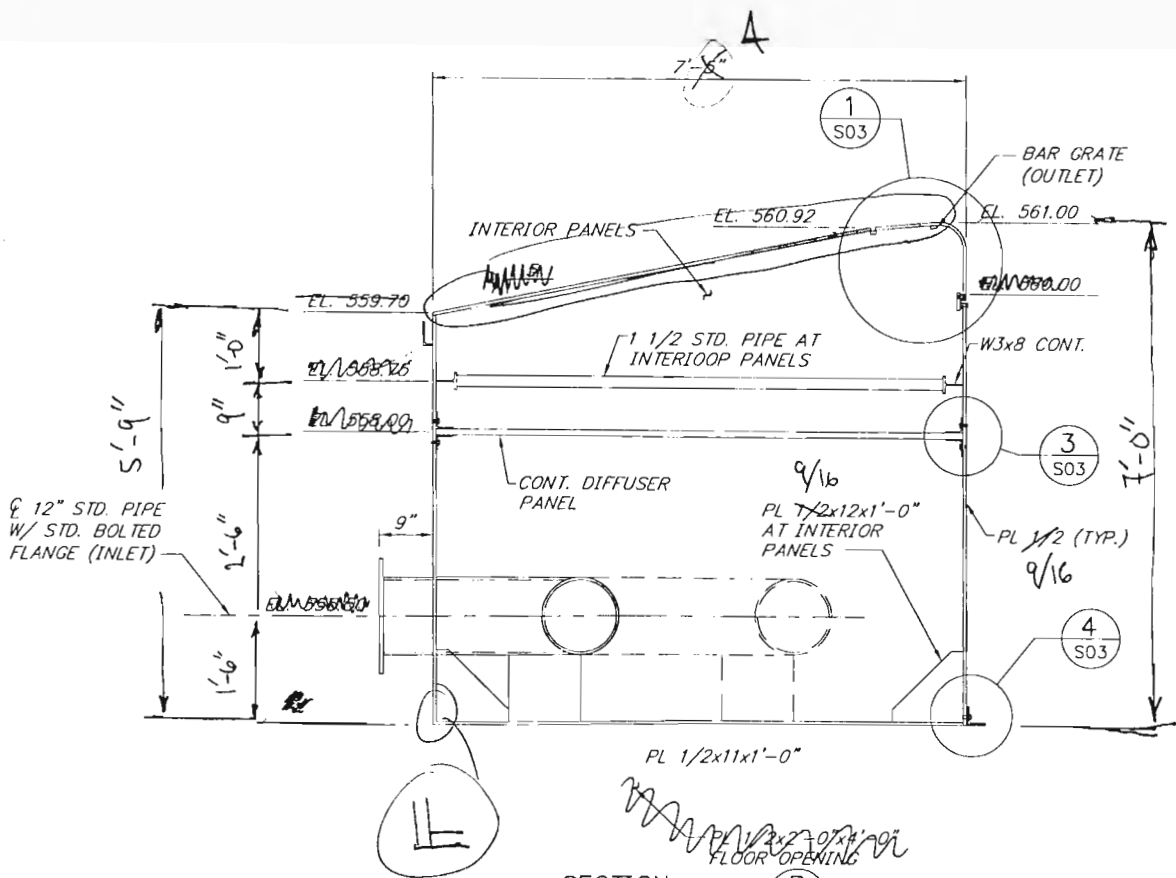
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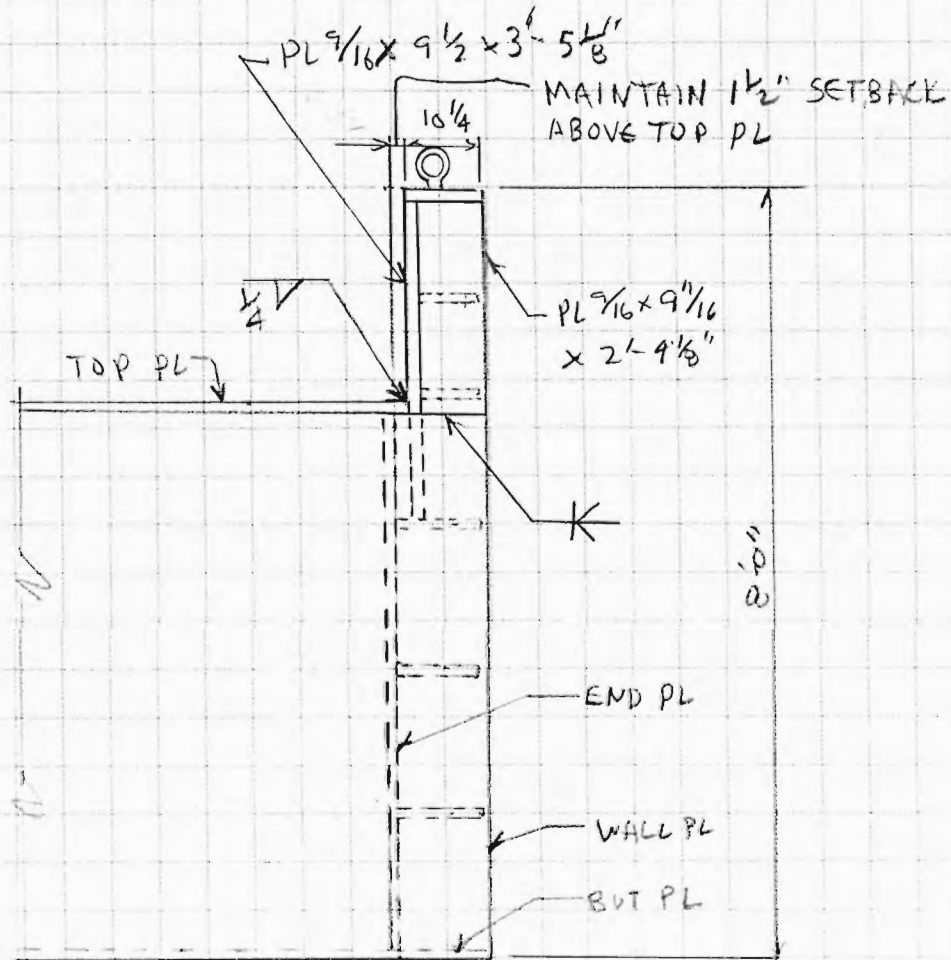
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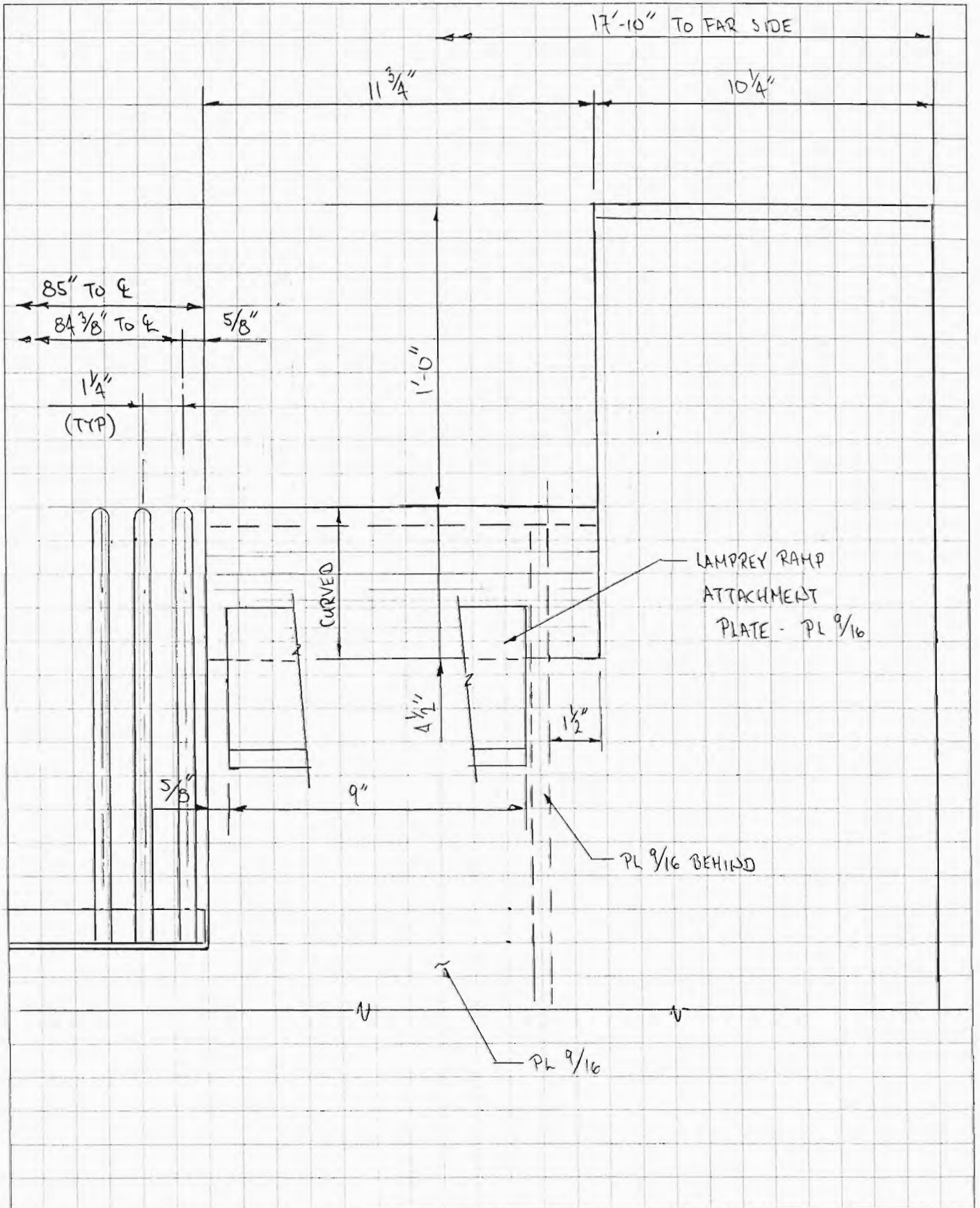
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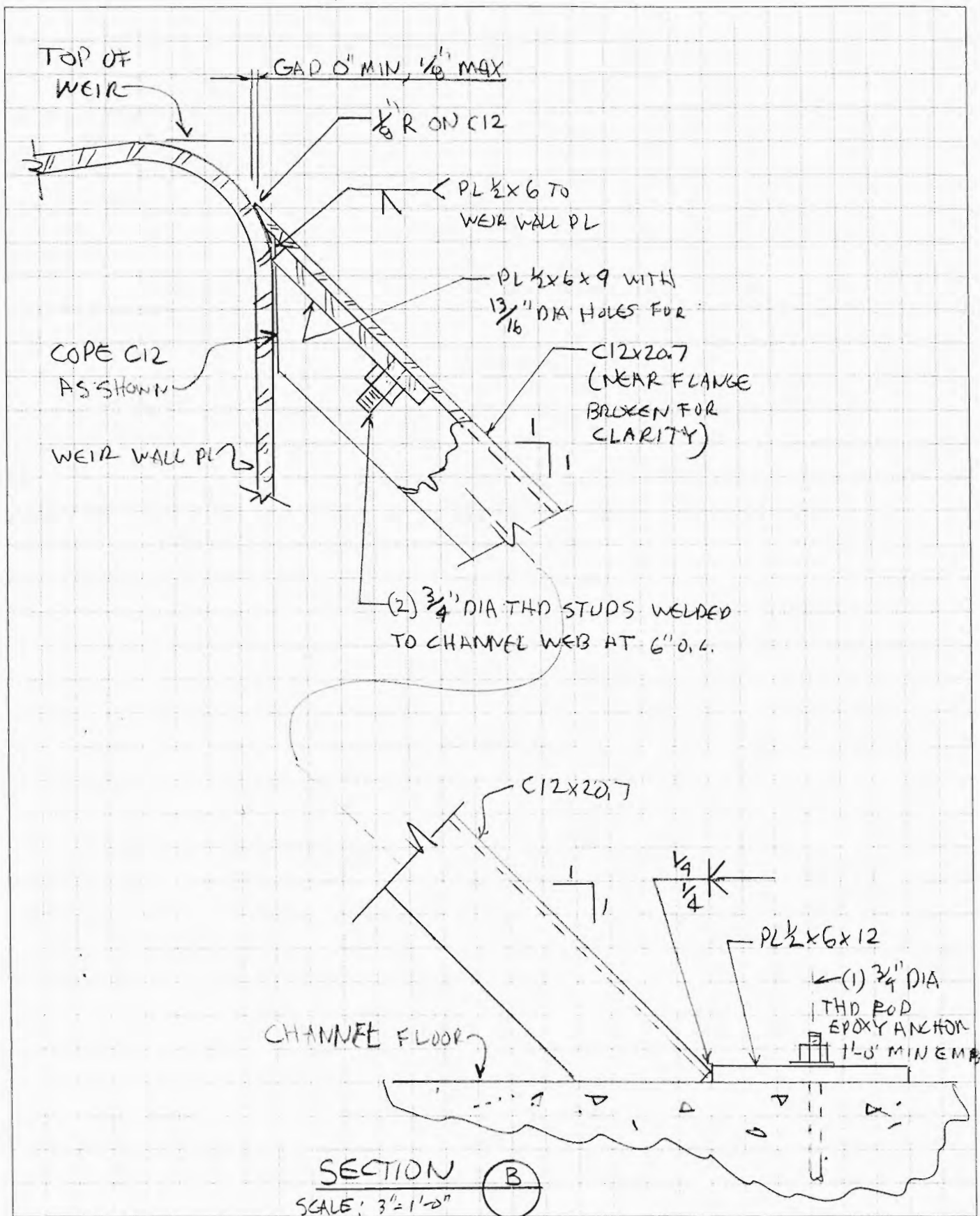


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Appendix B
Trap and Transport Protocol for Adult Salmon, Steelhead, and Migratory Bull Trout
Collected at the Priest Rapids Off Ladder Adult Fish Trap

**Contingency Plan for Trap and Transport of Adult Salmon,
Steelhead and Migratory Bull Trout from Priest Rapids Off-Ladder
Adult Fish Trap**

Public Utility District No. 2 of Grant County, Washington

March 2014

Executive Summary

This document provides notification of an emergency action by Public Utility District No. 2 of Grant County, Washington (Grant PUD) to provide alternative fish passage due to issues associated with the emergency drawdown of the Wanapum reservoir and the Rock Island tailrace. In the case that safe ladder passage cannot be restored at both Wanapum and Rock Island dams in time for the 2014 migration of adult anadromous salmon and steelhead, a contingency plan for trap and transport of adult salmonids, steelhead, and migratory bull trout from the Priest Rapids Dam Off-Ladder Adult Fish Trap (OLAFT) to a pre-determined point upstream has been developed. Procedures and protocols for this operation are included in this document.

Table of Contents

1.0 Priest Rapids Off-Ladder Adult Fish Trap and Transport 1

 1.1 Trap Modifications..... 1

 1.2 Run Timing..... 2

 1.3 OLAFT Operations 2

 1.4 Transport Protocols..... 2

 1.5 Fish Health and Disease..... 3

 1.6 Release Location..... 3

 1.7 Monitoring and Evaluation 4

 1.8 Road Construction and Travel Considerations 5

2.0 Security 5

3.0 Consultation 6

List of Figures

Figure 1 Decision matrix used to determine the necessity to implement collection and trap and haul measures from the Priest Rapids Dam Off-Ladder Adult Fish Trap to upstream release locations. 4

Figure 2 Travel time of Chinook trap and transport activities 2003 – 2013. 5

List of Tables

Table 1 Timeline for OLAFT Modifications 1

1.0 Priest Rapids Off-Ladder Adult Fish Trap and Transport - Overview

If the adult fish ladders are impassable at Wanapum Dam or Rock Island Dam, Public Utility District No. 2 of Grant County, Washington (Grant PUD) proposes an emergency measure to operate the Priest Rapids Dam Off-Ladder Adult Fish Trap (OLAFT) to collect adult migrating fish at Priest Rapids Dam starting April 15, 2014 and continuing until ladders at both dams are sufficiently operable, as determined by the members of the Priest Rapids Coordinating Committee (PRCC) which includes representation from Grant PUD, NMFS, U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Yakama Nation and Confederated Tribes of the Colville Reservation. The right and left bank fish ladders of Priest Rapids Dam will be shut down during this operation and fish passage will be diverted through the OLAFT via the in-ladder diversion weir at the left bank. All upstream migrating fish ascending the ladder will be diverted through the OLAFT collection facility into holding tanks designed to transport and release adult fish. The trap's steep pass denile entrance will be closed during non-trapping periods. Fish will then be trucked to a pre-determined location, either in the Wanapum or Rock Island reservoirs for release.

The procedures in this document are specific to trapping and transporting fish during the spring migration period of April 15 - June 1 (OLAFT Phase I). Should the fish ladders at Wanapum and Rock Island dams still be inoperable as of May 1, a revised trap and transport plan will be developed with specific procedures for transporting species migrating during the summer months (June 1 - August 31 – OLAFT Phase II). If the fish ladders at Wanapum and Rock Island dams remain inoperable as of August 1, a revised trap and transport plan will be developed with specific procedures for transporting species migrating during the fall (September 1 - November 30 – OLAFT Phase III). During these time periods, all efforts will be made to transport as many fish as possible. However, there may be times during the trapping effort when total fish numbers exceed the capacity to collect and transport the entire run.

1.1 Trap Modifications

Grant PUD and consultant engineers are designing modifications to the OLAFT that will facilitate water-to-water transfer of fish from the OLAFT facility to waiting transport tanks. A PVC transport chute is being designed and installed to direct fish from the OLAFT to the transport vehicles to eliminate the need to physically handle fish. Extension of the existing flume downstream of a false weir, transitioning the flume into pipe, and a pipe turn of approximately 150 degrees will allow for direct fish loading. A PIT-tag detection system located in the OLAFT will detect all tagged fish prior to being diverted. No fish anesthesia will be used for this work. A timeline for this activity is shown in Table 1 below. A second design is also being developed that would allow routing of fish via a wye and gate to an anesthetic tank. This second adaptation of the OLAFT will not be completed until June or July.

Table 1 **Timeline for OLAFT Modifications**

Date	Milestone
March 24, 2014	OLAFT modifications design complete
April 7, 2014	OLAFT modifications construction complete
April 14, 2014	OLAFT modifications installation complete

1.2 Run Timing

Based on historical run timing at Priest Rapids Dam, up to 1,500 fish could be encountered on a single day between April 15 - June 1, with a total of 10,000 to 15,000 spring Chinook, 100 to 150 steelhead, and less than 10 bull trout expected during this time frame. Other fish that may be encountered include these non-ESA listed species: chiselmouth, mountain whitefish, lamprey, suckers, northern pikeminnow and redbreast shiners. All encountered fish during this time period will be trapped and transported to the release location.

1.3 OLAFT Operations

The initial trap and transport activities will be conducted by two crews working 8 to 10-hour shifts each. Historical data indicates that adult migration occurs primarily during daylight hours. Trapping at the OLAFT would begin at 4 a.m. and the trap will be closed and cleared prior to 10 p.m. The Priest Rapids Dam left and right bank ladders will be closed at all times until ladder passage at Wanapum and Rock Island dams is restored. During OLAFT trap and transfer activities, a first-on, last-off turbine protocol will be utilized to provide attraction flow to the Priest Rapids left-bank ladder. Attraction flow to the right bank ladder will be minimized through utilization of inadvertent spill patterns. As the run increases or if unanticipated delays occur, additional shifts may be added and/or additional truck teams enlisted to assist with increasing fish trapping.

A minimum of two staff will operate the trap. Certified fish tank operators will transport and release the fish at a pre-determined location following fish transport protocols. The driver(s) will also assist with OLAFT operations while the truck is being filled. Trucks will be filled at the OLAFT or other locations if needed (e.g., Priest Rapids Hatchery wells, release locations, etc.).

A minimum of five trucks will be used for regular daily use, with a sixth truck available as a backup in the case of equipment failure. Truck specifications are currently being gathered to ensure that truck height, hatch size, and release mechanisms will be compatible with the OLAFT specifications. Grant PUD has currently secured six trucks, with other options being investigated.

1.4 Transport Protocols

The number of fish to be transported in each truck is proportionate to the size of tank, using a ratio of 0.5 lbs. of fish per gallon of water. This density is based on Washington Department of Fish and Wildlife (WDFW) recommendations for ESA-listed spring Chinook. For example, in a tank with 2,350 gallons of usable capacity and using an average spring Chinook weight of 14 lbs.¹, this tank will carry approximately 84 spring Chinook, unless the risks of delaying fish exceed the risks of transporting fish at a higher density. Staff will enumerate fish being loaded into the truck as they move down the diversion flume. Fish will not be held longer than eight hours, from the time the first fish is collected into the tank, through transfer, to the time they are released. Truck drivers will monitor dissolved oxygen, water temperature, and make periodic visual fish status inspections based on additional protocols attached to this document. Water quality parameters will be monitored during these operations.

All transport vehicles will carry a copy of any required permits.

¹ Data provided by WDFW using the observed mean weight of age-4 and age-5 Wenatchee spring Chinook salmon..

1.5 Fish Health and Disease

Fish are expected to be collected and released with as little handling as possible throughout the collection, transport, and release. A fish pathologist will review these protocols to ensure proper fish capture and handling techniques and transport conditions meet appropriate criteria.

1.6 Release Location

Implementation of the trap and transport operation, as well as selection of a release location, is dependent on a number of factors (Figure 1. If the PRCC determines ladder passage is sufficient at Rock Island and Wanapum dams, trapping and transporting would not occur, or cease, and fish will pass using existing and/or modified ladders (this is the preferred condition). If ladder passage is insufficient at Rock Island Dam, fish will be trapped and hauled to Kirby Billingsley Hydro Park above Rock Island Dam. If the PRCC determines ladder passage is sufficient at Rock Island Dam, but insufficient at Wanapum Dam then trapping and transporting to the Wanapum Reservoir would occur. Under this scenario, the initial release location will be at a location in the lower Wanapum Reservoir. If the lower Wanapum Reservoir location becomes unsuitable due to environmental conditions (temperature, turbidity, etc.) or unacceptable levels of fall back, fish would be released at an alternative location further upstream in the Wanapum Reservoir. Because of lower Wanapum and Rock Island reservoir levels, a flexible and adjustable release hose may be necessary to facilitate safe fish release at any locations in the Wanapum or Rock Island reservoirs.

Staff will be present at the selected release site to assist truck drivers with the fish release and will observe fish behavior as the fish are released into the reservoir, monitor water temperature, as well as protect the released fish from any illegal poaching. Staff will be equipped with ice and a vessel to hold any mortalities. Mortalities, if they occur, will be transferred to a freezer at Priest Rapids Hatchery and preserved for sampling by fish pathologists.

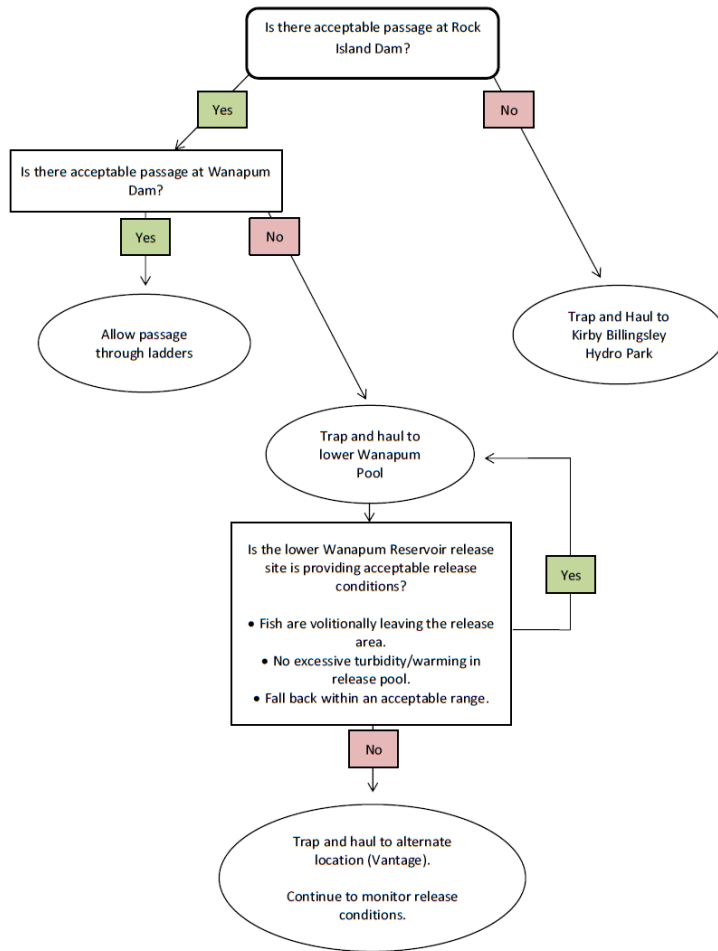


Figure 1 Decision matrix used to determine the necessity to implement collection and trap and haul measures from the Priest Rapids Dam Off-Ladder Adult Fish Trap to upstream release locations.

1.7 Monitoring and Evaluation

Migration delays at Priest Rapids Dam will be evaluated by monitoring the travel time of PIT-tagged fish from McNary Dam to OLAFT. The travel time of Chinook salmon during trap and transport activities will be compared with historical migration data (2003-2013) (Figure 2). If a ten-fish rolling average travel time exceeds seven days (the historical 75% exceedance travel time), managers will be notified and alternative trapping operations will be considered. Fallbacks at Rock Island Dam and Wanapum Dam (if PIT detection array are available) will be monitored in real-time using run-of-the-river PIT tags. If fallbacks exceed historical norms, resource managers will be alerted.

Additionally, drivers will use a standard checklist to report number of fish loaded, tank water level, travel time, dissolved oxygen levels, temperature, release time, and transport mortalities.

Grant PUD will provide an operations summary report at the conclusion of the project.

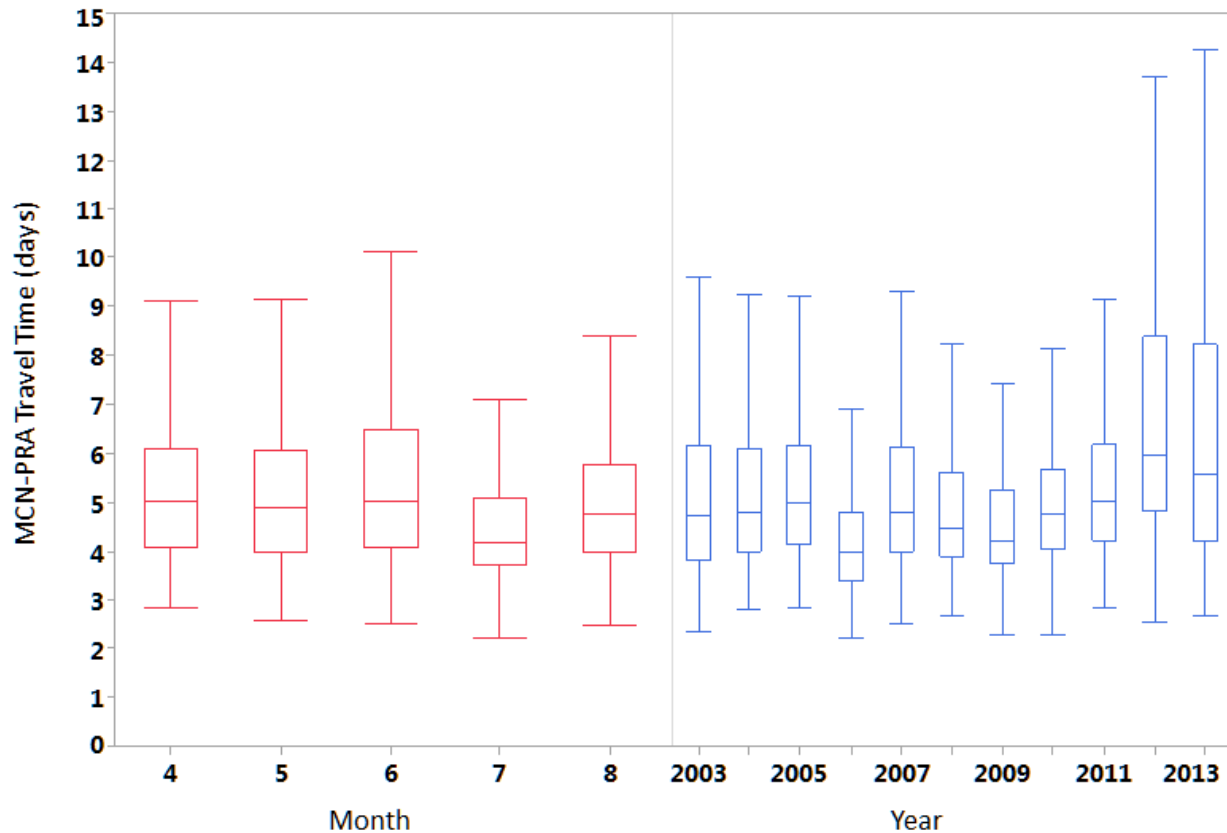


Figure 2 Travel time of Chinook trap and transport activities 2003 – 2013.

1.8 Road Construction and Travel Considerations

Grant PUD is working with Washington State Department of Transportation (WSDOT) to identify any potential travel closures or delays which could affect fish health. Construction of a roundabout on State Route (SR) 243 at the Road 24-S.W. intersection at Mattawa, WA is scheduled for April 15 - May 31. Because this project has the potential to delay fish transport during this time period, Grant PUD and WSDOT staff have determined a protocol to move fish transport trucks through the construct site unimpeded. Additional construction scheduled on I-90 just east of the Vantage Bridge is scheduled to begin May 21 and run through the end of June. This project replaces the asphalt driving lanes on I-90 for 11 miles from the Vantage Bridge to a mile west of George. WSDOT has stated that one lane of traffic will remain open during this construction, with the exception of paving at the Exit 137 off SR26 onto I-90, during which there will be short closures and traffic will be diverted across the Vantage Bridge and returned to I-90 in the eastbound lanes. OLAFT trap and transfer staff and WSDOT’s contractor crews will be in contact when fish trucks are scheduled to move through this project area.

2.0 Security

Public access to Priest Rapids Dam is strictly regulated. Arrangements will be made in advance for those participating in operation of the OLAFT. Unauthorized visitors without Grant PUD badges are not allowed on Grant PUD property. Anyone wishing to visit the site should contact Shannon Lowry, Grant PUD fisheries program supervisor, to make arrangements (slowry@gcpud.org; 509-289-9244).

3.0 Consultation

Any questions regarding this OLAFt trap and transport implementation plan should be directed to slowry@gcpud.org; 509-289-9244. OLAFt Trap and transport field crew lead is Dave Duvall (dduvall@gcpud.org; (509) 797-5171).

Appendix C
Agency and Tribal Representative Comments/Recommendations Summary Response
Table for Interim Fish Passage Operation Plan

Appendix Table C Agency and Tribal Representative Comments/Recommendations Summary Response Table for Interim Fish Passage Operation Plan

Submitting Entity	Agency Rep	Date Received	Comment ID	Agency Comment	Grant PUD Response
NOAA Fisheries	Bryan Nordlund & Scott Carlon	3/18/2014	Pump Screens	NOAA understands that due to the time constraints associated with this emergency action that fabrication and installation of compliant screens is not possible (paraphrase from phone conversation between M. Nicholls and B. Nordlund).	Grant PUD requests an emergency exemption of NOAA's screening criteria. The eight submersible pumps being installed at the Wanapum Dam left and right bank ladders do not have compliant screening and must be installed as quickly as possible.
NOAA Fisheries	Bryan Nordlund & Scott Carlon	3/18/2014	Wanapum Dam fish ladder and weir designs	NOAA requests to review the conceptual designs of the upper fish ladder weir and exit.	We have incorporated an adjustable weir plate to the fish ladder weir design to allow for adjustment of the amount of water that is pushed into the fish ladder vs. onto the forebay chute. Adjustments must be made at the beginning of the season and the plate bolted down once the desired flow split has been achieved. It is not meant to be adjustable during operation. grating from ½” clear to ¾” clear (1/2” bar @ 1.25” c to c) in order to maintain the desired velocity/flow coming out of the bar grating. Please note the lamprey passage plates on either side of the weir shown on page 1. Essentially these reduce the weir length by 2 feet. We have increased the opening of the weir grating from ½” clear to ¾” clear (1/2” bar @ 1.25” c to c) in order to maintain the desired velocity/flow coming out of the bar grating.
NOAA Fisheries	Bryan Nordlund & Scott Carlon	3/18/2014	Fish ladder adjustable weir plate	I'm not liking that protrusion into flow at the top of the plate in its up position.	Grant PUD envisions a reluctant jumper sliding back down the bar grate and catching a fin on the weir plate. We understand the concern. Can we reduce the vertical lift of the blocking plate by 1” so the blocking plate never rises above the tangent of the bar grating. We could also bull nose the top and bottom of the blocking plate further reducing sharp edges.
NOAA Fisheries	Bryan Nordlund	3/18/2014	Fish ladder adjustable	I would suggest either leaving it off initially, and adding only	Jacobs is comfortable with their analysis but (Grant PUD) still likes the idea of the adjustability. The

	& Scott Carlton		weir plate	if needed (i.e. flow doesn't split as Jacobs envisions) or installing something on the back side of the bar grate. Could the Bar grate be hinged such that you can open and retrofit a back of bar grate weir?	“sweet spot” according to Jacobs (consultant engineer) is blocking flow on the weir to 560.5’. If we reduce the vertical rise of the plate by 1” (as described above) we have 2” of adjustability above 560.5’ and 6” below 560.5’.
NOAA Fisheries	Bryan Nordlund & Scott Carlton	3/18/2014	Fish ladder adjustable weir plate	Please be sure to radius the top edge of the weir plate - no sharp edges anywhere in the migration path.	We will ensure all corners are radiused. We can also add silicone in areas that may be difficult to radius or to fill gaps.
U.S. Fish & Wildlife Service	Stephen Lewis	3/14/2014	Fish ladder modifications	How will this exit modification affect entrance velocities, if at all?	The flow curves of the auxiliary water system have been checked. We anticipate keeping the fish ladder entrance in compliance with current criteria, but this has not yet been tested at this forebay elevation.
U.S. Fish & Wildlife Service	Stephen Lewis	3/14/2014	Fish ladder modifications	There are many existing designs available for spiral chute exits. Is it possible for another manufacturer to replicate this same design in some manner since it's been in existence since the early 60s?	Grant PUD is currently working with Bryan Nordlund (NOAA Fisheries) on an acceptable chute design as a contingency (Phase II) to the current design (Phase I). Designs and fabrication for both the existing design and the contingency design will move forward in parallel. The Phase I design will be installed and monitored.
U.S. Fish & Wildlife Service	Stephen Lewis	3/14/2014	Fish ladder modifications	We discussed this a bit, but what is the coating of the ramp leading to the proposed PVC chute?	Chute will be made of Fiber Reinforced Plastic (FRP). This will provide a smooth surface. This material is used in the fabrication of current fish transport tanks.
U.S. Fish & Wildlife Services	Stephen Lewis	3/14/2014	Fish ladder modifications	Is there a contingency plan in the event more makeup water is needed to execute this modification?	The upper orifice walls are designed to flow 70 cfs through two orifices. We plan to block one of the orifices in the walls all together thus requiring about 35 cfs for a 12” drop to the next orifice wall. The lower weir walls are designed to flow 30 cfs through the lower orifices and 40 cfs over the weir. We should see a full orifice and some water over the weir at this location. If more water is needed down the fish ladder, there is the ability to adjust the weir plate.

U.S. Fish & Wildlife Service	Stephen Lewis	3/14/2014	Fish ladder modification	It's assumed this modification will function at forebay elevations ranging from 541'(3)-560'(58)?	The elevation of the fish ladder exit is 554'. Once the forebay reaches elevation 551' we will need to remove the weir and chute and the orifice blocking plates then continue to raise the forebay to 560-562'. This will require a short outage to remove the equipment.
U.S. Fish & Wildlife Service	Stephen Lewis	3/14/2014	Fish ladder modifications	The tailwater of Wanapum will likely fluctuate somewhat due to normal interim operations and Hanford Reach protection flows, so will these operations affect the functionality of this modification?	Our auxiliary water system forebay inlet has an elevation of 525'. The system will still be able to provide adequate attraction flow into the tailrace to attract fish to the entrance. The flow curves of the auxiliary water system have been checked. We should be able to keep fish ladder entrance in compliance with current criteria, but this has not yet been tested at this forebay elevation.
U.S. Fish & Wildlife Service	Stephen Lewis	3/14/2014	Fish ladder modifications	We encourage any rounding corners that may be possible during this modification to encourage lamprey passage in the event spillway repairs take longer than expected and extend into the lamprey passage timeframe.	We have designed lamprey ramps up and over the weir and will radius corners to reduce impacts to fish/lamprey passage.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Salmon & Steelhead	We understand that a "false weir" structure and accompanying ramp will be used at Wanapum Dam to convey fish upstream into the Wanapum forebay at its current water elevation ranging from 541 feet to 543 feet. The Plan does not clearly state whether or not a transition chute will be used during the initial installation to minimize injury to fish. We recommend installing this	Grant PUD is working with Bryan Nordlund (NOAA Fisheries) as the Priest Rapids Coordinating Committee technical expert on a two-phase approach. Wanapum Dam ladder Phase I is installation of the current flume system design that will have an exit elevation of 554'. With a forebay operating range of 541' to 545', the maximum vertical drop fish would encounter would be 13'. Grant PUD has also provided B. Nordlund with a report on adult salmon dropped from 35' with 100% survival. Based on observational data and in consultation with NOAA and USFWS, a decision will be made on whether to proceed with an alternative design (Wanapum Dam ladder Phase II).

				transition chute extension during initial installation rather than deferring this action further into the various fish passage timeframes. This chute should be designed to minimize the impact to fish below the 25 feet per second threshold as they enter the forebay at its current water elevation.	
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Salmon & Steelhead	The use of an average spring Chinook weight of 10 pounds may not portray an accurate calculation for the number of fish to be transported by truck and haul (120). We suggest an average weight of greater than 10 pounds to account for different collections of fish (i.e., jacks and adults).	Agreed. An average weight of 14 lbs. will be used for spring Chinook. If OLAF Phase II and Phase III must be implemented average weights will be determined in those implementation plans.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Salmon & Steelhead	Please consider the elimination/reduction of broodstock capture activities at the Priest Rapids Dam if/when trap and haul activities are initiated to minimize effects to salmonids.	Should trap and transport Phase II and III for the summer and fall migration be necessary, Grant PUD will work with the PRCC Hatchery Subcommittee to determine priorities related to activities at the OLAF.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Salmon & Steelhead	Please limit truck transport time to less than 8 hours to minimize effects to salmon and steelhead as well as other applicable fish species. We feel that a 3-4 hour timeframe is a much more reasonable timeframe. The use of more	Agreed. The intent is to limit the total time in the truck to no more than 8 hours, including travel time. Some trucks, particularly early in the run, will haul less than full loads.

				transport trucks will assist in this process.	
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Bull Trout	We recommend volitional passage as the primary method of conveying bull trout through the Project.	Grant PUD concurs.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Bull Trout	If trap and haul activities are initiated at the Project, we recommend separating bull trout to the extent possible from other salmonids to minimize the effect of crowding during these activities.	The OLAFT will not have the ability to automatically separate fish. Bull Trout will be transported and released to the identified release point.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Bull Trout	There are no apparent specific actions delineated for bull trout in the event these fish are encountered during trap and haul activities. As you are aware, bull trout occurrences at the Project are somewhat infrequent (approximately 10 on an annual basis). If bull trout are encountered during trap and haul activities and volitional passage is not possible due to the lack of functionality of the proposed modifications, we suggest the use of specialized aerated coolers as utilized in the Mid-Columbia Bull Trout Study to transport bull trout above the Rocky Island Dam.	The OLAFT will not have the ability to automatically separate fish. Bull Trout will be transported and released to the identified release point.
U.S. Fish & Wildlife	Stephen Lewis	3/18/2014	Bull Trout	If trap and haul activities are initiated and functional	The OLAFT will not have the ability to automatically separate fish. Bull Trout will be transported and

Service				improvements to the upstream fishways of Rock Island Dam are not complete, release bull trout above Rock Island Dam in conjunction with the USFWS.	released to the identified release point.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Bull Trout	Numerous bull trout occupy the upper Wanapum Reservoir within close proximity to the tailwater of the Rock Island Dam. For example, approximately 50-120 bull trout pass upstream through the fishways at Rock Island, primarily through the right bank fish ladder (RPE entrance). Please coordinate with Chelan PUD to ensure sufficient tailwater elevations that facilitate the operation of the adult upstream fishways (and their associated modifications) at the Rock Island Dam for bull trout as well as the other fish species contemplated herein.	Grant and Chelan PUDs are closely coordinating on ladder modifications and dam operations. Grant PUD, Chelan PUD, USBOR, BPA and USCOE are having daily coordination calls
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Bull Trout	Please note condition, length, and life history stage of all bull trout encountered during the proposed modifications and their associated implementation.	As part of this emergency action, crews will minimize handling on all listed species and weights and measurements will not be taken during the trap and transport operation.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Pacific Lamprey	While we appreciate Grant PUD's efforts to modify the false weir to convey adult lamprey upstream of	Please note the lamprey passage plates on either side of the weir shown on page 1 of the conceptual drawing. Essentially these reduce the weir length by 2 feet. We have increased the opening of the weir

				<p>Wanapum Dam, the likelihood of 100% passage is not guaranteed. We foresee lamprey ascending the weir and collecting on the transition ramp, and not necessarily sliding into the forebay at its current location. As such, we recommend Grant PUD personnel collect lamprey at this location and convey upstream depending on the functionality of the upstream fish passage modifications at the Rock Island Dam.</p>	<p>grating from 1/2" clear to 3/4" clear (1/2" bar @ 1.25" c to c) in order to maintain the desired velocity/flow coming out of the bar grating. Grant PUD will continue to consult with Priest Rapids Fish Forum on alternatives for lamprey passage.</p>
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Fish ladder modifications	<p>Due to the high level of uncertainty associated with lamprey passage at the Project at this time, we recommend Grant PUD begin the development of a trapping program to convey lamprey above the Rock Island Dam.</p>	<p>Grant PUD will continue working with the PRFF on alternatives for lamprey passage. Any necessary trap and transport of lamprey will be covered in the OLAFT trap and haul Phase II implementation plan (summer migrants).</p>
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	White Sturgeon	<p>We find no apparent provisions for the transport of white sturgeon above the Priest Rapids and Wanapum dams. Please consider the trap and haul of white sturgeon since the false weir will likely not convey white sturgeon above the Project.</p>	<p>At this time, Grant PUD has not incorporated a sturgeon transport process into the Interim Fish Operations Plan. If high concentrations of sturgeon would be observed trying to use the Priest Rapids OLAFT, Grant PUD will consult with the USFWS and Priest Rapids Fish Forum on potential trap and transport protocols. Grant PUD is focusing its efforts on facilitating passage for adult salmonid, steelhead, bull trout and Pacific lamprey, at the Wanapum Fishways, for the primary reason that a preliminary review of sturgeon passage data for Wanapum Dam over the past 5 years indicated that only 2 sturgeon were observed using the Wanapum fishways. If high</p>

					concentrations of sturgeon would be observed trying to use the Wanapum fishways, Grant PUD would consult with the USFWS and Priest Rapids Fish Forum on potential trap and transport protocols.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Monitoring & Evaluation	Please apply adaptive management when crafting measures designed to assess the effectiveness of the fishway modifications.	The Interim Fish Passage Operations Plan and the actions contained within it will follow the adaptive management principles included within the Priest Rapids Salmon and Steelhead Settlement Agreement.
U.S. Fish & Wildlife Service	Stephen Lewis	3/18/2014	Monitoring & Evaluation	We understand that adult migration delays will be assessed from McNary Dam to the Priest Rapids OLAFT. We also recommend assessments of migration delay from the Priest Rapids Dam to the Rock Island Dam through the use of PIT-tagged fish.	A PIT-tag array is being installed at the Wanapum ladder to assess passage. Real-time monitoring of returning PIT-tags will occur in addition to supplemental tagging of adults to assess passage through the project. A monitoring plan is included in the Priest Rapids Interim Fish Passage Operations Plan.
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 1	Completing the passage modifications at the left bank ladder and trap and haul provisions at PRD should be concurrent and equal priorities (I think that is what you are doing). In addition, work should proceed to allow for extension of the outlet ramps of the fishways at Wanapum to reduce the drop-distance to the forebay, although not at the risk of delaying the installation of the false weir for passage.	Grant PUD is working with Bryan Nordlund (NOAA Fisheries) as the Priest Rapids Coordinating Committee technical expert on a two-phase approach. Phase I is installation of the current flume system design that will have an exit elevation of 554'. With a forebay operating range of 541' to 545', the maximum vertical drop fish would encounter would be 13'. Grant PUD has also provided Bryan Nordlund with a report on adult salmon dropped from 35 feet with 100% survival. Based on observational data and in consultation with NOAA and USFWS, a decision will be made on whether to proceed with an alternative design.
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 2	When passage modifications at Wanapum and Rock Island Dams are complete, Trap and Haul operations should	After completion of the Wanapum Dam ladder modifications we will begin testing and evaluating passage at Wanapum Dam. Trap and haul operations will continue during ladder testing and until safe and

				continue, although at a reduced level until passage at the modified adult ladders is confirmed. This represents a risk averse strategy such that we don't have all our eggs in one basket (i.e. once adults pass PRD we have no way to re-capture them if the adult passage is lacking in efficiency at either Wanapum or Rock Island Dams).	acceptable passage is confirmed. To test ladder passage, fish ascending Priest Rapids Dam will be intercepted and PIT-tagged at OLAF. After tagging and recovery, fish will return to the Priest Rapids ladder using the existing OLAF exit. PIT detections will occur at the new Wanapum array. This process of intercepting, tagging, and releasing fish at OLAF is commonly used during runs to evaluate upstream migration.
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 3	Loading rates for trap and haul are based on an average of 10 lbs/fish for Chinook. I know the citation is the Repo. Study in the Wenatchee Basin, but 10 lbs/Chinook seems pretty light and may incorporate the average of the run and include jacks. The problem with this approach is that is highly likely that any individual truck may have varying proportion of jacks and over-loading is likely if the truck is predominately adults. Suggest that as trucks are loaded, observations occur to assess the jack/adult ratio and adjust the loading rate accordingly.	Agreed. An average weight of 14 lbs. will be used for spring Chinook. If OLAF Phase II and Phase III must be implemented average weights will be determined in those implementation plans.
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 4	The document cites an intent to limit the duration fish are in the truck to less than 8 hours, I concur. The amount of time the truck is at PRD should be	Agreed. The intent is to limit the total time in the truck to no more than 8 hours, including travel time. Some trucks, particularly early in the run, will haul less than full loads.

				determined (i.e. loading time) such that the loading time and transit time is less than 8 hours. The implications are that the trucks may not have a "full load" when they need to leave based on total truck time of 8 hours, so effort should continue to line up more trucks.	
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 5	Adult transport trucks appear to be equipped with O2, recirculation and meters. How will temps be regulated? Also, is "recirculation" continual replacement of water in the tank (i.e. flow through) or internal recirculation, which actually is aeration? For O2 I suggest that is liquid O2 and not compressed O2 as the latter effectively heats the water in the tank.	The OLAFT does not currently have the capability for single-pass truck recirculation. However, during the spring trapping period water will continuously be entering the tank as the fish are loaded and can be drained to maintain the appropriate water level in the tank. During the spring trapping period, fish will be held at low densities and river temperatures should remain low. Grant PUD will assess whether recirculation can be achieved at the OLAFT should implementation of summer and fall trap and transport is necessary.
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 6	Flume entry in to the transport trucks needs to be constructed such that the fish don't slam into the sides of the truck.	Agreed. Designs currently being considered are installation of a rubberized boot from the pipe to the truck hatch, such as those used on fish pumps.
Colville Confederated Tribes	Kirk Truscott	3/18/2014	Comment 7	Lamprey passage at the false weir may be poor and may be the capture at the PRD OLAFT, as such trapping efforts in the PRD ladder should be considered to aid in the trap and haul of lamprey.	Please note the lamprey passage plates on either side of the weir shown on page 1 of the conceptual drawing. Essentially these reduce the weir length by 2 feet. We have increased the opening of the weir grating from 1/2" clear to 3/4" clear (1/2" bar @ 1.25" c to c) in order to maintain the desired velocity/flow coming out of the bar grating. Grant PUD will continue to consult with PRFF on lamprey passage.
Colville	Kirk	3/18/2014	Comment 8	Discontinuing the trap and	A PIT-tag array is being installed at the Wanapum

Confederated Tribes	Truscott			haul to the minimum time necessary is important, as such, real-time monitoring of adult passage is necessary to assess the efficacy of the passage modifications. PIT tags in adults returning should help this assessment, however observations at the Wanapum Dam fishway outlets will also be needed to verify adults are actually passing the false weir (unless there are provisions to add PIT tag detections upstream of the false weir.	ladder to assess passage. Real-time monitoring of returning PIT-tags will occur in addition to supplemental tagging of adults to assess passage through the project.
Yakama Nation	Bob Rose	3/18/2014	Wanapum fish weir	This seems like a reasonable approach, primarily for the salmonids. I do not believe lamprey will do well, but will expand on that a bit later. My two concerns with the weir are (1) there does need to be a flume that reaches from the weir to the water surface to break the fall of the salmon, and (2) we have to protect the fish that are jumping over the weir so that they actually land on the flume, rather than falling into the water at the approximately 13 feet drop. I don't know the best way to attach the flume so that it does extend to the surface of the water - maybe attached to the dam or maybe attached to a	Grant PUD is working with Bryan Nordlund (NOAA Fisheries) as the Priest Rapids Coordinating Committee technical expert on a two-phase approach. Wanapum Dam ladder Phase I is installation of the current flume system design that will have an exit elevation of 554'. With a forebay operating range of 541' to 545', the maximum vertical drop fish would encounter would be 13'. Grant County PUD has also provided Bryan Nordlund with a report on adult salmon dropped from 35 feet with 100% survival. Based on observational data and in consultation with NOAA and USFWS, a decision will be made on whether to proceed with an alternative design (Wanapum Dam ladder Phase II).

				floating platform which in turn is attached to the dam. Either way, I don't think we want to find out in May that fish are not performing well due to the excessive drop - by then we are too late. With respect to fish jumping off from the weir, I wonder if the weir crest could be chevron shaped, with the point a bit lower in elevation, allowing some flow of water over this apex. This might attract the fish to this point and encourage them to swim - rather than jump over the weir. Obviously some sort of walls could also be put into place to prevent an "over-jump" and prevent the fish from landing away from the flume.	
Yakama Nation	Bob Rose	3/18/2014	Trap and Haul	This is an unfortunate, but necessary "Plan B". I believe your Plan is almost a "minimalist" approach and I will advocate that more trucks be available, less fish are crowded into each truck, and that there be a much reduced occupancy of fish in the trucks (i.e. maximum of 3-4 hours and not the prescribed 8 hours). I do not have any literature available to me to support my position, but I	The intent is to limit the total time in the truck to no more than 8 hours, including travel time.. Fish will be transported above Rock Island until satisfactory passage at the Rock Island ladders is confirmed. Fish size used for calculating transport capacity have been revised up to 14 lbs. At 14 lbs, using a tanker with 2,350 usable gallons, the capacity would be approximately 84 adults. The OLAF does not have the capability for single-pass truck recirculation. However, water will continuously be entering the tank as the fish are loaded. Excess water will be drained to maintain capacity.

				<p>question that an average of 10 lbs per fish is realistic, I do not know how you are going to moderate water temperatures - but suggest with a quicker turn-around time you may not need to be so concerned, and I believe the point is to minimize stress on the fish - not minimize the cost of the operation. I also believe that it is worth considering that once fish are collected, it may be best simply to transport above Rock Island - particularly until we are certain that the deniles being used at Rock Island are operating with high efficiency. I will also recommend that early in the season - we alternate days that we use Trap and Haul and the fishways. This provides us with experience in each operation while the numbers are still relatively low - a dress rehearsal if you will - rather than trying to get it right when we are quickly overwhelmed in fish. I think this also supports the general notion that we shouldn't put all the eggs in one basket - especially until we have evidence from the PIT tags that fish are making their way up the river</p>	
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				safely. Which, incidental the means for carrying on this PIT monitoring should be confirmed and better spelled out in this document. At least indicate that the PRCC will address this interest and determine, in real time, success of the actions being implemented.	
Yakama Nation	Bob Rose	3/18/2014	N/A	Understanding the difficult situation we are in, and given the above, passage through the fishways is the preferred option and every effort must be taken to ensure that passage through the fishways is achieved. I am not in favor of shutting off passage in the fishways in any condition unless absolutely necessary. I encourage Grant (and Chelan PUD) to work closely with Bonneville Power Administration to ensure appropriate river operations such that the Wanapum reservoir can be maintained to a level to allow for optimal performance at the Rock Island denile structures currently being implemented at that location. I would encourage some language in the document that recognizes the need for this coordination	Comment noted. The primary objective is to have fishways at Wanapum and Rock Island operational as soon as possible. Coordination between the PUDs and BPA is ongoing and will continue. Grant PUD, Chelan PUD BPA, USBOR and USCOE are holding daily river coordination calls to ensure that river operations through the Mid-Columbia are coordinated.

				that will help Grant meet its goal to minimize negative effects on these fish runs.	
Yakama Nation	Bob Rose	3/18/2014	Lamprey passage	I wish I could be more encouraged that lamprey will pass the Wanapum (and Rock Island) fishways efficiently, but I am not. We now understand that when the OLOFT is being used, lamprey passage efficiency suffers at the Priest Rapids left bank ladder. If we are to use a Trap and Haul strategy, this will create a negative effect on this portion of the run. At Wanapum Dam, I do not know if there is a precedent to understand how lamprey will behave when faced with a false weir - and a flume. My guess is that they will hold at the top of the weir - and then what? If this is the case - it is worth considering a night time strategy to collect lamprey at the top of the weir - when salmonids are not typically using the fish way at levels used in the day time. It may also be worth considering a "false bottom" at the head of the flume with a highly perforated plate forming the surface (water can flow underneath this plate) in which	Please note the lamprey passage plates on either side of the weir shown on page 1 of the conceptual drawing. Essentially these reduce the weir length by 2 feet. We have increased the opening of the weir grating from 1/2" clear to 3/4" clear (1/2" bar @ 1.25" c to c) in order to maintain the desired velocity/flow coming out of the bar grating. Grant PUD will continue to consult with Priest Rapids Fish Forum on alternatives for lamprey passage.

				the lamprey are prevented from sucking onto the flume - for at least some distance until their velocity is such that they will not be able to attach to the flume. I will also note that past research indicates that new lamprey passage structures do not typically operate very well the first year - likely due to lack of "seasoning" by the river. This same effect is probable at the Rock Island lamprey passage structures being constructed aside of the deniles.	
Yakama Nation	Bob Rose	3/18/2014	Lamprey passage	This discussion may be better suited to the PRFF, but I will note here that due to the very high level of uncertainty of lamprey passage that might occur both at Priest Rapids and Wanapum, I will strongly advocate that Grant begin preparing to establish a very aggressive trapping program at Priest Rapids Dam such that these fish can be transported above Rock Island Dam. This strategy, along with fishway passage seems to me the most prudent way to ensure the least impact to this tribally important resource.	Comment noted.
Washington Department	Patrick Verhey	3/18/2014	N/A	In general the Draft Emergency Action-	Grant PUD and Chelan PUD have been coordinating weekly on fish passage issues at both Wanapum and

of Fish & Wildlife				<p>Modification of Adult Fish Ladders at Wanapum Dam and Contingency Trapping and Transport of Adult Salmon, Steelhead and Migratory Bull Trout From Priest Rapids Off-Ladder Adult Fish Trap (Plan) is an excellent starting point. It is apparent much thought has gone into the development of the Plan. However, this document only addresses fish passage at Wanapum Dam. The Plan should be developed hand in hand with the Rock Island Fish passage plan. If fish passage at Rock Island Dam is not adequate, fish passage at Wanapum is moot. We are left with relying heavily on trap and haul operations. The Hourly Coordination of mid-Columbia River dams should be implemented and mentioned in the document to ensure fish passage is a high priority and the proposed denil structures at Rock Island Dam operate efficiently to pass fish.</p>	<p>Rock Island Dams. In addition, weekly coordination/briefing calls have been setup among Grant, Chelan, the Priest Rapids Coordinating Committee and HCP committees.</p>
Washington Department of Fish & Wildlife	Patrick Verhey	3/18/2014	N/A	<p>We recommend, once operational, running fishways and the trap and haul operation concurrently until adult fish passage at the fishways is evaluated.</p>	<p>Fish passage the adult ladders will be evaluated. If the PRCC determines that passage is not sufficient at either of the ladders, the trap and transport operation will be implemented. A decision-tree is included in the OLAFT Trap and Transport Phase I Implementation Plan.</p>

Washington Department of Fish & Wildlife	Patrick Verhey	3/18/2014	N/A	We anticipate the fish health protocols to inform the trap and haul operation, specifically the duration of time fish are in the trucks and water treatments to reduce descaling and stress on fish.	WDFW fish health pathologist is reviewing the OLAFT Trap and Transport Phase I Implementation Plan protocols and procedures.
Washington Department of Fish & Wildlife	Patrick Verhey	3/18/2014	N/A	We recommend using the average of 14lbs/ per fish, which is the average of 4 and 5 year old Wenatchee River spring Chinook for estimating the number of fish transport trucks needed. If a tanker with 2,350 usable gallons is utilized, @ 14 lbs per fish, the capacity would be about 84 adults (calculated at 83.9) If we have a higher than anticipated age-3 component then more fish per truck could be loaded and not exceed the 0.5 fish per gallon of water.	Agreed. An average weight of 14 lbs. will be used for spring Chinook. If OLAFT Phase II and Phase III must be implemented average weights will be determined in those implementation plans.
Washington Department of Fish & Wildlife	Patrick Verhey	3/18/2014	N/A	One other consideration, is that for transport times, early in the season there will be few fish moving which, under a 3-4 hour turnaround time means you may only be hauling a couple of fish each load. As the fish runs build, the turnaround time will decrease naturally because it will take less time trapping to reach capacity of each vehicle. Additionally, the larger the	Grant PUD is working to secure a variety of trucks appropriate for adult fish transfer, ranging in size from approximately 600 gallons to 2500 gallons. The transport schedule will assure the total holding time, including transport, for fish does not exceed 8 hours.

				<p>volume of a truck, the longer it will take to reach capacity during low fish abundance periods, whereas if the smaller volume tankers were utilized earlier on then it would require less trap time to reach densities.</p>	
Washington Department of Fish & Wildlife	Patrick Verhey	3/18/2014	N/A	<p>The Plan should include a discussion on how PIT tag data will be used to evaluate the passage efficiency of the fishways.</p>	<p>A monitoring and evaluation plan is included in the OLAFT Trap and Transportation Implementation plans as well as the overall Priest Rapids Project Interim Fish Passage Operations Plan.</p>
Washington Department of Fish & Wildlife	Patrick Verhey	3/18/2014	N/A	<p>While trapping lamprey in the fishway is preferable to passing lamprey through the ladder, if lamprey do pass via the false weir/flume, a portion of the flume should be constructed of a material, like perforated plating, that does not allow lamprey to easily attach. Lamprey attaching to the exit flume would likely result in delay of passage and injury. Also, lamprey may elect not to use the fishway due to the presence of scent or for the same yet to be determined reason why they don't seem to pass the OLAFT entrance readily. Another potential solution may be to trap lamprey as they exit the weir and transport them above Rock Island Dam, thereby</p>	<p>Please note the lamprey passage plates on either side of the weir shown on page 1 of the conceptual drawing. Essentially these reduce the weir length by 2 feet. We have increased the opening of the weir grating from 1/2" clear to 3/4" clear (1/2" bar @ 1.25" c to c) in order to maintain the desired velocity/flow coming out of the bar grating. Grant PUD will continue to consult with Priest Rapids Fish Forum on alternatives for lamprey passage.</p>

				bypassing the denils at Rock Island Dam. Lamprey trapped in the fishways should also be transported above Rock Island Dam.	
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Appendix D
Received Agency and Tribal Representative Comments and Recommendation
under ESA Consultation for Wanapum Fishway Modifications
and Trap and Transport Protocols

From: [Scott Carlon - NOAA Federal](#)
To: [Tom Dresser](#)
Cc: [Bryan Nordlund - NOAA Federal](#); kirk.truscott@colvilletribes.com; [Bob Rose](#); [Jim Craig](#); [Curtis Dotson](#); [Jeff Korth](#); carmen.andonaegui@dfw.wa.gov; [Patrick Verhey](#); [Alyssa Buck](#); [Carl Merkle](#); [Debbie Williams](#); [Melissa Rohr](#); [Dennis Rohr](#); [Steve Lewis](#); [Aaron Beavers - NOAA Federal](#)
Subject: Re: ATTENTION: -----Fwd: draft of emergency action fish passage document
Date: Tuesday, March 18, 2014 6:37:04 PM

Tom:

The National Marine Fisheries Service greatly appreciates the work Grant PUD has accomplished thus far on drafting an emergency action plan for fish passage at the Priest Rapids and Wanapum Dams. We also appreciate that Grant PUD has engaged our fish passage engineers and the Priest Rapids Coordinating Committee in development of the subject plan and design of temporary fish passage facilities. It is our understanding that Grant PUD will submit the draft action plan to the Federal Energy Regulatory Commission (Commission) for their final review. Per the Endangered Species Act (ESA) emergency consultation procedures, we consider this plan and the following recommendations to be part of the administrative record for the ongoing ESA section 7 emergency consultation with the Commission on endangered Upper Columbia River spring-run Chinook salmon and threatened Upper Columbia River steelhead.

We think the plan is well written and is a good approach to providing temporary fish passage under the emergency conditions Grant PUD is working with. However, we do have the following recommendations.

Trap and Haul at Priest Rapids Dam

- While we understand that the designs for modifying the off ladder adult fish trap (OLAFT) are preliminary, and expect that you will continue to engage our fish passage engineers and the PRCC to the best of your ability as designs move forward, we suggest that you take care not to drop fish in the transport tanks such that they are slammed into the tank walls. The current design suggests that this may happen.
- We recommend that you limit the amount of time that fish are held in the transport tanks to 4 hours, i.e., 4 hours from the time the last fish is loaded to offloading upstream.
- The use of an average weight of 10 pounds for adult spring Chinook may be too small for calculation of load densities. We suggest using an average weight of 14 pounds for calculating load density.
- We recommend that, if possible, collection of brood stock or test fish for research purposes be eliminated or limited as much as possible at the OLAFT. We are concerned that activities around the OLAFT could slow or stop adult fish from entering the trap and create significant delay.

Wanapum Fish Ladders:

- As previously mention, we expect you to continue to engage our fish passage engineers and the PRCC to the best of your ability as designs and plans for modifying the Wanapum Dam fish ladders move forward. We prefer that Grant PUD, as soon as practicable, design and install an extension to the flume leading from the ladder exits down to the Wanapum forebay. As currently designed, a free fall of 9 to 11 feet could result in injury. We suggest that the flume extend to a point where fish are limited to a maximum free fall of 4 feet. This flume should also be designed to handle large numbers of fish as could be expected during the sockeye salmon run.
- As a conservative approach, we recommend that the OLAFT remain modifications remain in place until we are certain that the Wanapum fish ladder modifications are working as designed, and suggest that the trap and haul be conducted on alternate days until we know that fish are safely passing Wanapum Dam and Rock Island Dam.
- When it is established that the fish ladders at Wanapum and Rock Island Dams are functioning properly, the trap and haul effort can cease and at that point all fish ladders should remain open.

Monitoring and Evaluation:

- Lastly, we urge Grant PUD to include use of PIT tag data to evaluate the passage efficiency of the trap and haul and fishway modifications.

Again, we appreciate the tremendous effort and work Grant PUD has put into the emergency plan and we look forward to working with you as you work through the emergency action.

Scott

On Mon, Mar 17, 2014 at 6:01 PM, <Drohr5@aol.com> wrote:

PRCC:

Please see the attached draft document received from Tom. He is requesting you look it over and let him know if you have any recommendations for the draft.

As you are aware, there is a timing issue here with final preparation and deliverance to FERC. Accordingly, any recommendations you may have need to be sent to Tom by COB on Tuesday/tomorrow. Moreover, as Tom has stated below, and from me as well, your patience and understanding are appreciated.

Please call with any questions you may have. Thank you, everyone.

--Denny

From: TDresse@gcpud.org

To: drohr5@aol.com

Sent: 3/17/2014 5:38:53 P.M. Pacific Daylight Time

Subj: draft of emergency action fish passage document

Denny;

Please find attached the draft of emergency action fish passage document. I would like 1 last review by the PRCC and seek recommendations they may have. I am looking for their recommendations by COB Tuesday.

Thanks – please thank them for their patience and understanding

Tom Dresser

Fish, Wildlife & Water Quality Manager

Public Utility District No. 2 of Grant County, Washington

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From: [Lewis, Stephen](#)
To: [Scott Carlon - NOAA Federal](#); [Bryan Nordlund \(bryan.nordlund@noaa.gov\)](#); [kirk.truscott@colvilletribes.com](#); [Bob Rose](#); [Jim Craig](#); [Tom Dresser](#); [Curtis Dotson](#); [Korth, Jeff \(DFW\)](#); [carmen.andonaegui@dfw.wa.gov](#); [Verhey, Patrick M \(DFW\)](#); [Alyssa Buck](#); [Carl Merkle](#); [Debbie Williams](#); [melissarohr76@gmail.com](#); [Drohr5@aol.com](#)
Cc: [Jessica Gonzales](#); [Jeff Krupka](#)
Subject: Re: ATTENTION: -----Fwd: draft of emergency action fish passage document
Date: Tuesday, March 18, 2014 5:00:18 PM

PRCC Members:

Below you will find the USFWS' comments on the Grant PUD *Emergency Action Fish Passage Plan (Plan)* for the Priest Rapids Hydroelectric Project (Project) (FERC No. 2149). Due to the March 18, 2014 deadline for comments on this Plan, we reserve the right to augment these comments as the proposed upstream fishway modifications are implemented, evaluated, and adapted to facilitate upstream fish passage at the Project. These comments are a collective effort from PRCC representative Jim Craig and myself for the upstream passage of salmon & steelhead, bull trout, Pacific lamprey, white sturgeon, and any other applicable fish species through the Priest Rapids and Wanapum dams.

Salmon & Steelhead:

- We understand that a "false weir" structure and accompanying ramp will be used at Wanapum Dam to convey fish upstream into the Wanapum forebay at its current water elevation ranging from 541 feet to 543 feet. The Plan does not clearly state whether or not a transition chute will be used during the initial installation to minimize injury to fish. We recommend installing this transition chute extension during initial installation rather than deferring this action further into the various fish passage timeframes. This chute should be designed to minimize the impact to fish below the 25 feet per second threshold as they enter the forebay at its current water elevation.
- The use of an average spring Chinook weight of 10 pounds may not portray an accurate calculation for the number of fish to be transported by truck and haul (120). We suggest an average weight of greater than 10 pounds to account for different collections of fish (i.e., jacks and adults).
- Please consider the elimination/reduction of broodstock capture activities at the Priest Rapids Dam if/when trap and haul activities are initiated to minimize effects to salmonids.
- Please limit truck transport time to less than 8 hours to minimize effects to salmon and steelhead as well as other applicable fish species. We feel that a 3-4 hour timeframe is a much more reasonable timeframe. The use of more transport trucks will assist in this process.

Bull Trout:

- We recommend volitional passage as the primary method of conveying bull trout through the Project.
- If trap and haul activities are initiated at the Project, we recommend separating bull trout to the extent possible from other salmonids to minimize the effect of crowding during these activities.
- There are no apparent specific actions delineated for bull trout in the event these fish are encountered during trap and haul activities. As you are aware, bull trout occurrences at the Project are somewhat infrequent (approximately 10 on an annual basis). If bull trout are encountered during trap and haul

activities and volitional passage is not possible due to the lack of functionality of the proposed modifications, we suggest the use of specialized aerated coolers as utilized in the *Mid-Columbia Bull Trout Study* to transport bull trout above the Rocky Island Dam.

- If trap and haul activities are initiated and functional improvements to the upstream fishways of Rock Island Dam are not complete, release bull trout above Rock Island Dam in conjunction with the USFWS.
- Numerous bull trout occupy the upper Wanapum Reservoir within close proximity to the tailwater of the Rock Island Dam. For example, approximately 50-120 bull trout pass upstream through the fishways at Rock Island, primarily through the right bank fish ladder (RPE entrance). Please coordinate with Chelan PUD to ensure sufficient tailwater elevations that facilitate the operation of the adult upstream fishways (and their associated modifications) at the Rock Island Dam for bull trout as well as the other fish species contemplated herein.
- Please note condition, length, and life history stage of all bull trout encountered during the proposed modifications and their associated implementation.

Pacific Lamprey:

- While we appreciate Grant PUD's efforts to modify the false weir to convey adult lamprey upstream of Wanapum Dam, the likelihood of 100% passage is not guaranteed. We foresee lamprey ascending the weir and collecting on the transition ramp, and not necessarily sliding into the forebay at its current location. As such, we recommend Grant PUD personnel collect lamprey at this location and convey upstream depending on the functionality of the upstream fish passage modifications at the Rock Island Dam.
- Due to the high level of uncertainty associated with lamprey passage at the Project at this time, we recommend Grant PUD begin the development of a trapping program to convey lamprey above the Rock Island Dam.

White Sturgeon:

- We find no apparent provisions for the transport of white sturgeon above the Priest Rapids and Wanapum dams. Please consider the trap and haul of white sturgeon since the false weir will likely not convey white sturgeon above the Project.

Monitoring & Evaluation:

- Please apply adaptive management when crafting measures designed to assess the effectiveness of the fishway modifications.
- We understand that adult migration delays will be assessed from McNary Dam to the Priest Rapids OLAFT. We also recommend assessments of migration delay from the Priest Rapids Dam to the Rock Island Dam through the use of PIT-tagged fish.

The USFWS appreciates the opportunity to provide comments on the subject Plan. Please feel free to contact us if you require clarification on these comments. While these comments apply to a wide range of fish species, please realize that the USFWS (Central Washington Field Office) will issue its response with regard to the ESA Section 7 emergency consultation process for bull trout due to time constraints at a later date.

S-

On Tue, Mar 18, 2014 at 2:09 PM, Scott Carlon - NOAA Federal
<scott.carlon@noaa.gov> wrote:

----- Forwarded message -----

From: <Drohr5@aol.com>

Date: Mon, Mar 17, 2014 at 6:01 PM

Subject: ATTENTION: -----Fwd: draft of emergency action fish passage document

To: Scott.Carlon@noaa.gov, Bryan.Nordlund@noaa.gov,
kirk.truscott@colvilletribes.com, rosb@yakamafish-nsn.gov, Jim_L_Craig@fws.gov,
TDresse@gcpud.org, cdotson@gcpud.org, jeff.korth@dfw.wa.gov,
carmen.andonaegui@dfw.wa.gov, patrick.verhey@dfw.wa.gov, Abuck1@gcpud.org,
CarlMerkle@ctuir.com, DWilli1@gcpud.org, melissarohr76@gmail.com

Cc: drohr5@aol.com

PRCC:

Please see the attached draft document received from Tom. He is requesting you look it over and let him know if you have any recommendations for the draft.

As you are aware, there is a timing issue here with final preparation and deliverance to FERC. Accordingly, any recommendations you may have need to be sent to Tom by COB on Tuesday/tomorrow. Moreover, as Tom has stated below, and from me as well, your patience and understanding are appreciated.

Please call with any questions you may have. Thank you, everyone.

--Denny

From: TDresse@gcpud.org

To: drohr5@aol.com

Sent: 3/17/2014 5:38:53 P.M. Pacific Daylight Time

Subj: draft of emergency action fish passage document

Denny;

Please find attached the draft of emergency action fish passage document. I would like 1 last review by the PRCC and seek recommendations they may have. I am looking for their recommendations by COB Tuesday.

Thanks – please thank them for their patience and understanding

Tom Dresser

Fish, Wildlife & Water Quality Manager
Public Utility District No. 2 of Grant County, Washington
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"If a road has no obstacles, it probably doesn't lead to anywhere." S. Lewis

From: [Bob Rose](#)
To: [Denny Rohr](#)
Cc: [Scott.Carlson@noaa.gov](#); [Bryan Nordlund \(bryan.nordlund@noaa.gov\)](#); [Kirk Truscott](#); [Jim Craig](#); [Tom Dresser](#); [Curtis Dotson](#); [Jeff Korth](#); [Andonaegui, Carmen \(DFW\)](#); [Verhey, Patrick M \(DFW\)](#); [Alyssa Buck](#); [CarlMerkle@ctuir.com](#); [Debbie Williams](#); [Melissa Rohr](#); [Steve Parker](#); [Paul Ward](#); [Tom Skiles](#); [Gary James](#); [Aaron Jackson](#)
Subject: Re: ATTENTION: -----Fwd: draft of emergency action fish passage document
Date: Tuesday, March 18, 2014 1:27:55 PM

Thanks Denny for sending this along, and thanks to Grant PUD staff for getting a well prepared document out in a timely manner.

I think you folks have done a good job in getting the stage set, but I have some concerns that I believe need to be addressed.

Wanapum fishway weir: This seems like a reasonable approach, primarily for the salmonids. I do not believe lamprey will do well, but will expand on that a bit later. My two concerns with the weir are (1) there does need to be a flume that reaches from the weir to the water surface to break the fall of the salmon, and (2) we have to protect the fish that are jumping over the weir so that they actually land on the flume, rather than falling into the water at the approximately 13 feet drop. I don't know the best way to attach the flume so that it does extend to the surface of the water - maybe attached to the dam or maybe attached to a floating platform which in turn is attached to the dam. Either way, I don't think we want to find out in May that fish are not performing well due to the excessive drop - by then we are too late. With respect to fish jumping off from the weir, I wonder if the weir crest could be chevron shaped, with the point a bit lower in elevation, allowing some flow of water over this apex. This might attract the fish to this point and encourage them to swim - rather than jump over the weir. Obviously some sort of walls could also be put into place to prevent an "over-jump" and prevent the fish from landing away from the flume.

Trap and Haul: This is an unfortunate, but necessary "Plan B". I believe your Plan is almost a "minimalist" approach and I will advocate that more trucks be available, less fish are crowded into each truck, and that there be a much reduced occupancy of fish in the trucks (i.e. maximum of 3-4 hours and not the prescribed 8 hours). I do not have any literature available to me to support my position, but I question that an average of 10 lbs per fish is realistic, I do not know how you are going to moderate water temperatures - but suggest with a quicker turn-around time you may not need to be so concerned, and I believe the point is to minimize stress on the fish - not minimize the cost of the operation. I also believe that it is worth considering that once fish are collected, it may be best simply to transport above Rock Island - particularly until we are certain that the deniles being used at Rock Island are operating with high efficiency. I will also recommend that early in the season - we alternate days that we use Trap and Haul and the fishways. This provides us with experience in each operation while the numbers are still relatively low - a dress rehearsal if you will - rather than trying to get it right when we are quickly overwhelmed in fish. I think this also supports the general notion that we shouldn't put all the eggs in one basket - especially until we have evidence from the PIT tags that fish are making their way up the river safely. Which, incidental the means for carrying on this PIT monitoring should be confirmed and better spelled out in this document. At least indicate that the PRCC will address this interest and determine, in real time, success of the actions being implemented.

Understanding the difficult situation we are in, and given the above, passage through the fishways is the preferred option and every effort must be taken to ensure that passage through the fishways is achieved. I am not in favor of shutting off passage in the fishways in any condition unless absolutely necessary. I encourage Grant (and Chelan PUD) to work closely with Bonneville Power Administration to ensure appropriate river operations such that the Wanapum reservoir can be maintained to a level to allow for optimal performance at the Rock Island denile structures currently being implemented at that location. I would encourage some language in the document that recognizes the need for this coordination that will help Grant meet its goal to minimize negative effects on these fish runs.

Lamprey Passage: I wish I could be more encouraged that lamprey will pass the Wanapum (and Rock Island) fishways efficiently, but I am not. We now understand that when the OLOFT is being used, lamprey passage efficiency suffers at the Priest Rapids left bank ladder. If we are to use a Trap and Haul strategy, this will create a negative effect on this portion of the run. At Wanapum Dam, I do not know if there is a precedent to understand how lamprey will behave when faced with a false weir - and a flume. My guess is that they will hold at the top of the weir - and then what? If this is the case - it is worth considering a night time strategy to collect lamprey at the top of the weir - when salmonids are not typically using the fish way at levels used in the day time. It may also be worth considering a "false bottom" at the head of the flume with a highly perforated plate forming the surface (water can flow underneath this plate) in which the lamprey are prevented from sucking onto the flume - for at least some distance until their velocity is such that they will not be able to attach to the flume. I will also note that past research indicates that new lamprey passage structures do not typically operate very well the first year - likely due to lack of "seasoning" by the river. This same effect is probable at the Rock Island lamprey passage structures being constructed aside of the deniles.

This discussion may be better suited to the PRFF, but I will note here that due to the very high level of uncertainty of lamprey passage that might occur both at Priest Rapids and Wanapum, I will strongly advocate that Grant begin preparing to establish a very aggressive trapping program at Priest Rapids Dam such that these fish can be transported above Rock Island Dam. This strategy, along with fishway passage seems to me the most prudent way to ensure the least impact to this tribally important resource.

Again, I appreciate the good work the Grant PUD staff has put into the development of this document in such a timely manner. I look forward to working with Grant to make the best of this very difficult situation.

B Rose
YN FRMP

On Mon, Mar 17, 2014 at 6:01 PM, <Drohr5@aol.com> wrote:

PRCC:

Please see the attached draft document received from Tom. He is requesting you look it over and let him know if you have any recommendations for the draft.

As you are aware, there is a timing issue here with final preparation and deliverance to FERC. Accordingly, any recommendations you may have need to be sent to Tom by COB on Tuesday/tomorrow. Moreover, as Tom has stated below, and from me as well, your patience and understanding are appreciated.

Please call with any questions you may have. Thank you, everyone.

--Denny

From: TDresse@gcpud.org
To: drohr5@aol.com
Sent: 3/17/2014 5:38:53 P.M. Pacific Daylight Time
Subj: draft of emergency action fish passage document

Denny;

Please find attached the draft of emergency action fish passage document. I would like 1 last review by the PRCC and seek recommendations they may have. I am looking for their recommendations by COB Tuesday.

Thanks – please thank them for their patience and understanding

Tom Dresser
Fish, Wildlife & Water Quality Manager
Public Utility District No. 2 of Grant County, Washington
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Bob Rose
Yakama Nation
Fisheries Resource Management Program
509-945-0141

From: [Kirk Truscott](#)
To: Drohr5@aol.com; [Tom Dresser](#)
Subject: RE: ATTENTION: -----Fwd: draft of emergency action fish passage document
Date: Tuesday, March 18, 2014 1:16:39 PM

Tom,

Unfortunately I'm at a workshop and have had little time to review the document, but did give it the once over and have a couple of comments:

- 1) Completing the passage modifications at the left bank ladder and trap and haul provisions at PRD should be concurrent and equal priorities (I think that is what you are doing). In addition, work should proceed to allow for extension of the outlet ramps of the fishways at Wanapum to reduce the drop-distance to the forebay, although not at the risk of delaying the installation of the false weir for passage.
- 2) When passage modifications at Wanapum and Rock Island Dams are complete, Trap and Haul operations should continue, although at a reduced level until passage at the modified adult ladders is confirmed. This represents a risk averse strategy such that we don't have all our eggs in one basket (i.e. once adults pass PRD we have no way to re-capture them if the adult passage is lacking in efficiency at either Wanapum or Rock Island Dams).
- 3) Loading rates for trap and haul are based on an average of 10 lbs/fish for Chinook. I know the citation is the Repo. Study in the Wenatchee Basin, but 10 lbs/Chinook seems pretty light and may incorporate the average of the run and include jacks. The problem with this approach is that is highly likely that any individual truck may have varying proportion of jacks and over-loading is likely if the truck is predominately adults. Suggest that as trucks are loaded, observations occur to assess the jack/adult ratio and adjust the loading rate accordingly.
- 4) The document cites an intent to limit the duration fish are in the truck to less than 8 hours, I concur. The amount of time the truck is at PRD should be determined (i.e. loading time) such that the loading time and transit time is less than 8 hours. The implications are that the trucks may not have a "full load" when they need to leave based on total truck time of 8 hours, so effort should continue to line up more trucks.
- 5) Adult transport trucks appear to be equipped with O2, recirculation and meters. How will temps be regulated? Also, is "recirculation" continual replacement of water in the tank (i.e. flow through) or internal recirculation, which actually is aeration? For O2 I suggest that is liquid O2 and not compressed O2 as the latter effectively heats the water in the tank.
- 6) Flume entry in to the transport trucks needs to be constructed such that the fish don't slam into the sides of the truck.
- 7) Lamprey passage at the false weir may be poor and may be the capture at the PRD OLAFT, as such trapping efforts in the PRD ladder should be considered to aid in the trap and haul of lamprey.
- 8) discontinuing the trap and haul to the minimum time necessary is important, as such, real-time monitoring of adult passage is necessary to assess the efficacy of the passage modifications. PIT tags in adults returning should help this assessment, however observations at the Wanapum Dam fishway outlets will also be needed to verify adults are actually passing the false weir (unless there are provisions to add PIT tag detections upstream of the false weir).

That is all I have for now. I was unable to review the designs included in the document, but am confident that sufficient coordination has occurred between the District/WDFW/NOAA and USFWS such that any major design deficiencies have been addressed.

Kirk

From: Drohr5@aol.com [Drohr5@aol.com]

Sent: Monday, March 17, 2014 6:01 PM

To: Scott.Carlon@noaa.gov; Bryan.Nordlund@noaa.gov; Kirk Truscott; rosb@yakamafish-nsn.gov; Jim_L_Craig@fws.gov; TDresse@gcpud.org; cdotson@gcpud.org; jeff.korth@dfw.wa.gov; carmen.andonaegui@dfw.wa.gov; patrick.verhey@dfw.wa.gov; Abuck1@gcpud.org; CarlMerkle@ctuir.com; DWilli1@gcpud.org; melissarohr76@gmail.com

Cc: drohr5@aol.com

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From: [Verhey, Patrick M \(DFW\)](#)
To: Drohr5@aol.com; [Tom Dresser](#)
Cc: [Debbie Williams](#); melissarohr76@gmail.com; Scott.Carlon@noaa.gov; Bryan.Nordlund@noaa.gov; kirk.truscott@colvilletribes.com; rosb@yakamafish-nsn.gov; Jim_L_Craig@fws.gov; [Tom Dresser](#); [Curtis Dotson](#); [Korth, Jeff \(DFW\)](#); [Andonaegui, Carmen \(DFW\)](#); [Alyssa Buck](#); CarlMerkle@ctuir.com; [Tonseth, Michael A \(DFW\)](#)
Subject: RE: ATTENTION: -----Fwd: draft of emergency action fish passage document
Date: Tuesday, March 18, 2014 5:02:53 PM

Tom and Denny, In general the Draft Emergency Action-Modification of Adult Fish Ladders at Wanapum Dam and Contingency Trapping and Transport of Adult Salmon, Steelhead and Migratory Bull Trout From Priest Rapids Off-Ladder Adult Fish Trap (Plan) is an excellent starting point. It is apparent much thought has gone into the development of the Plan. However, this document only addresses fish passage at Wanapum Dam. The Plan should be developed hand in hand with the Rock Island Fish passage plan. If fish passage at Rock Island Dam is not adequate, fish passage at Wanapum is moot. We are left with relying heavily on trap and haul operations. The Hourly Coordination of mid-Columbia River dams should be implemented and mentioned in the document to ensure fish passage is a high priority and the proposed denial structures at Rock Island Dam operate efficiently to pass fish.

WDFW has the following specific comments for your consideration in the development of the Plan:

Restoring Fish Passage Comments:

- The description of events that occur after the fish jumps or swims over the false weir and enters the flume, then finally enters the Wanapum Forebay is not clear. How far does the fish drop into the forebay? How wide is the flume? WDFW recommends designing the flume as an adjustable slide to decrease /minimize the height at which fish fall. The length of the fall should not be greater than two times the body length of the shortest fish. This fall distance is approximately four feet. In regards to the width of the flume. There is a correlation between the width of the flume and the depth of the water in the flume. Steelhead have a tendency to turn around in the area subject to dewatering after the false weir as observed during early designs of the OLAFT. Designing a transition area that, to the extent possible, prevents fish from turning around or falling back, yet provide sufficient water to minimize descaling and injury to fish will be challenging. Tapering down the width of the flume from sixteen feet to approximately eight feet will increase the water depth and reduce injury to the fish. Extending a shade eight feet over the transition area may reduce the incidence of steelhead turning around. These measures should be investigated early in the design process rather than during high passage time periods in June and July.
- We recommend, once operational, running fishways and the trap and haul operation concurrently until adult fish passage at the fishways is evaluated.
- We anticipate the fish health protocols to inform the trap and haul operation, specifically the duration of time fish are in the trucks and water treatments to reduce descaling and stress on fish.
- We recommend using the average of 14lbs/ per fish, which is the average of 4 and 5 year old Wenatchee River spring Chinook for estimating the number of fish transport trucks needed. If a tanker with 2,350 usable gallons is utilized, @ 14 lbs per fish, the capacity would be about 84 adults (calculated at 83.9) If we have a higher than anticipated age-3 component then more fish per truck could be loaded and not exceed the 0.5 fish per gallon of water.

- One other consideration, is that for transport times, early in the season there will be few fish moving which, under a 3-4 hour turnaround time means you may only be hauling a couple of fish each load. As the fish runs build, the turnaround time will decrease naturally because it will take less time trapping to reach capacity of each vehicle. Additionally, the larger the volume of a truck, the longer it will take to reach capacity during low fish abundance periods, whereas if the smaller volume tankers were utilized earlier on then it would require less trap time to reach densities.
- The Plan should include a discussion on how PIT tag data will be used to evaluate the passage efficiency of the fishways.

Lamprey Comments:

- While trapping lamprey in the fishway is preferable to passing lamprey through the ladder, if lamprey do pass via the false weir/flume, a portion of the flume should be constructed of a material, like perforated plating, that does not allow lamprey to easily attach. Lamprey attaching to the exit flume would likely result in delay of passage and injury. Also, lamprey may elect not to use the fishway due to the presence of scent or for the same yet to be determined reason why they don't seem to pass the OLAFT entrance readily. Another potential solution may be to trap lamprey as they exit the weir and transport them above Rock Island Dam, thereby bypassing the denils at Rock Island Dam. Lamprey trapped in the fishways should also be transported above Rock Island Dam.

Jeff Korth had a scheduling conflict today and was not able to provide comments. He may have comments tomorrow morning in addition to the comments I provided. Thanks for considering my comments.



Patrick Verhey

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Work schedule is M-Th

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To: Scott.Carlon@noaa.gov; Bryan.Nordlund@noaa.gov; kirk.truscott@colvilletribes.com; rosby@yakamafish-nsn.gov; Jim_L_Craig@fws.gov; TDresse@gcpud.org; cdotson@gcpud.org; Korth, Jeff (DFW); Andonaegui, Carmen (DFW); Verhey, Patrick M (DFW); Abuck1@gcpud.org; CarlMerkle@ctuir.com; DWilli1@gcpud.org; melissarohr76@gmail.com

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