SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

Energizing Life in Our Communities

June 22, 2022

VIA ELECTRONIC FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission (FERC)
888 First Street NE
Washington, DC 20426

Re: Jackson Hydroelectric Project, FERC No. 2157
Fish Habitat Enhancement Plan 2021 Annual Report
License Appendix G A-LA 12

Dear Secretary Bose:

Enclosed is Public Utility District No. 1 of Snohomish County's Fish Habitat Enhancement Plan 2021 Annual Report pursuant to the Jackson Hydroelectric Project's License Appendix G A-LA12. The draft report was provided to the Aquatic Resource Committee for review and comment. Consultation documentation is included in the report's Appendix 3.

If you have any questions on the Fish Habitat Enhancement Plan 2021 Annual Report, please contact Dawn Presler, Sr. Environmental Coordinator, at (425) 783-1709 or DJPresler@snopud.com.

Sincerely,

/s/ Keith Binkley

Keith Binkley
Manager, Natural Resources
(425) 783-1769
KMBinkley@snopud.com

Enclosed: Fish Habitat Enhancement Plan 2021 Annual Report

cc: Aquatic Resource Committee

CERTIFICATE OF SERVICE

I hereby certify that I have this day served via e-mail a copy of the foregoing filing upon each person on the Project's Aquatic Resource Committee in accordance with ordering paragraph K of the Project license issued by the Federal Energy Regulatory Commission on September 2, 2011.

/s/ Dawn J. Presler

Dawn J. Presler
Sr. Environmental Coordinator
Public Utility District No. 1 of
Snohomish County
2320 California Street
PO Box 1107
Everett, WA 98206-1107
Telephone: (425) 783-1709

Presler, Dawn

From: Presler, Dawn
Sent: Wednesday, June 22, 2022 10:28 AM
To: Anne Savery; Brock Applegate; Jeff Garnett; Jennifer Bailey; Mike Rustay; Monica Kannadaguli; Nate Morgan; Richard Vacirca; Tom O'Keefe; 'elizabeth.babcock@noaa.gov'
Cc: Andrew McDonnell; Keith Binkley
Subject: JHP (FERC No. 2157) - cc Fish Habitat Enhancement Plan 2021 Annual Report
Attachments: 2021 FHEP Annual Report.pdf

Dear ARC,
Attached is your cc: of the 2021 Fish Habitat Enhancement Plan Annual Report that I will be e-filing with FERC this morning; it'll also be posted to our web site in the next few days. Please let me know if you have any questions on it.

Cheers,
Dawn Presler
(she, her, hers)
Sr. Environmental Coordinator
Generation – Natural Resources
Snohomish County PUD No. 1
Everett, WA

(425) 783-1709 (work)

Henry M. Jackson Hydroelectric Project
(FERC No. 2157)

Fish Habitat Enhancement Plan: 2021 Annual Report (A-LA 12)

Snohomish County PUD
Public Utility District No. 1

Everett, WA

June 2022

Final – This document has been prepared for Snohomish PUD. It has been peer-reviewed by Snohomish PUD for accuracy and formatting based on information known at the time of its preparation and with that understanding is considered complete by Snohomish PUD. The document may be cited as:

Public Utility District No. 1 of Snohomish County. 2022. Fish Habitat Enhancement Plan: 2021 Annual Report (A-LA 12) for the Henry M. Jackson Hydroelectric Project, FERC No. 2157. June 2022.

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APPENDICES

1.0 INTRODUCTION

Public Utility District No. 1 of Snohomish County (the District) received a license on September 2, 2011 (License), from the Federal Energy Regulatory Commission (FERC) for the Henry M. Jackson Hydroelectric Project (Project). License Ordering Paragraphs D (Washington Department of Ecology 401 Water Quality Certification conditions) and E (U.S. Forest Service section 4(e) conditions) require the District to implement Aquatic License Article 12: Fish Habitat Enhancement Plan (A-LA 12) as detailed in License Appendix G. The District filed the Fish Habitat Enhancement Plan (FHE Plan) with the FERC on November 19, 2010.

As indicated in the FHE Plan, funded projects will be designed to provide additional Project-related enhancements to aquatic resources and hydrologic processes focused in the Sultan River basin; thereby, providing considerable benefits to aquatic habitat and anadromous and resident fish populations throughout the License term. These additional habitat enhancement projects, working in conjunction with other protection, mitigation and enhancement measures, such as improved side channel connectivity, increased instream flows, and implementation of fish passage at the Diversion Dam, will likely substantially increase the quantity and quality of aquatic habitat and performance of anadromous and resident fish populations in the lower Sultan River. Establishment of the ongoing FHE Plan and Habitat Enhancement Account (HEA) will also allow for adaptive management as conditions in the basin change. The mitigation provided through the fund will best be able to address long-term habitat enhancement and restoration needs by allowing flexibility to ensure that projects are developed and implemented during the License term.

Pursuant to Section 6.2 of the FHE Plan, the District is to prepare a report by June 30 of each year detailing activities that occurred the previous year and activities planned for the present year as they relate to implementation of FHE Plan-approved projects. This FHE Plan Annual Report, covering activities conducted in 2021 and planned for 2022. Appendix 1 contains the ARIS Report, and Appendix 2 contains the new proposed project for a grant match.

This draft report was provided to the Aquatic Resources Committee (ARC) for a 30-day review and comment period on May 20, 2022; no comments were received from the ARC. The ARC consists of the City of Everett, City of Sultan, Snohomish County, Washington Department of Ecology, Washington Department of Fish and Wildlife (WDFW), Tulalip Tribes, U.S. Forest Service, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and American Whitewater. Documentation of consultation with the ARC regarding the report is included in Appendix 3.

2.0 ACTIVITIES FOR YEAR 2021

2.1 Project Selection

In October 2021, the ARC approved $207,500 for the acquisition and ongoing maintenance of a 1.24-acre parcel along the Sultan River with 600 feet of shoreline that was heavily disturbed with development. This project was referred to as the “Oster Property”.

2.2 Project Implementation

2.2.1 Diversion Dam Fish Counting Sonar Device

Staff completed monitoring and data collection from the ARIS 3000 underwater sonar device during 2021. In 2021, the data were analyzed, and preparation of a report began.

2.2.2 Oster Property Acquisition

After the ARC approved the property acquisition in October 2021, Snohomish PUD's Real Estate Department discovered that the property was already under a purchase agreement process at a price above asking. The new owners indicated a desire to not develop the site, just to have a place to sit and watch the river. Snohomish PUD reached out to the new owners to inform them of our interest in property revegetation and conservation to improve riparian and aquatic habitat conditions. No additional work on this project is anticipated at this time.

2.3 Project Monitoring

No additional monitoring of FHE Plan habitat projects was conducted beyond that already described above.

3.0 ACTIVITIES FOR YEAR 2022

3.1 Project Selection

To capitalize on a grant opportunity, Snohomish PUD requested a 20% match to the WA Recreation and Conservation Office grant for construction related work associated with the extension and expansion of a side channel network along the Sultan River. That project was listed as a priority project on the ARC's Priority Project List developed by Herrera Environmental in 2019. The match request was for $153,000.

3.2 Project Implementation

3.2.1 Diversion Dam Fish Counting Sonar Device

The ARIS monitoring report was developed and provided to the ARC for their information on May 20, 2022. The final report is included as Appendix 1.

3.2.2 RCO Grant Match

The RCO grant match was approved by the ARC on May 16, 2022, see Appendix 2.

4.0 FUND BALANCE

As of December 31, 2021, the fund's account balance was $2,082,952.72. However, this balance does not reflect amounts not yet spent towards approved projects and reserves for potential slides. The balance of unallocated funds for use on future projects is approximately $1.45 million, as follows:

Fund Start	$ 2,500,000.00
September 2021	$ 256,365.42
Interest to-date (12/31/21)	+$ 205,022.40
Subtotal	**$ 2,961,387.82 (deposits)**
Confluence property acquisition	-$ 4,861.38 (closed)
Lower Skykomish River restoration	-$ 157,955.98 (closed)
Riparian restoration Sultan River	-$ 219,491.25 (closed)
Riparian restoration Sultan River (2-yr extension)	-$ 0 (closed)
Habitat Projects Prioritization	-$ 48,493.80 (closed)
LWD in Reaches 2 & 3	-$ 100,000.00 (closed)
Oster Property Acquisition	-$ 0 (closed)
Sonar Device (ARIS)	-$ 149,684.81 (closed)
RCO Grant Match	-$ 153,000.00 (allocated)
Future slides reserve	-$ 500,000.00 (allocated)
Hochfeld property acquisition	-$ 173,300.00 (allocated)
Subtotal	**-$1,506,787.22 (spent or allocated)**
	Total 1,454,600.60 (unallocated balance to-date)

Starting the tenth anniversary after issuance of the License (Year 11) and annually thereafter for the term of the License, Snohomish PUD deposits $200,000 (based on 2011 dollars) into the fund account per Section 5.1 of the FHE Plan; the first payment ($256,365.42) was made in September 2021.

5.0 FHE PLAN RECOMMENDATIONS

No recommendations for changes to the FHE Plan are being made at this time.

Appendix 1

ARIS Report

SONAR MONITORING OF STEELHEAD TROUT AND CHINOOK SALMON AT THE SULTAN RIVER DIVERSION DAM, 2018-2021

Final Report for the Fish Habitat Enhancement Plan Funded Project

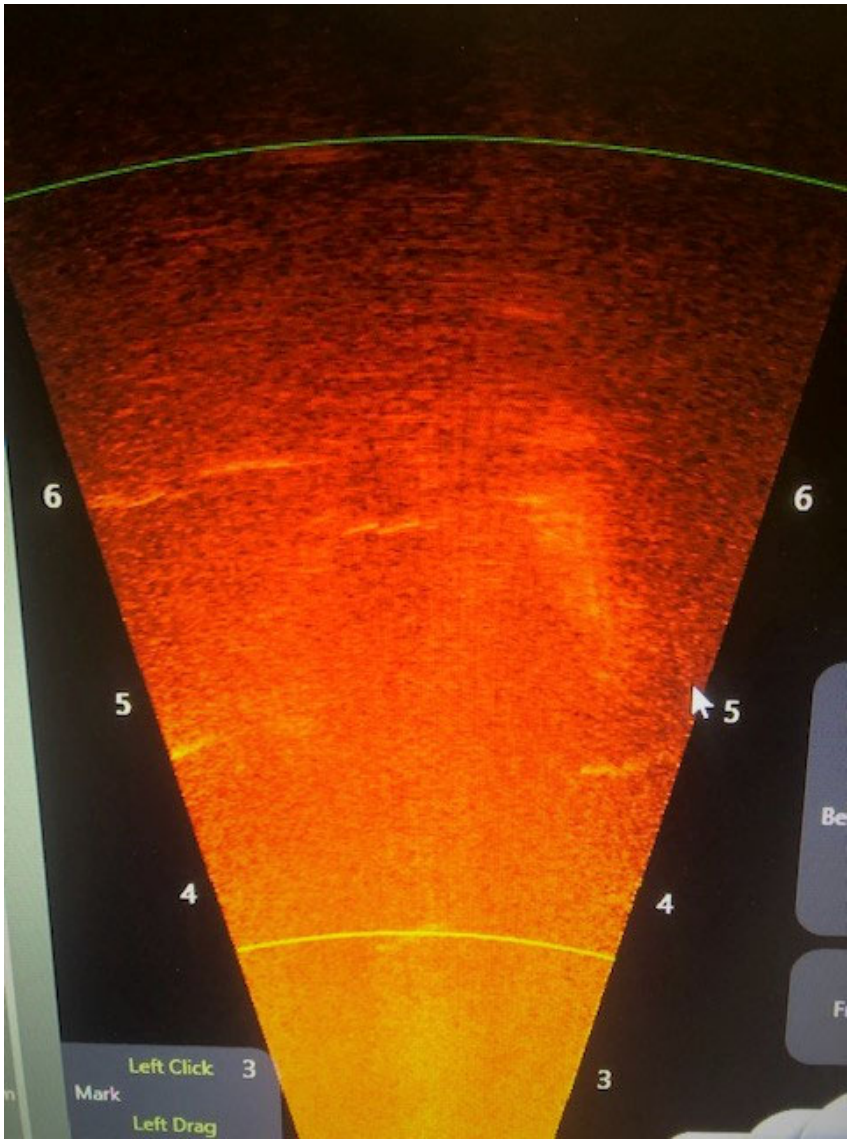

Photo note: ARIS image from September 10, 2021. Fish are elongated light orange figures. Seven (7) Chinook salmon are captured in this image.

May 2022

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

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1 INTRODUCTION

The City of Everett Diversion Dam (Diversion Dam) was built in 1930 at River Mile (RM) 9.7 on the Sultan River. The Diversion Dam had been a barrier to upstream fish migration until October 2016 when the Public Utility District No. 1 of Snohomish County (Snohomish PUD) completed the structural modifications necessary to allow fish passage as a Federal Energy Regulatory Commission (FERC) license requirement for its Jackson Hydroelectric Project. Since completion, adult salmonids, including threatened[1] Chinook salmon and steelhead trout, now have unencumbered access to over five additional miles of suitable spawning habitat upstream of the Diversion Dam.

To document and monitor adult Chinook salmon and steelhead trout as they migrate past the Diversion Dam into the newly accessible reach of the Sultan River, Snohomish PUD operated an ARIS/DIDSON Explorer 3000 Underwater Sonar Device (ARIS) for 3 years during the steelhead spring spawning season and 3 years during the fall Chinook spawning season. This project was initiated by the Jackson Project's Aquatic Resources Committee (ARC) using funds from the Fish Habitat Enhancement (FHE)fund. This report documents the results and observations associated with these 6 seasons of monitoring to close out the FHE project.

2 BACKGROUND

On October 14, 2009, Snohomish PUD filed a comprehensive settlement agreement with the FERC. The agreement included a suite of License Articles, one of which was Aquatic License Article 13 (A-LA 13) which provided for the development of the Diversion Dam Volitional Passage Plan (DDVPP).

The DDVPP required Snohomish PUD to provide volitional fish passage at such a time when the spawning escapement of either Chinook salmon or steelhead trout within the Diversion Dam Index Area (RM 9.2-9.7) equals or exceeds in any one season, ten percent of the combined total spawning escapement of either species within the four established index areas on the Sultan River downstream of the Diversion Dam. During the 2013 steelhead spawning season, a total of 47 redds were documented in all four indexes, 5 of which (11%) were in the Diversion Dam Index Area, thus triggering the requirement to provide volitional fish passage.

Passage was completed in October 2016 and for the first time since 1930, fish had access to 5.9 miles of habitat upstream of the Diversion Dam. This 5.9-mile section of river lies entirely within Reach 3 of the Sultan River (Figure 1), much of which is extremely remote and hazardous to traverse to complete fish surveys. Reach 3 extends to the base of Culmback Dam at RM 16.1; however, the section between RM 15.6 and 16.1 is extremely high gradient and not passable to fish.

[1] Both Chinook salmon and steelhead trout are listed as threatened species under the Endangered Species Act.

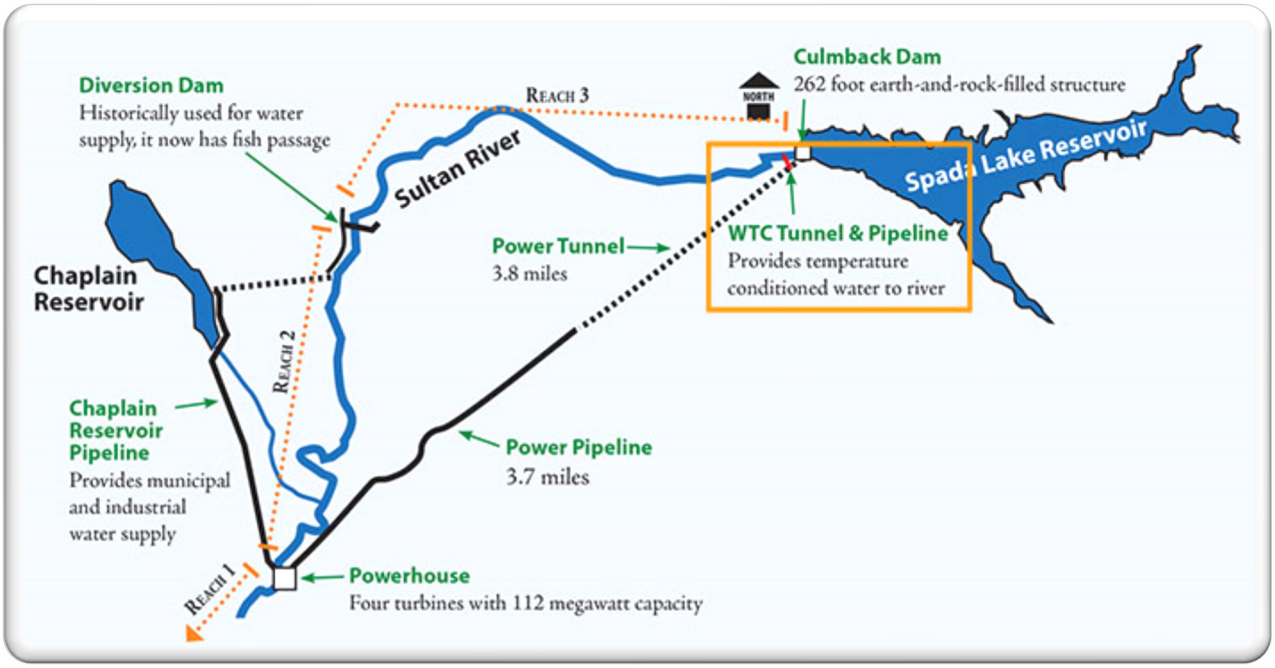

Figure 1. Map depicting Reaches 1, 2, and 3 of the Sultan River.

Figures 2a, 2b, and 3 show the Diversion Dam prior to and after completion of fish passage.

Figure 2a and 2b. Before completion of fish passage, City of Everett Diversion Dam at River Mile 9.7 of the Sultan River. Note fish (unknown salmon or steelhead, circa 1970) in lower photo.

Figure 3. Fish passage corridor after completion of Diversion Dam Volitional Passage in 2016.

In 2016, Snohomish PUD submitted a proposal to the ARC to use FHE funds to purchase the ARIS detection system and associated staff time for data collection. The ARC agreed to fund the proposed project and the ARIS was subsequently installed at the base of the left abutment along the downstream face of the Diversion Dam to monitor adult Chinook salmon and steelhead trout during their respective fall and spring spawning seasons. Information obtained from this monitoring will help to specifically structure the instream flow schedule for Reach 3, as well as, provide biological information necessary for fine-tuning of the Phase 2 Water Temperature Conditioning Program. Species composition and run timing will be coupled with field surveys to document relative habitat utilization by species within Reach 3. This information will also inform the need and location for future habitat restoration actions within the lower Sultan River. The intent of the ARIS data collection effort was to provide:

- enumeration, in real time,
- run timing,
- validation of escapement surveys, and
- behavior in the fish corridor at the Diversion Dam as fish migrate upstream.

Specifically, enumeration and run timing data will help tailor instream and process flow schedules, as well as control measures for water temperature conditioning, and other management related actions within Reach 3. The purpose of fish behavior information was to evaluate passage effectiveness and document any delay in migration in the Diversion Dam fish passage corridor, and if delay was detected, determine the potential cause and contributing factors.

The Diversion Dam is an important component of the City of Everett's water delivery system that has been integrated into the Jackson Hydroelectric Project. Figure 4 "Overall System Schematic" depicts the components of the hydroelectric project and how they relate to passage at the Diversion Dam. In general, the majority of water is diverted from Spada Lake Reservoir and delivered to the Powerhouse via the Power Tunnel; however, water is also released into the Sultan River directly downriver of Culmback Dam. Flow delivered to the Powerhouse is either released directly into Reach 1 of the Sultan River at the powerhouse or routed to the Portal 2 Control Structure located on the shore of Lake Chaplain. The Portal 2 Control Structure regulates water flowing into Lake Chaplain for water supply use by the City of Everett and also delivers flow back to the Diversion Dam through the Return Line to meet Minimum Instream Flow (MIF) requirements in Reach 2 (Table 1). Table 2 shows the 2021 MIF release schedule from Culmback into Reach 3. The MIF requirement in Reach 2 is attained with a combination of flow at the RM 9.8 stream gage (release flow from Culmback plus accretion) just upriver of the Diversion Dam and water that is introduced at the Diversion Dam through the Return Line from Lake Chaplain.

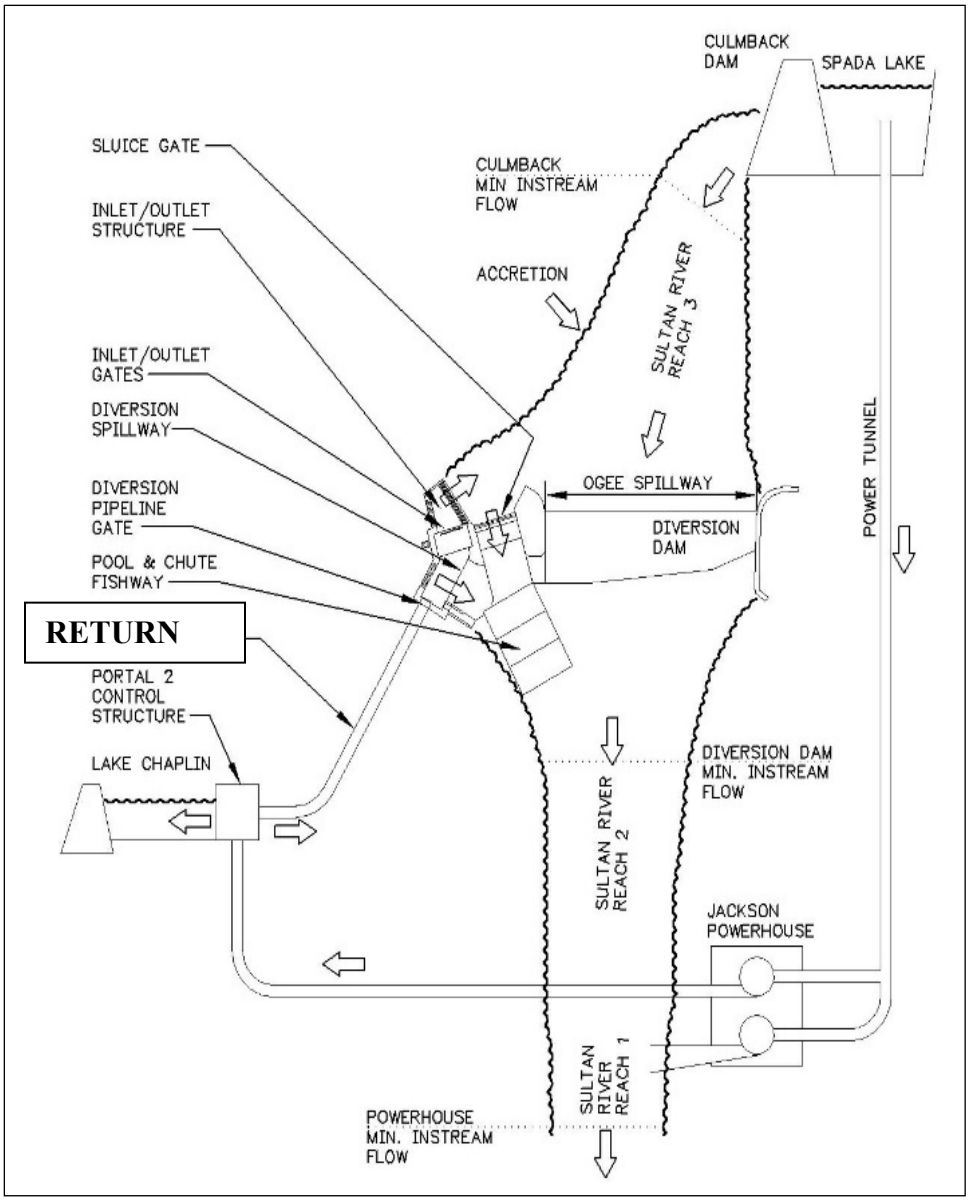

Figure 4. Overall system schematic, City of Everett Diversion Dam.

Table 1. Reach 2 Minimum Instream Flow requirements and schedule.

Dates		Minimum Instream Flow (cfs)
November 1 to March 15		100
March 16 to June 15		140
June 16 to September 14		100
September 15 to October 31	Spada elevation above 1,415 feet	200
	Spada elevation between 1,415 and 1,405 feet	175
	Spada elevation below 1,405 feet	150

Table 2. 2021 Minimum Instream Flow (MIF) release schedule from Culmback Dam into Reach 3.

Dates	CFS
Jan 1-15	31
Jan 16-31	32
Feb 1-14	20
Feb 15-28/9	20
Mar 1-15	20
Mar 16-31	38
Apr 1-15	33
Apr 16-30	22
May 1-15	33
May 16-31	25
Jun 1-15	20
Jun 16-30	20
Jul 1-15	25
Jul 16-31	25
Aug 1-15	30
Aug 16-31	31
Sep 1-14	75
Sep 15-21	73
Sep 22-30	73
Oct 1-15	63
Oct 16-31	51
Nov 1-15	25
Nov 16-30	20
Dec 1-15	24
Dec 16-31	32

3 METHODS

3.1 ARIS PLACEMENT LOCATION AND OPERATION

The ARIS was mounted on the concrete face of the Diversion Dam adjacent to the fish passage corridor and entrance into Reach 3. It was positioned on a stainless-steel track and attached to a cable that allowed it to be lowered or raised depending on water level. The ARIS was attached to a Sound Metrics ARIS Rotator AR2 and controlled by ARIScope software interface, which provided horizontal and vertical positioning control. Aiming was performed remotely using a laptop computer located in the secure gate house building at the Diversion Dam. The ARIS was set to record 24 hours/day, 7 days a week during monitoring seasons. However, as high water approached, it was raised out of the water to avoid damage.

The ARIS transmits sound pulses across the width (approximately 23 feet) of the fish passage corridor and converts the returning echoes into digital images. The corridor has a relatively uniform bottom profile with small rocks which is ideal for a transect. Large rocks and an uneven bottom profile can permit fish to pass undetected by the sonar (McDougall et al. 2016). At times, particularly after high water events, large rocks from upstream moved into the transect area. Snohomish PUD Biologists maintained the area by rolling these rocks downstream to maintain a uniform bottom profile.

Approximately 115 GB of images were obtained daily and saved on hard drives located in the secure gate house building at the Diversion Dam. Hard drives were switched out weekly and data was processed using ARIS Fish software. Processing sonar data is time consuming and therefore many studies that estimate salmon passage using sonar, subsample data, for example ten minutes/hour (Key et al. 2014). Due to the small number of fish that we encounter migrating into Reach 3 compared with other sonar studies, as well as other questions we investigated regarding fish behavior and timing, we did not subsample data. Processing typically took 1-2 hours to process one day of data. During processing, an echogram was created and as the processor scrolls through the files, if a fish was detected, its length was measured (cm) by using a tool to mark each end of the fish. Fish length was used to identify individual fish as they moved upstream and downstream out of sonar range. This was required in order to determine an escapement estimate in Reach 3. If escapement was determined only from the number of times fish moved upstream out of sonar range, the escapement estimate would be inflated. To avoid this, individual fish were tracked as they moved upstream and downstream out of sonar range. Only when a fish moved upstream and was not seen again moving downstream was it counted as a fish migrating into Reach 3, and thus contributing to the escapement estimate. Of note is that the sonar image is not sufficiently detailed to allow for the detection or absence of adipose fins.

3.2 CHINOOK AND STEELHEAD SPAWNER SURVEYS

A primary objective of ARIS data was to document utilization of the newly accessible habitat within Reach 3 and validate escapement as determined by spawner surveys. Annually, Snohomish PUD Biologists conduct Chinook salmon spawner surveys in the fall and steelhead

trout spawner surveys in the spring. Survey methods are consistent with those employed by the Washington Department of Fish and Wildlife to assess species presence, abundance, distribution, timing, and run composition (Snohomish PUD, Fish and Habitat Monitoring Plan, 2010).

The Sultan River has five established index survey areas referred to as intensive areas (Figure 5). These areas are surveyed every 10-14 days throughout the Chinook salmon and steelhead trout spawning seasons. The remainder of the river is comprised of nine supplemental survey index areas that are surveyed at least once during the peak of the spawning period. Surveys in both intensive and supplemental index areas involve enumerating redds and fish (live and dead) and collecting biological samples. Data from the intensive and supplemental area surveys are used to develop an escapement estimate in cooperation with Washington Department of Fish and Wildlife Biologists at the completion of each spawning season.

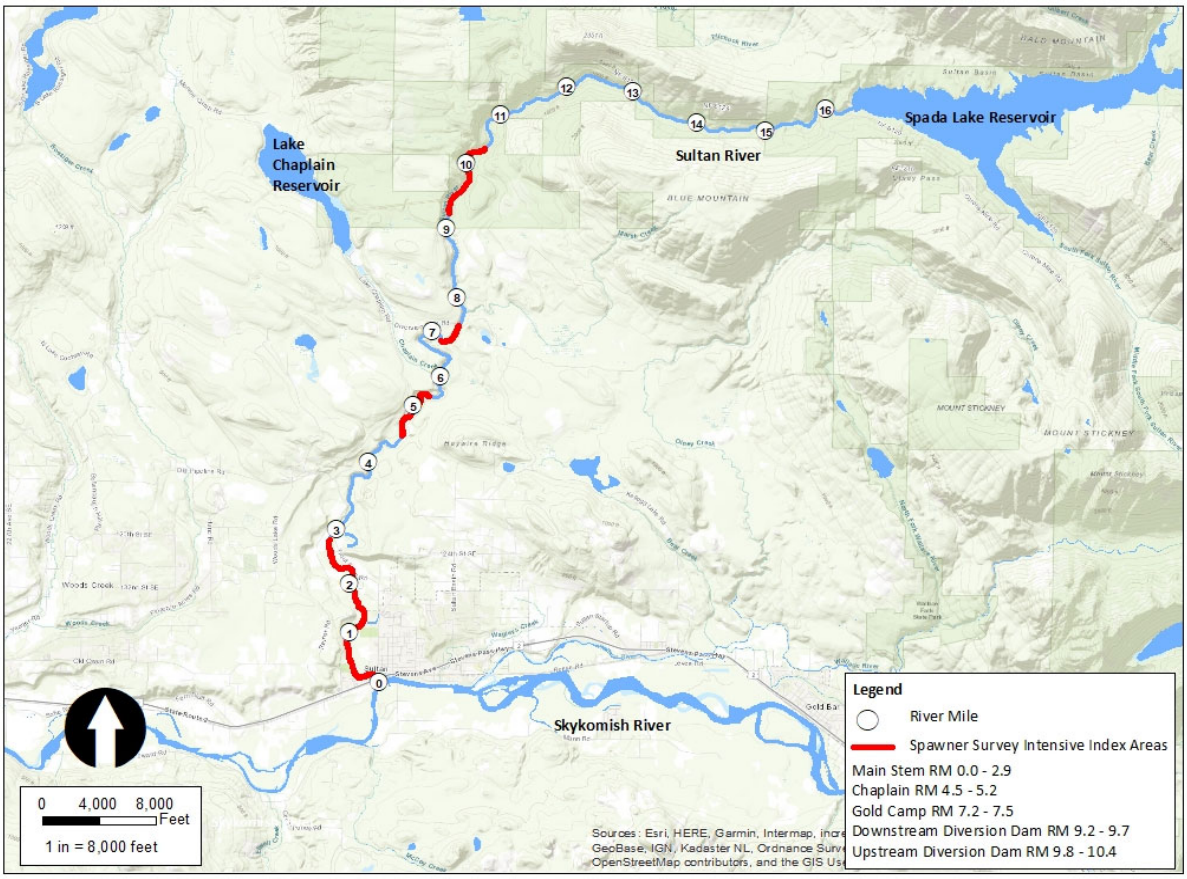

Figure 5. Map depicting the five Sultan River intensive spawner survey areas.

3.3 OPERATING CONDITIONS

Temperature and flow can initiate upward migration of adult salmon (Peterson et al. 2017). We investigated whether temperature and or flow at the confluence of the Sultan and Skykomish rivers may be enticing hatchery Chinook salmon or hatchery steelhead trout into the Sultan River. The Wallace River Hatchery is located approximately 5 miles upstream of the mouth of

the Sultan River and releases summer run Chinook and winter steelhead annually. Reiter Ponds Hatchery is located approximately 10 miles upstream from the mouth of the Sultan River and releases winter and summer steelhead annually.

At the Diversion Dam, we documented localized temperature and flow conditions to explore whether these factors were influencing Chinook or steelhead behavior during passage and potentially altering or delaying their migration within the fish passage corridor. Of particular interest was whether water being introduced into the river from the Return Line to meet MIF requirements in Reach 2 was affecting migration.

3.3.1 Temperature and Flow near the confluence of the Sultan and Skykomish Rivers

The following data were evaluated during the Chinook salmon and steelhead trout monitoring seasons:

- Maximum daily temperature at RM 0.2 of the Sultan River and RM 14.1 of the Skykomish River (0.3 miles upstream of the confluence with the Sultan River)
- Mean daily flow at the USGS 12138160 Sultan River gaging station downstream of the Powerplant and the USGS 12134500 Skykomish River gaging station near Gold Bar

3.3.2 Flow and Temperature in the Diversion Dam fish passage corridor

To determine a possible cause if delay was detected on the ARIS at the Diversion Dam fish passage corridor, the following data were examined:

- Mean daily flow (cfs) at RM 9.8, RM 9.6 and the Return Line water that is introduced back into the river at the Diversion Dam to meet Reach 2 MIF requirements
- Mean daily temperature at RM 9.6 and the Return Line

Figure 6 illustrates the locations where Return Line flow is introduced into the river, the location of the ARIS, the spillway box, and the fish passage corridor.

Figure 6. Sultan River Diversion Dam showing location of ARIS, fish passage corridor, spillway box, and the locations of return flow (Snohomish PUD drone photo, 2021).

Temperature and flow data for 2021 are representative of other monitoring seasons and therefore only analysis and data for 2021 are included in this report. Temperature and flow data for other monitoring years can be provided by Snohomish PUD upon request.

4 RESULTS

4.1 ENUMERATION AND ESCAPEMENT

Monitoring occurred over a four-year period with Chinook salmon monitoring in 2018, 2020, and 2021 and steelhead trout monitoring in 2019, 2020, and 2021. On days the ARIS did not operate during the monitoring season, the average catch/day was calculated using the number of observed fish for 7 days prior and 7 days after not operating. The average number of fish per day during this 14-day period was extrapolated to days the ARIS did not operate. A caveat to our method of estimating counts on missing days is that we did not account for days with high river flow (>300 cfs at RM 9.6), including process flows and naturally occurring events. We have observed that the high velocity in the relatively narrow (23-foot) fish passage corridor during these flows prevent fish from migrating upriver.

Tables 3 and 4 provide a summary, by season, of the number of Chinook salmon and steelhead trout that migrated into Reach 3 using ARIS data and from spawner survey data. The tables also show the escapement estimate for the entire Sultan River as determined by spawner surveys.

Table 3. ARIS and spawning ground survey (SGS) summary, Sultan River Chinook salmon, 2018, 2020, and 2021.

CHINOOK					
Start	**End**	**Dates not operated**	**ARIS escapement in Reach 3**	**Spawner survey escapement in Reach 3**	**Spawner survey escapement entire river**
8/2/18	10/30/18	9/8 to 9/11 (process flow) and 9/22 to 9/23 and 10/31 (high flows)	43 (no extrapolation for days not operated)	45	585
8/11/20	11/3/20	8/20 to 8/24, 8/31 to 9/7, and 9/19 to 9/23 (equipment malfunction)	92 (75 observed and 17 extrapolated)	88	692
6/16/21	10/31/21	7/25-8/1;8/15-8/19;8/20-8/23;9/23-9/29 (equipment malfunction)	130 (120 observed and 10 extrapolated)	140	375

Table 4. ARIS and spawning ground survey (SGS) summary, Sultan River steelhead trout, 2019, 2020, and 2021.

STEELHEAD					
Start	**End**	**Dates not operated**	**ARIS escapement in Reach 3**	**Spawner survey escapement in Reach 3**	**Spawner survey escapement entire river**
2/15/19	6/16/19	4/10 to 4/11 and 5/24 to 5/27 (process flows)	6 (No extrapolation)	10	56
3/3/20	6/19/20	4/15 to 4/19 process flow5/13 to 5/21 (equipment malfunction)	7 (5 observed and 2 extrapolated)	5	86
3/3/21	6/15/21	4/2 to 4/4 (equipment malfunction) and 5/21 to 5/23 (process flow)	23 (22 observed and 1 extrapolated)	10	124

4.2 RUN TIMING

Defining run timing data was a fundamental goal for this project. Tables 5 and 6 show fish counts by Statistical Week (Week) during Chinook salmon and steelhead trout monitoring. Daily counts are presented in Appendix A.

In 2018 and 2020, the ARIS was taken in for maintenance immediately after steelhead season and was redeployed for Chinook monitoring as soon as maintenance was completed. In 2021, the ARIS operated continuously after the end of the steelhead trout season (June 15) through the Chinook salmon season (June 16-October 31).

Table 5. ARIS Chinook count and percentage of run, by Statistical Week, Sultan River, 2018, 2020, and 2021.

CHINOOK			
Statistical Week	2018	2020	2021
	Number and % of run		
24			3 (2%)
25			2 (2%)
26			1 (1%)
27			2 (2%)
28			0
29			6 (5%)
30			6 (5%)
31	2 (5%)		9 (7%)
32	2 (5%)		4 (3%)
33	4 (9%)	3 (3 %)	3 (2%)
34	1 (2%)	5 (5 %)	4 (3%)
35	1 (2%)	9 (10 %)	26 (20%)
36	2 (5%)	4 (4 %)	33 (25%)
37	5 (12%)	8 (9 %)	20 (15%)
38	4 (9%)	11 (12 %)	0
39	7 (16%)	19 (21 %)	4 (3%)
40	6 (14%)	12 13%)	5 (4%)
41	4 (9%)	15 (15 %)	0
42	4 (9%)	3 (3 %)	1 (1%)
43	1 (2%)	2 (2 %)	1 (1%)
44		1 (1 %)	
Total	43	92	130
Statistical Weeks		Corresponding Months	
22-26		June	
27-31		July	
32-35		August	
36-40		September	
41-44		October	

Table 6. ARIS steelhead count and percentage of run, by Statistical Week, Sultan River, 2019, 2020, and 2021.

STEELHEAD			
Statistical Week	2019	2020	2021
	Number and % of run		
7	0		
8	0		
9	0		0
10	0		0
11	0		0
12	0		0

13	0		3 (13 %)
14	0	0	1 (4 %)
15	1 (17%)	0	1 (4 %)
16	1 (17%)	0	1 (4 %)
17	0	0	4 (17 %)
18	1 (17%)	0	2 (9 %)
19	1 (17%)	0	5 (22 %)
20	0	3 (43 %)	2 (9 %)
21	1 (17%)	1 (14 %)	2 (9 %)
22	1 (17%)	3 (43 %)	2 (9 %)
23		0	0
24		0	0
25		0	
Total	6	7	23

Statistical Weeks	Corresponding Months
6-9	February
10-13	March
14-18	April
19-22	May
23-26	June

4.3 TEMPERATURE AND FLOW NEAR THE CONFLUENCE OF THE SULTAN AND SKYKOMISH RIVERS DURING THE 2021 MONITORING SEASONS

Temperature and flow at the confluence of the Sultan and Skykomish rivers were investigated in combination with run timing of Chinook and steelhead as documented on the ARIS. The purpose of this analysis was to determine if temperature and or flow may be enticing hatchery Chinook or hatchery steelhead into the Sultan River that were otherwise destined for the Wallace Hatchery or Reiter Ponds, further upstream in the Skykomish River.

4.3.1 Chinook

Table 5 shows 66 Chinook (51% of season total) were documented in June, July, and August, 2021(Weeks 24-35). Studies indicate a water temperature threshold exists at approximately 20°C, which at or above that, triggers adult Chinook to seek cooler water (Richter et al. 2005). Figure 7 shows the maximum daily temperature at RM 0.2 of the Sultan River and the Skykomish River, 0.3 miles upriver from the mouth of the Sultan. During Weeks 24-28, 8 fish were documented by the ARIS and the Skykomish River had not yet reached 20°C. The Skykomish River was over 20°C for the first time on July 24 (Week 29) when it reached 20.1°C and was over or near 20°C every day through August 16 (Week 33). Sultan River maximum daily temperature was generally 4-7 degrees cooler than the Skykomish River during this time and 28 fish were detected by the ARIS. The Skykomish River did not exceed 20°C after August 16 and temperature of the Sultan River and Skykomish River were similar for the remainder of the season.

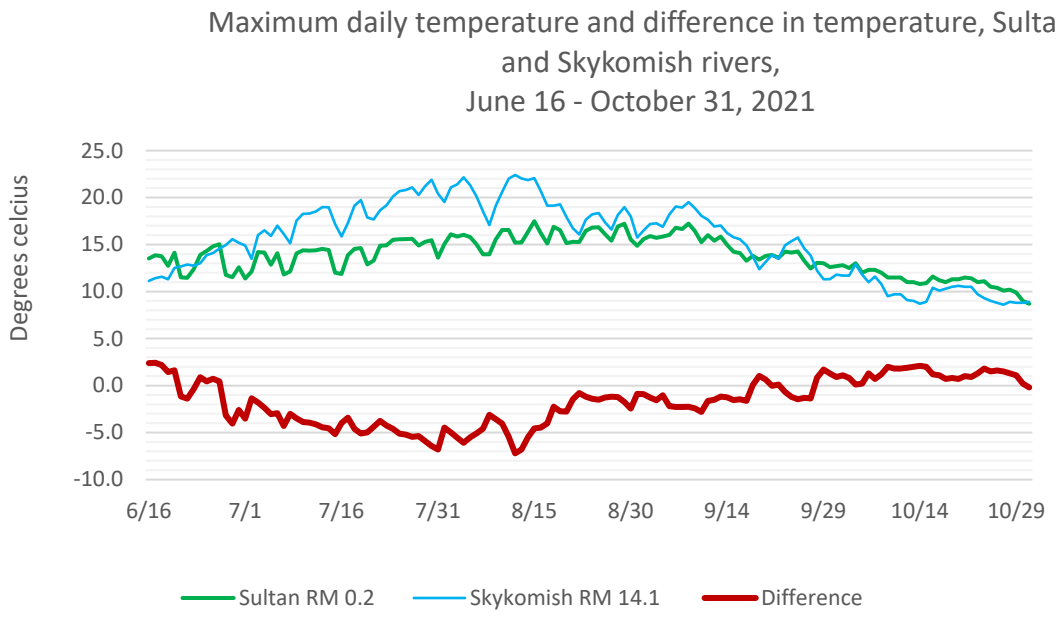

Figure 7. Maximum daily temperature at RM 0.2 of the Sultan River and RM 14.1 (0.3 miles upriver from the mouth of the Sultan River) of the Skykomish River and difference between the two temperatures, June 16 - October 31, 2021.

Figure 8 below tracks flow in the Sultan River below the Powerhouse and in the Skykomish River near Gold Bar and the percent contribution of the Sultan River, relative to flow downstream of the confluence. A moderate spike of 1,260 cfs was detected in the Sultan on June 29 (Week 26). The Skykomish flow was relatively high at this time, and it is unlikely this flow would trigger upriver migration of summer Chinook salmon into the Sultan. A Whitewater Recreation Event occurred on August 8 (Week 31). Mean daily flow was 481 cfs and maximum flow was 852 cfs. A naturally occurring spike occurred on August 13 (Week 32). Mean daily flow was 1,140 cfs and maximum flow was 1,230 cfs. This was a relatively small increase; however, the Skykomish River was quite low at this time (769 cfs) and as a result, fish may have been drawn into the Sultan River.

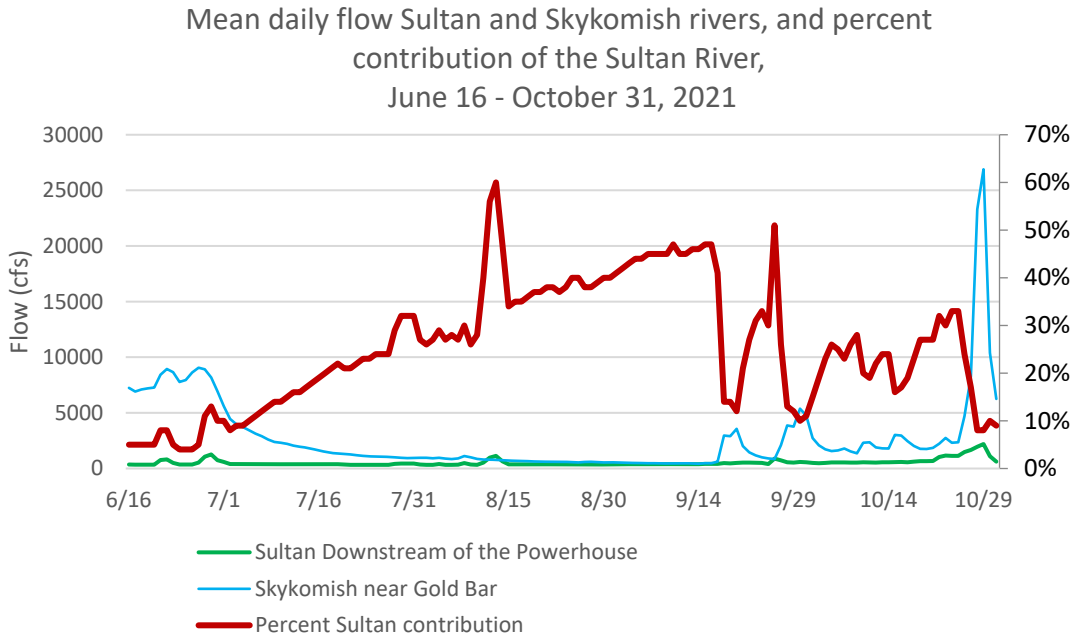

Figure 8. Mean daily flow, Sultan River (downstream of Powerhouse) and Skykomish River (near Gold Bar) and percent contribution of the Sultan River relative to flow downstream of the confluence, June 16 - October 31, 2021.

4.3.2 Steelhead

Adult steelhead seek cooler water when temperature reaches approximately 20°C (Richter et al. 2005). As Figure 9 shows, temperature in the Skykomish River was well below 20°C during their migration.

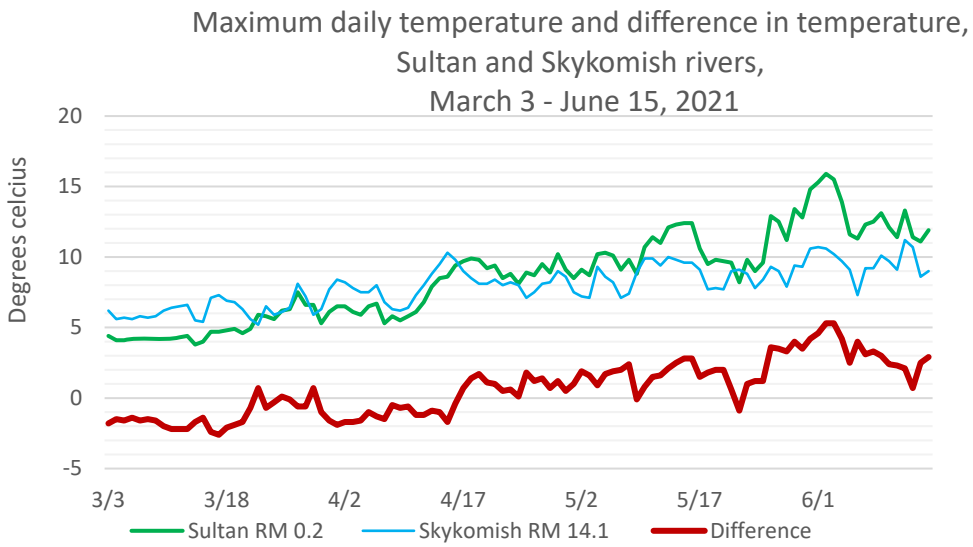

Figure 9. Maximum daily temperature at RM 0.2 of the Sultan River and RM 14.1 (0.3 miles upriver from the mouth of the Sultan River) of the Skykomish River and difference between the two temperatures, March 3 - June 15, 2021.

As Figure 10 shows, flow in the Skykomish River was sufficient during steelhead migration and there is no indication that flow nor temperature were factors in drawing hatchery steelhead into the Sultan River that were destined for the Wallace Hatchery or Reiter Ponds Hatchery. No hatchery steelhead have been documented in the Sultan River since planting of steelhead in the Sultan ceased in the early 1990s.

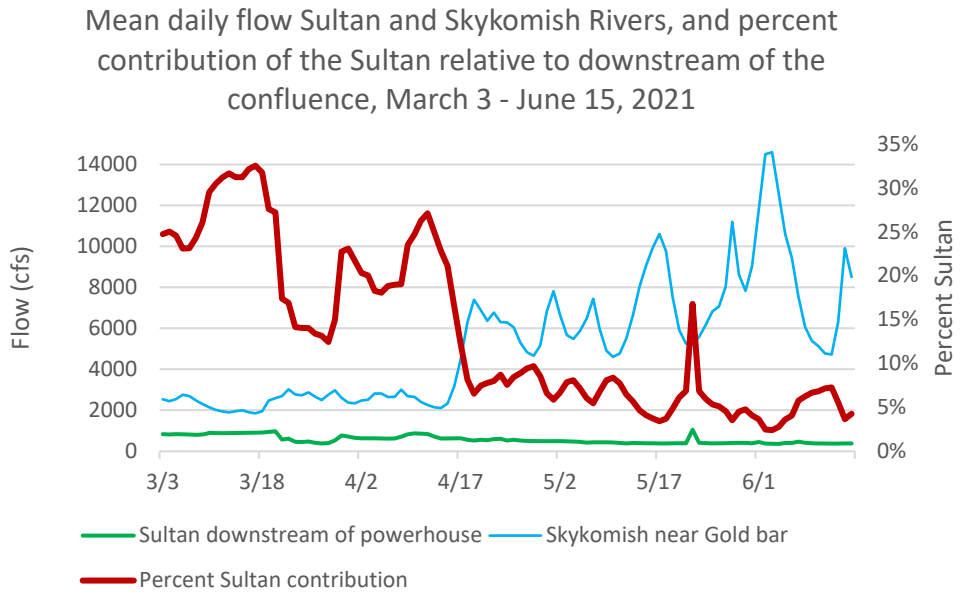

Figure 10. Mean daily flow, Sultan River (downstream of Powerhouse) and Skykomish River (near Gold Bar) and percent contribution of the Sultan River relative to flow downstream of the confluence, March 3 - June 15, 2021.

Data used to create Figures 7-10 are found in Appendix B.

4.4 FLOW AND TEMPERATURE IN THE DIVERSION DAM FISH PASSAGE CORRIDOR DURING THE 2021 MONITORING SEASONS

4.4.1 Chinook

Figure 11 shows flow at RM 9.8, the Return Line, and RM 9.6 as well as the percentage of flow in the Return Line relative to flow at RM 9.6 during the 2021 Chinook season. Percentage of flow from the Return Line is important because if the Return Line is greater than 50 percent of the flow at RM 9.6 (particularly at higher flows), it can overwhelm the fish passage corridor with turbulent water causing fish to hold rather than migrate upstream into Reach 3. Note the increase in Return Line and RM 9.6 flow as well as the large increase in the percent Return Line flow on September 14, one day in advance and in preparation of the seasonal increase in the MIF requirement in Reach 2 to 200 cfs.

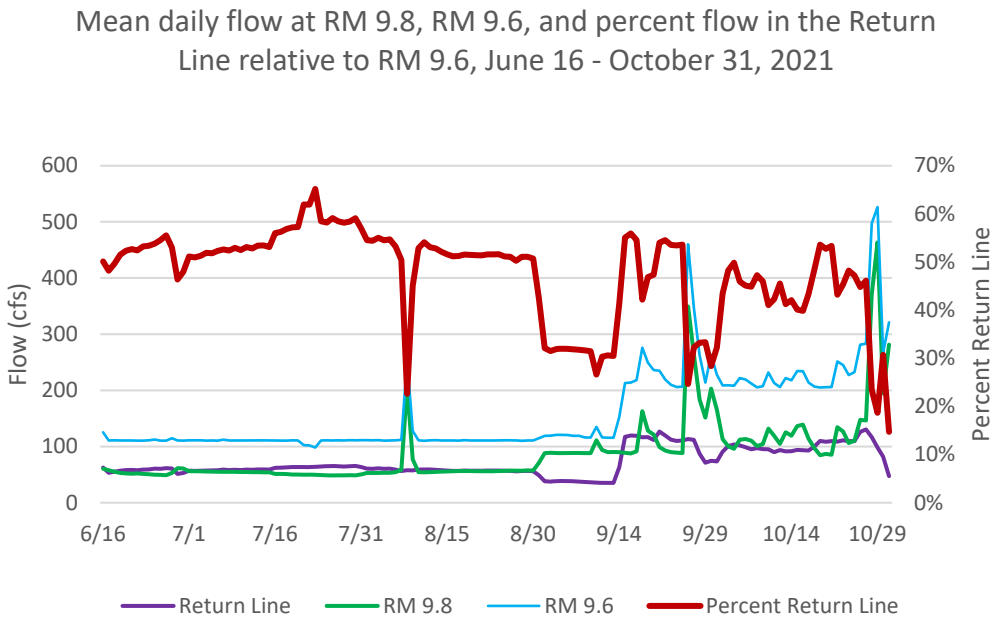

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Figure 11. Mean daily flow at RM 9.8, Return Line, and RM 9.6, and Percent Flow in the Return Line relative to RM 9.6, June 16 - October 31, 2021.

Figure 12 shows temperature in the Return Line and at RM 9.6 during the 2021 Chinook salmon season. Return Line temperature was cooler than RM 9.6 through August 5 (Week 31). After August 5, Return Line temperature was warmer than RM 9.6 for the remainder of the season.

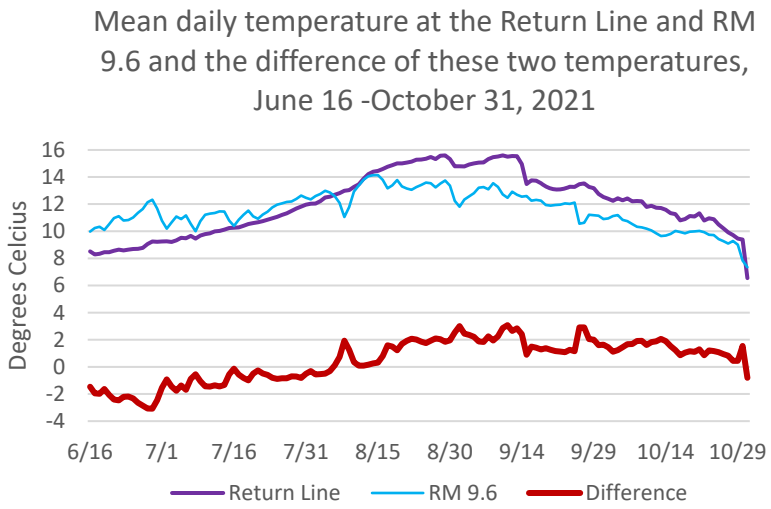


Figure 12. Mean daily temperature in the Return Line and RM 9.6 and difference between these 2 locations, Sultan River, June 16 - October 31, 2021.

4.4.2 Steelhead

The Reach 2 MIF requirement is 140 cfs during the entire steelhead season (March 16 - June 15). The combination of water released from Culmback Dam into Reach 3, accretion, and the Reach 2 MIF being considerably lower than during Chinook season, prevented the Return Line flow from becoming too great and overwhelming the fish corridor. The flow did exceed 50% relative to RM 9.6 at times (Figure 13), but because the Reach 2 MIF was 140 cfs, flow from the Return Line was not large enough to be detrimental to migration as documented on the ARIS. Temperature of the Return Line and RM 9.6 was quite similar throughout the steelhead season (Figure 14).

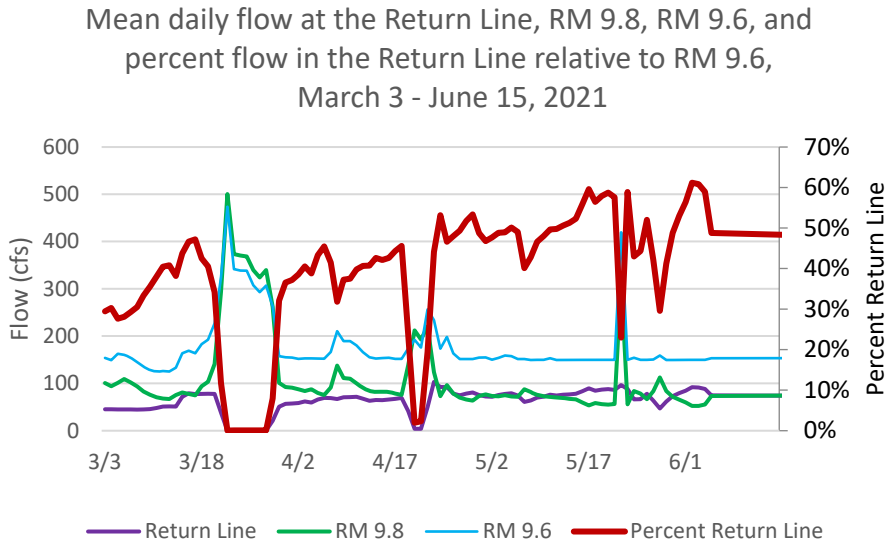


Figure 13. Mean daily flow at RM 9.8, Return Line, and RM 9.6, and % flow in the Return Line relative to RM 9.8, March 3 - June 15, 2021.

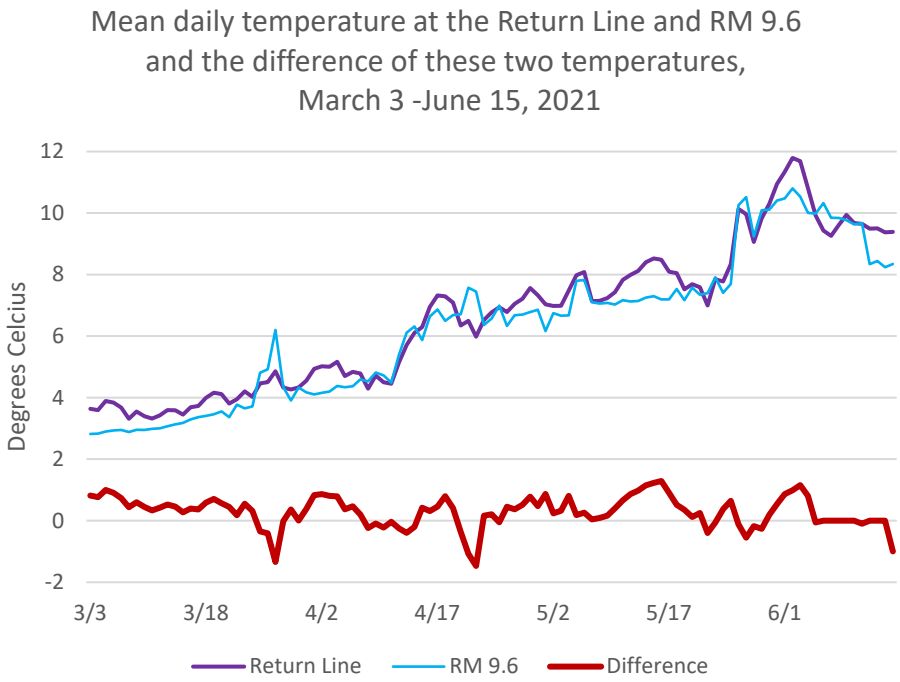


Figure 14. Mean daily temperature in the Return Line and RM 9.6 and difference between these 2 locations, Sultan River, March 3 - June 15, 2021.

Data used to create Figures 11-14 are found in Appendix C.

5 DISCUSSION

5.1 ENUMERATION AND ESCAPEMENT

Validation of escapement surveys was an essential goal of this project. Tables 3 and 4 show Reach 3 escapement as determined by the ARIS and from spawner surveys. Generally, the two methods resulted in similar escapement estimates. A fundamental reason they may differ is that spawner escapement estimates are based solely on redd counts. Washington Department of Fish and Wildlife protocol (Snohomish PUD, Fish and Habitat Monitoring Plan, 2010) assumes 2.5 Chinook salmon per redd and 1.62 steelhead trout per redd. The number of fish per redd varies annually and the values are not meant to be precise from year to year, but rather are a long-term average. Since the ARIS documents live fish, it can be expected that the two estimates will differ marginally.

The largest discrepancy between the ARIS escapement estimate and the spawner survey estimate occurred in the 2021 steelhead season in which the ARIS escapement was 24 fish, and the spawner escapement estimate was 10 fish. Assuming 1.62 fish/redd this equates to approximately 15 redds using ARIS data and approximately 6 redds using spawner survey data. As was discussed in the methods section, one intensive index area (RM 9.8-10.4; surveyed every 10-14 days) has been established upstream of the Diversion Dam. The remaining 5 miles of Reach 3 spawning habitat is comprised of supplemental areas that are surveyed one or two times around

peak spawning time. Data obtained from surveying once or twice per season is not as accurate as data obtained from areas that are surveyed every 10-14 days. Some redds in the 5-mile supplemental area were likely not documented resulting in the discrepancy between the ARIS estimate and spawner escapement estimate during for the 2021 steelhead season. The Washington Department of Fish and Wildlife commonly uses supplemental index areas, and this method is an accepted practice in developing spawner escapement estimates (Snohomish PUD, Fish and Habitat Monitoring Plan, 2010).

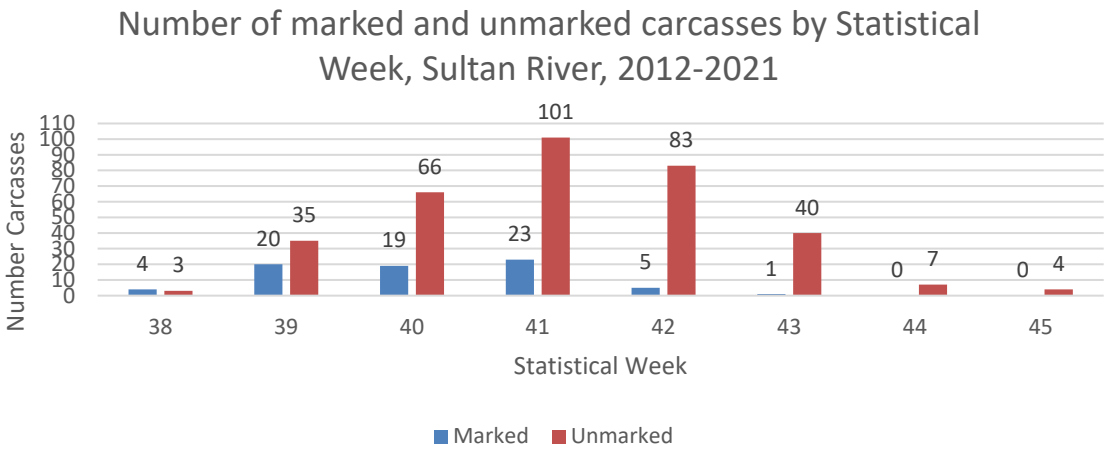
5.2 TEMPERATURE AND FLOW NEAR THE CONFLUENCE OF THE SULTAN AND SKYKOMISH RIVERS DURING THE 2021 MONITORING SEASONS

5.2.1 Chinook

Many marked (adipose fin-clipped and or codded wire tagged) hatchery Chinook carcasses are found in the Sultan River and the number has been increasing in recent years as documented by Snohomish PUD Biologists during spawner surveys (Table 7). Figure 15 shows that marked carcasses are recovered primarily early in the season.

Table 7. Number of carcasses and number and percent of marked (ad-clipped and or cwt tagged) carcasses by year, Sultan River, 2001-2021.

Year	Total Carcasses	Number Marked	Percent Marked
2001	30	1	3%
2002	50	4	8%
2003	19	1	5%
2004	43	1	2%
2005	21	1	5%
2006	20	0	0%
2008	40	0	0%
2010	18	2	11%
2012	68	18	26%
2013	48	1	2%
2014	27	8	30%
2015	38	16	42%
2016	42	1	2%
2017	35	2	6%
2018	45	3	7%
2019	4	1	25%
2020	79	13	16%
2021	62	9	15%



Statistical Weeks	Corresponding Months
36-40	September
41-44	October

Figure 15. Number of marked (ad-clipped and or coded wire tagged) and unmarked Chinook carcasses by week, Sultan River, 2012-2021.

No hatchery Chinook are released in the Sultan River but more than 1.5 million summer run Chinook are released annually from the Wallace River Hatchery (5 miles upriver from the mouth of the Sultan). As documented on the ARIS, fish began migrating into Reach 3 in June. Typically, summer hatchery Chinook begin spawning in early to mid-September (Tom Cox, WDFW, personal communication, March 2, 2022). In 2021, a total of three Chinook carcasses, all unmarked, were recovered in Reach 3 during a supplemental survey on October 26.

In years 2012 to 2020, nine Chinook carcasses implanted with coded wire tags have been recovered in the Sultan River. Eight of these were released from the Wallace Hatchery and one was from the Whitehorse Hatchery located on the North Stillaguamish River.

The Sultan River typically runs cooler than the Skykomish River during the summer months when Spada Reservoir is stratified, and cool reservoir water is utilized to keep Sultan River temperature below the 16°C temperature criteria (Ecology Designated Core Summer Salmonid Habitat). The combination of License-mandated MIF and temperature regulations result in the Sultan River generally having enough flow and temperature difference to cool the Skykomish River around the vicinity of the confluence during this time of year (Haas et al. 2007). Annually, Snohomish PUD Biologists observe fish milling in the deep pool at the confluence and anglers catch adult and juvenile salmonids in this pool throughout the summer.

Studies show the high temperature that triggers adult Chinook to seek cooler water is approximately 20°C (Richter et al. 2005). In 2021, the maximum temperature on the Skykomish was over 20°C for the first time on July 24 when it reached 20.1. Maximum temperature was over or near 20°C every day through August 16. Sultan River maximum daily temperature was generally 4-7 degrees Celsius cooler than the Skykomish River during this time. Skykomish River temperature did not reach 20°C after August 16.

A moderate spike in Sultan River flow occurred in Week 26 (June 29, 1,260 cfs). The Skykomish River flow was relatively high at this time (8,180 cfs), and it is unlikely this flow would trigger upriver migration of summer Chinook into the Sultan. Another spike occurred in Week 32 (August 13, 1,140 cfs). This was a relatively small increase in flow; however, the Skykomish River was quite low at this time (769 cfs) and this pulse flow may have drawn summer Chinook into the Sultan River.

In 2021, temperature, and to a lesser extent flow likely played a role in attracting hatchery Chinook into the Sultan River that were destined for the Wallace Hatchery. Temperature in the Skykomish and Sultan rivers in 2021 was fairly typical of recent years. The Skykomish River has reached 20°C every year since 2013 (Snohomish PUD Temperature Data) and climate change will likely result in warmer temperatures in the Skykomish River (Battin et al. 2007) in future years, triggering more Wallace Hatchery Chinook to migrate into the Sultan. This is a concern because limiting the proportion of hatchery origin spawners (pHOS) in wild populations is a fundamental component of standards recommended by the Hatchery Scientific Review Group (HSRG). The HSRG was established by the U.S. Congress in 2000 and its principles and recommendations were the foundation for the WDFW hatchery reforms adopted in 2009 (Commission Policy #C-3619).

5.2.2 Steelhead

Both flow and temperature were determined not to be factors in initiating upward migration of winter hatchery steelhead. Winter run hatchery steelhead are released from Wallace Hatchery and Reiter Ponds (approximately 5 and 10 miles upriver, respectively) annually; however, they are typically finished returning to the hatchery by February. Adult steelhead seek cooler water when temperature reaches approximately 20°C (Richter et al. 2005). As Figure 9 shows, temperature in the Skykomish River is well below 20°C during their migration with sufficient flow. No hatchery steelhead have been documented in the Sultan River since planting of winter steelhead in the Sultan ceased in the early 1990s.

5.3 FLOW AND TEMPERATURE IN THE DIVERSION DAM FISH PASSAGE CORRIDOR DURING THE 2021 MONITORING SEASONS

Determining fish length using sonar is imprecise and thus, cannot be used to consistently track individual fish, particularly if fish are of similar length or even the same length (Clabough et al. 2016). However, after six seasons of monitoring, some general assessments can be made regarding migration behavior as it relates to flow and temperature in the Diversion Dam fish passage corridor.

5.3.1 Chinook

Flows greater than 200 cfs at RM 9.6 impacted upstream migration when the proportion of flow from the Return Line was greater than 50% of the flow at RM 9.6. This was evident during the 2021 Chinook season when the MIF increased from 100 cfs on September 14 to 200 cfs on September 15 (Week 38). The release from Culmback Dam during this time of year was 73 cfs (Table 2), which is relatively high compared with much of the year. This high release is intended

to mitigate the need for higher release volumes through the Return Line and released into the fish passage corridor. Even so, 117 cfs was introduced through the Return Line compared with 213 cfs at the RM 9.6 gage. This Return Line release (55% relative to RM 9.6) of relatively high velocity water overwhelms the fish passage corridor. Similar releases occurred much of the remainder of the season. When the percentage of Return Line flow did decline it was because increased accretion in Reach 3 resulted in less flow through the Return Line to meet the MIF requirement of 200 cfs in Reach 2. At times during this increase in accretion, velocity in the fish passage corridor was too great and fish did not migrate upriver.

There were days prior to September 15 when the Return Line percentage was also high, primarily due to low flow being released from Culmback Dam. However, since minimum Reach 2 flow was 100 cfs prior to September 15, Return Line flow (cfs) was far less. Fish did exhibit minimal delays, but it was not nearly as impactful as it was beginning September 15.

Table 6 indicates a higher percentage of fish were documented after September 15 in 2018 and 2020 than in 2021. In 2020, the MIF was 175 cfs and in 2018 it was 200 cfs. In 2018, the accretion in Reach 3 sometimes increased resulting in less Return Line flow and more favorable flow within the fish corridor.

Ideally, temperature of Return Line water should be similar to river water temperature to reduce the likelihood of a thermal barrier manifesting that may confuse migrating fish. Figure 12 shows temperature in the Return Line and at RM 9.6 during the 2021 Chinook season. Beginning on August 5 and continuing through the remainder of the season, the Return Line temperature was often warmer than the temperature at RM 9.6 and at times by as much as two degrees Celsius.

During the 2021 Chinook season after September 15, fish were observed dropping downriver and out of the ARIS image. Using length data to identify individual fish, some of these fish were not seen again, thus they did not migrate into Reach 3. Ten Chinook redds were documented in the 0.5 (RM 9.2-9.7) mile index area immediately downstream of the Diversion Dam in 2021. In contrast, for years 2017-2020 combined, a total of ten redds were documented in this area. Also, after completion of the DDVPP, a spawning riffle formed mid-channel approximately 150 feet downstream of the Diversion Dam. This area was not suitable for spawning prior to completion of passage but since then Snohomish PUD Biologists have documented Chinook redds at this riffle. In 2021, six of the ten redds in the index area were documented at this riffle. The disproportionately high utilization of this riffle by Chinook in 2021, in conjunction with the flow volume and distribution at the Diversion Dam, may suggest that at times, Chinook selected against migrating into Reach 3. Since completion of fish passage in 2016, Snohomish PUD Biologists have documented two or fewer Chinook redds at this riffle per season.

5.3.2 Steelhead

During the entire steelhead season (March 16-June 15), the Reach 2 MIF is 140 cfs. Even though the proportion of flow in the Return Line relative to RM 9.6 was quite high at times, the overall flow was considerably lower than during Chinook season after September 15 and delay was minimal.

Figure 14 shows temperature in the Return Line and at RM 9.6 during the 2021 steelhead season, which was quite similar at these two locations throughout the season.

6 RECOMMENDATIONS

Flow and Temperature Near the Confluence of the Sultan and Skykomish Rivers

The Skykomish River will likely warm with climate change and more hatchery fish will be attracted to the Sultan River, particularly when temperatures in the Skykomish River exceed 20°C. This realization brings to light the need for mindful considerations of behavioral responses of cold-water salmonids when scheduling high volume, cool water releases under baseflow conditions, especially when Chinook salmon are seeking thermal refuge and milling in the pool at the mouth of the Sultan River. Typically, by mid-September, the Skykomish River has cooled, and the majority of Wallace Hatchery Chinook have returned to the hatchery.

Flow and Temperature in the Fish Passage Corridor

Hydraulic and thermal conditions in the fish passage corridor are generally favorable for Chinook and steelhead migration. However, at times, there are certain flow and temperature scenarios that can influence or impede migration. To minimize these scenarios the following are recommended:

- Improve localized hydraulic conditions at the Diversion Dam by: 1) limiting the Return Line flow volume routed through concrete ramp to a maximum of 70 cfs and 2) exploring options for introducing the balance of the supplemental flow necessary to meet the fall 200 cfs MIF in a fish friendly manner that does not result in turbulent or confusing flow conditions. Explore operational adjustments to minimize the difference in temperatures between flow sources and entry points as waters are blended.
- Have the ARC consider using the FHE fund to purchase additional water for supplemental releases in Reach 3 from September 15-October 31 or during periods when accretion is low.

Spawning Surveys and Monitoring Related Recommendations

- To assess whether fish are freely migrating into Reach 3 freely, a useful indicator may be to evaluate spawning activity and relative utilization in the index area immediately downstream of the Diversion Dam (RM 9.2-9.7) and particularly at the newly formed riffle 150 feet downstream of the dam. Increased spawning and relative utilization in these areas may be indicative of unfavorable conditions in the fish passage corridor.
- Conduct additional Chinook surveys, upstream of the index area, in the portion of Reach 3 where most spawning occurs. The purpose of these surveys is primarily to increase the chances of recovering carcasses. The timing of a once per season supplemental spawner survey in late October, soon after the peak of spawning, is appropriate to develop an escapement estimate. However, the vast majority of carcasses of fish that spawned in September or early to mid-October are no longer available in late October due to predation, pulse flows, or decomposition. As indicated by Figure

15, most hatchery carcasses are recovered early in the season, and it is likely that many of the fish that were documented on the ARIS beginning in June were hatchery origin Chinook. These additional surveys would provide valuable data regarding the proportion of hatchery Chinook spawning in Reach 3. This information is critical in documenting the proportion of hatchery origin spawners (pHOS) in the Sultan River.

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APPENDIX A: CHINOOK AND STEELHEAD DAILY COUNTS

Table A-1. CHINOOK 2018 Daily Counts

Statistical Week	Date	Number Chinook	Length (cm)	Comments (other fish, etc.)
31	8/2/2018	0		
	8/3/2018	2	66,73	
	8/4/2018	0		
	8/5/2018	0		
32	8/6/2018	0		
	8/7/2018	0		
	8/8/2018	1	80	
	8/9/2018	0		
	8/10/2018	0		
	8/11/2018	0		
	8/12/2018	1	77	
33	8/13/2018	0		
	8/14/2018	0		
	8/15/2018	2	41,84	
	8/16/2018	1	69	
	8/17/2018	0		
	8/18/2018	0		
	8/19/2018	1	63	
34	8/20/2018	0		
	8/21/2018	0		
	8/22/2018	1	58	
	8/23/2018	0		
	8/24/2018	0		
	8/25/2018	0		
	8/26/2018	0		
35	8/27/2018	0		
	8/28/2018	0		
	8/29/2018	0		
	8/30/2018	0		
	8/31/2018	1	89	
	9/1/2018	0		
	9/2/2018	0		
36	9/3/2018	0		

	9/4/2018	0		
	9/5/2018	0		
	9/6/2018	2	69,85	
	9/7/2018	0		
	9/8/2018			Did not operate; process flow
	9/9/2018			Did not operate; high flow
37	9/10/2018			Did not operate; high flow
	9/11/2018	0		
	9/12/2018	0		
	9/13/2018	2	77,56	
	9/14/2018	1	85	
	9/15/2018	2	68,721	
	9/16/2018	0		
38	9/17/2018	2	84,58	
	9/18/2018	1	79	
	9/19/2018			
	9/20/2018			
	9/21/2018	1	75	
	9/22/2018			Did not operate; high flow
	9/23/2018			Did not operate; high flow
39	9/24/2018	1	83	
	9/25/2018	2	55,88	
	9/26/2018	2	70,78	
	9/27/2018	2	76,86,	
	9/28/2018	0		
	9/29/2018	0		
	9/30/2018	0		
40	10/1/2018	0		
	10/2/2018	2	77,79	
	10/3/2018	1	85	
	10/4/2018	0		
	10/5/2018	1	78	
	10/6/2018	1	73	
	10/7/2018	1	82	
41	10/8/2018	0		
	10/9/2018	2	90,81	
	10/10/2018	0		
	10/11/2018	0		
	10/12/2018	1	88	
	10/13/2018	1	78	
	10/14/2018	0		

42	10/15/2018	0		
	10/16/2018	1	87	
	10/17/2018	0		
	10/18/2018	0		
	10/19/2018	0		
	10/20/2018	3	86,75,82	
	10/21/2018	0		
43	10/22/2018	0		
	10/23/2018	0		
	10/24/2018	1	80	
	10/25/2018	0		
	10/26/2018	0		
	10/27/2018	0		
	10/28/2018	0		
44	10/29/2018	0		
	10/30/2018	0		
TOTAL		43		

Table A-2. CHINOOK 2020 Daily Counts

Statistical Week	Date	Number Chinook	Incudes Extrapolation	Length (cm)	Comments (other fish, etc.)
33	8/11/2020	0	0		1 30cm unknown species hanging
	8/12/2020	1	1	56	1 30cm unknown species hanging
	8/13/2020	1	1	73	1 30cm unknown species hanging
	8/14/2020	0	0		maximum daily discharge downstream powerplant; likely encouraged migration of hatchery fish
	8/15/2020	1	1	68	1 30cm unknown species hanging
	8/16/2020	0	0		1 30cm unknown species hanging
34	8/17/2020	0	0		1 30cm unknown species hanging
	8/18/2020	2	2	75,39	unknown species ~ 35 cm hanging in view throughout season
	8/19/2020	0	0		
	8/20/2020		0.6		Power off at ARIS Aug. 20-24. May be related to ARIS now being remote so can monitor from office or home. It may be turning off for same reason our office computers turns off periodically and needs to be turned on by IT or someone in office.
	8/21/2020		0.6		Power off at ARIS Aug. 20-24
	8/22/2020		0.8		Power off at ARIS Aug. 20-24
	8/23/2020		0.7		Power off at ARIS Aug. 20-24
35	8/24/2020		0.7		Power off at ARIS Aug. 20-24
	8/25/2020	1	1	75	

	8/26/2020	3	3	76,45,59	
	8/27/2020	1	1	78	
	8/28/2020	0	0		
	8/29/2020	3	3	58,40,41	
	8/30/2020	0	0		
36	8/31/2020		0.6		Power off at ARIS Aug. 31-Sept. 7
	9/1/2020		0.7		Power off at ARIS Aug. 31-Sept. 7
	9/2/2020		0.7		Power off at ARIS Aug. 31-Sept. 7
	9/3/2020		0.6		Power off at ARIS Aug. 31-Sept. 7
	9/4/2020		0.6		Power off at ARIS Aug. 31-Sept. 7
	9/5/2020		0.6		Power off at ARIS Aug. 31-Sept. 7
	9/6/2020		0.5		Power off at ARIS Aug. 31-Sept. 7
37	9/7/2020		0.8		Power off at ARIS Aug. 31-Sept. 7
	9/8/2020	2	2	77,39	
	9/9/2020	1	1	40	
	9/10/2020	2	2	85,70	
	9/11/2020	0	0		Operated through 9/11 process flow (0145 to 1145). Range 408-647, average 599 cfs
	9/12/2020	1	1	77	
	9/13/2020	1	1	90	
38	9/14/2020	4	4	80,89, 65,68	
	9/15/2020	1	1	60	
	9/16/2020	0	0		
	9/17/2020	3	3	92,75,75	
	9/18/2020	0	0		
	9/19/2020		1.4		Power off at ARIS Sept. 19-23
	9/20/2020		1.6		Power off at ARIS Sept. 19-23
39	9/21/2020		1.7		Power off at ARIS Sept. 19-23
	9/22/2020		1.7		Power off at ARIS Sept. 19-23
	9/23/2020		1.6		Power off at ARIS Sept. 19-23
	9/24/2020	1	1	75	
	9/25/2020	6	6	87,80,82,68,82,77	
	9/26/2020	2	2	42,85	
	9/27/2020	5	5	65,79,86,89,55	
40	9/28/2020	2	2	68,96	
	9/29/2020	4	4	70,84,88,77	
	9/30/2020	0	0		
	10/1/2020	2	2	88,77	
	10/2/2020	0	0		
	10/3/2020	4	4	86,58,74,73	
	10/4/2020	0	0		

41	10/5/2020	4	4	84,66,89,51	
	10/6/2020	4	4	96,58,82,79	
	10/7/2020	2	2	56,77	
	10/8/2020	2	2	93,88	
	10/9/2020	0	0		
	10/10/2020	0	0		
	10/11/2020	3	3	84,42,78	
42	10/12/2020	0	0		
	10/13/2020	1	1	50	
	10/14/2020	0	0		
	10/15/2020	1	1	42	
	10/16/2020	0	0		
	10/17/2020	0	0		
	10/18/2020	1	1	77	
43	10/19/2020	0	0		
	10/20/2020	2	2	93,77	
	10/21/2020	0	0		
	10/22/2020	0	0		
	10/23/2020	0	0		
	10/24/2020	0	0		66 cm may be coho
	10/25/2020	0	0		
44	10/26/2020	0	0		
	10/27/2020	0	0		68 cm may be coho
	10/28/2020	1	1	84	
	10/29/2020	0	0		
	10/30/2020	0	0		50,60 may be coho
	10/31/2020	0	0		
	11/1/2020	0	0		70,52 may be coho
45	11/2/2020	0	0		
	11/3/2020	0	0		65 may be coho
	11/4/2020	0	0		
TOTAL		75	92		

Table A-3. CHINOOK 2021 Daily Counts

Statistical Week	Date	Number Chinook	Incudes Extrapolation	Length (cm)	Comments (other fish, etc.)
24	6/16/2021	0	0		Misc. smaller fish 30-40 cm throughout season
	6/17/2021	2	2	58,81	
	6/18/2021	1	1	78	
	6/19/2021	0	0		

	6/20/2021	0	0		
25	6/21/2021	0	0		
	6/22/2021	0	0		
	6/23/2021	0	0		
	6/24/2021	0	0		
	6/25/2021	0	0		
	6/26/2021	0	0		
	6/27/2021	2	2	96,73	
26	6/28/2021	0	0		
	6/29/2021	1	1	83	
	6/30/2021	0	0		
	7/1/2021	0	0		
	7/2/2021	0	0		
	7/3/2021	0	0		
	7/4/2021	0	0		
27	7/5/2021	0	0		
	7/6/2021	0	0		
	7/7/2021	1	1	65	
	7/8/2021	0	0		
	7/9/2021	1	1	78	
	7/10/2021	0	0		
	7/11/2021	0	0		
28	7/12/2021	0	0		
	7/13/2021	0	0		
	7/14/2021	0	0		
	7/15/2021	0	0		
	7/16/2021	0	0		
	7/17/2021	0	0		
	7/18/2021	0	0		
29	7/19/2021	0	0		
	7/20/2021	0	0		
	7/21/2021	1	1	59	
	7/22/2021	0			
	7/23/2021	3	3	55,48,81	
	7/24/2021	2	2	64,59	
	7/25/2021		0.4		Did not operate 7/25 through 8/1
30	7/26/2021		0.6		
	7/27/2021		0.7		
	7/28/2021		0.9		
	7/29/2021		0.9		
	7/30/2021		1.0		

	7/31/2021		0.8		
	8/1/2021		0.6		
31	8/2/2021	2	2	89,58	
	8/3/2021	2	2	58,95	
	8/4/2021	2	2	64,93	
	8/5/2021	1	1	63	
	8/6/2021	2	2	52,80	
	8/7/2021	0			
	8/8/2021	0			
32	8/9/2021	1	1	55	
	8/10/2021	1	1	81	
	8/11/2021	1	1	48	
	8/12/2021	0			
	8/13/2021	0			
	8/14/2021	1	1	66	
	8/15/2021		0.4		Did not operate 8/15 through 8/19
33	8/16/2021		0.4		
	8/17/2021		0.3		
	8/18/2021		0.2		
	8/19/2021		0.1		
	8/20/2021	1.0	1.0	61	
	8/21/2021		0.5		Did not operate 8/21 through 8/23
	8/22/2021		0.5		
34	8/23/2021		0.5		
	8/24/2021	0			
	8/25/2021	0			
	8/26/2021	0			
	8/27/2021	2	2	53,75	
	8/28/2021	2	2	67,89	
	8/29/2021	0			
35	8/30/2021	1	1	79	
	8/31/2021	0			
	9/1/2021	4	4	55,67,85,98	
	9/2/2021	12	12	80,59,84,82,97,44,59,40,57,63,57,63	
	9/3/2021	2	2	57,63	
	9/4/2021	4	4	102,68,47,50	
	9/5/2021	3	3	60,99,74	
36	9/6/2021	5	5	104,56,64,61,57	
	9/7/2021	2	2	76,65	
	9/8/2021	1	1	82	

	9/9/2021	7	7	68,90,75,91,87	
	9/10/2021	7	7	91,87,94,65,68,64,83,94,55	
	9/11/2021	5	5	68,87,81,56,70	
	9/12/2021	6	6	48,70,81,65,68,79	
37	9/13/2021	7	7	50,67,76,63,72,70,76	
	9/14/2021	10	10	54,75,67,56,84,93,65,70,100,77	
	9/15/2021	1	1	68	
	9/16/2021				
	9/17/2021	2	2	55,75	
	9/18/2021	0			
	9/19/2021	0			68 cm on image 9/19 and 9/21 but did not go up; 85cm on image on 9/19 but did not go up
38	9/20/2021	0			
	9/21/2021	0			
	9/22/2021	0			
	9/23/2021		0.1		Did not operate 9/23 through 9/29
	9/24/2021		0.1		
	9/25/2021		0.1		
	9/26/2021		0.2		
39	9/27/2021		0.2		
	9/28/2021		0.2		
	9/29/2021		0.4		
	9/30/2021	0			
	10/1/2021	0			
	10/2/2021	2	2	81,66	
	10/3/2021	1	1	74	
40	10/4/2021	0			
	10/5/2021	0			
	10/6/2021	3	3	79,86,54	
	10/7/2021	0			
	10/8/2021	0			
	10/9/2021	1	1	78	
	10/10/2021	1	1	56	
41	10/11/2021	0			
	10/12/2021	0			
	10/13/2021	0			
	10/14/2021	0			
	10/15/2021	0			
	10/16/2021	0			
	10/17/2021	0			

42	10/18/2021	0			
	10/19/2021	1	1	86	
	10/20/2021	0		70	
	10/21/2021	0			
	10/22/2021	0			
	10/23/2021	0			
	10/24/2021	0			
43	10/25/2021	0			
	10/26/2021	0			
	10/27/2021	0			
	10/28/2021	0			
	10/29/2021	0			
	10/30/2021	0			
	10/31/2021	0			
TOTAL		120	130		

Table A-4. 2019 Steelhead Daily Counts

Statistical Week	Date	Number Steelhead	Length (cm)	Comments (other fish, etc.)
7	2/15/2019			~30-35 cm fish throughout season
	2/16/2019			
8	2/17/2019			
	2/18/2019			
	2/19/2019			
	2/20/2019			
	2/21/2019			
	2/22/2019			
	2/23/2019			
9	2/24/2019			
	2/25/2019			
	2/26/2019			
	2/27/2019			
	2/28/2019			
	3/1/2019			
	3/2/2019			
10	3/3/2019			
	3/4/2019			
	3/5/2019			
	3/6/2019			
	3/7/2019			
	3/8/2019			

	3/9/2019			
11	3/10/2019			
	3/11/2019			
	3/12/2019			
	3/13/2019			
	3/14/2019			
	3/15/2019			
	3/16/2019			
12	3/17/2019			
	3/18/2019			
	3/19/2019			
	3/20/2019			
	3/21/2019			
	3/22/2019			
	3/23/2019			
13	3/24/2019			
	3/25/2019			
	3/26/2019			
	3/27/2019			
	3/28/2019			
	3/29/2019			
	3/30/2019			
14	3/31/2019			
	4/1/2019			
	4/2/2019			
	4/3/2019			
	4/4/2019			
	4/5/2019			
	4/6/2019			
15	4/7/2019	1	74	
	4/8/2019			
	4/9/2019			
	4/10/2019			
	4/11/2019			
	4/12/2019			
	4/13/2019			
16	4/14/2019			
	4/15/2019	1	88	
	4/16/2019			
	4/17/2019			
	4/18/2019			

	4/19/2019			
	4/20/2019			
17	4/21/2019			
	4/22/2019			
	4/23/2019			
	4/24/2019			
	4/25/2019			
	4/26/2019			
	4/27/2019			
18	4/28/2019			
	4/29/2019			
	4/30/2019			
	5/1/2019			
	5/2/2019			
	5/3/2019	1	73	
	5/4/2019			
19	5/5/2019			
	5/6/2019			
	5/7/2019			
	5/8/2019			
	5/9/2019	1	72	
	5/10/2019			
	5/11/2019			
20	5/12/2019			80 cm but did not go up
	5/13/2019			
	5/14/2019			
	5/15/2019			
	5/16/2019			
	5/17/2019			
	5/18/2019			
21	5/19/2019			
	5/20/2019	1	77	
	5/21/2019			
	5/22/2019			
	5/23/2019			
	5/24/2019			Pulled at 10am for process flow
	5/25/2019			Did not operate 5/24 through 5/27
22	5/26/2019			
	5/27/2019			
	5/28/2019			
	5/29/2019	1	63	

	5/30/2019			
	5/31/2019			
	6/1/2019			
23	6/2/2019			
	6/3/2019			
	6/4/2019			
	6/5/2019			
	6/6/2019			
	6/7/2019			
	6/8/2019			
24	6/9/2019			
	6/10/2019			
	6/11/2019			
	6/12/2019			
	6/13/2019			
	6/14/2019			
	6/15/2019			
	6/16/2019			
TOTAL		6		

Table A-5. 2020 STEELHEAD Daily Counts

Statistical Week	Date	Number Steelhead	Includes Extrapolation	Length (cm)	Comments
14	3/30/2020				
	3/31/2020				
	4/1/2020				
	4/2/2020				
	4/3/2020				
	4/4/2020				
15	4/5/2020				
	4/6/2020				
	4/7/2020				
	4/8/2020				
	4/9/2020				
	4/10/2020				
	4/11/2020				
16	4/12/2020				
	4/13/2020				
	4/14/2020				
	4/15/2020				Not operating 4/15-4/19; process flow
	4/16/2020				

	4/17/2020				
	4/18/2020				
17	4/19/2020				
	4/20/2020				
	4/21/2020				
	4/22/2020				
	4/23/2020				
	4/24/2020				
	4/25/2020				
18	4/26/2020				
	4/27/2020				
	4/28/2020				
	4/29/2020				
	4/30/2020				
	5/1/2020				
	5/2/2020				
19	5/3/2020				
	5/4/2020				
	5/5/2020				
	5/6/2020				
	5/7/2020				
	5/8/2020				
	5/9/2020				
20	5/10/2020				
	5/11/2020	2	2	76,70	
	5/12/2020				
	5/13/2020		0.1		Not operating 5/13-5/21; ARIS inexplicably stopped recording
	5/14/2020		0.1		
	5/15/2020		0.1		
	5/16/2020		0.1		
21	5/17/2020		0.2		
	5/18/2020		0.3		
	5/19/2020		0.1		
	5/20/2020		0.2		
	5/21/2020		0.2		
	5/22/2020				
	5/23/2020			69	
22	5/24/2020	1	1	69	
	5/25/2020	1	1	86	
	5/26/2020				
	5/27/2020	1	1	77	

	5/28/2020				
	5/29/2020				
	5/30/2020				
23	5/31/2020				
	6/1/2020				
	6/2/2020				
	6/3/2020				
	6/4/2020				
	6/5/2020				
	6/6/2020				
24	6/7/2020				
	6/8/2020				
	6/9/2020				
	6/10/2020				
	6/11/2020				
	6/12/2020				
	6/13/2020				
25	6/14/2020				
	6/15/2020				
	6/16/2020				
	6/17/2020				
	6/18/2020				
	6/19/2020				
TOTAL		5	7		

Table A-6. 2021 STEELHEAD Daily Counts

Statistical Week	Date	Number Steelhead	Includes Extrapolation	Statistical Week	Date
9	3/3/2021				35 cm fish observed every day through 4/1. Appears from downstream but does not migrate upstream past ARIS. 40 cm same behavior from 3/4 to 3/9 then not observed.
	3/4/2021				
	3/5/2021				
	3/6/2021				
	3/7/2021				
10	3/8/2021				
	3/9/2021				
	3/10/2021				
	3/11/2021				
	3/12/2021				
	3/13/2021				

	3/14/2021				
11	3/15/2021				
	3/16/2021				
	3/17/2021				
	3/18/2021				
	3/19/2021				
	3/20/2021				
	3/21/2021				
12	3/22/2021				
	3/23/2021				
	3/24/2021				
	3/25/2021				
	3/26/2021				
	3/27/2021				
	3/28/2021				
13	3/29/2021				
	3/30/2021	2	2	70, 77	
	3/31/2021				
	4/1/2021				
	4/2/2021		0.21		stopped at 1300 on 4/2
	4/3/2021		0.21		Not operating 4/2 @1300 through 4/4
	4/4/2021		0.21		Not operating
14	4/5/2021				
	4/6/2021				
	4/7/2021	1	1	70	
	4/8/2021				
	4/9/2021				
	4/10/2021				
	4/11/2021				
15	4/12/2021				
	4/13/2021				
	4/14/2021	1	1	80	
	4/15/2021				
	4/16/2021				
	4/17/2021				
	4/18/2021				
16	4/19/2021	1	1	61	
	4/20/2021				
	4/21/2021				
	4/22/2021				
	4/23/2021				

	4/24/2021				
	4/25/2021				
17	4/26/2021	1	1	83	
	4/27/2021				
	4/28/2021				
	4/29/2021				
	4/30/2021	1	1	86	
	5/1/2021	1	1	75	
	5/2/2021	2	2	75,83	
18	5/3/2021				
	5/4/2021				
	5/5/2021				
	5/6/2021				
	5/7/2021	1	1	59	
	5/8/2021				
	5/9/2021	1	1	88	
19	5/10/2021				
	5/11/2021				
	5/12/2021				
	5/13/2021				
	5/14/2021	1	1	67	
	5/15/2021	1	1	70	
	5/16/2021	2	2	76,83	
20	5/17/2021				
	5/18/2021	2	2	61,72	
	5/19/2021				
	5/20/2021				
	5/21/2021				PROCESS FLOW
	5/22/2021				DID NOT OPERATE 5/21 through 5/23
	5/23/2021				(Did not extrapolate; fish not likely to migrate during process flow)
21	5/24/2021	1	1	72	
	5/25/2021				
	5/26/2021				
	5/27/2021				
	5/28/2021				
	5/29/2021	1	1	77	
	5/30/2021				
22	5/31/2021				
	6/1/2021				
	6/2/2021				
	6/3/2021				

	6/4/2021				
	6/5/2021				
	6/6/2021	2	2	70,85	
23	6/7/2021				
	6/8/2021				
	6/9/2021				
	6/10/2021				
	6/11/2021				
	6/12/2021				
	6/13/2021				
24	6/14/2021				
	6/15/2021				
TOTAL		22	23		

APPENDIX B: MAXIMUM DAILY TEMPERATURE AND MEAN DAILY FLOW NEAR THE CONFLUENCE OF THE SULTAN AND SKYKOMISH RIVERS DURING 2021 CHINOOK AND STEELHEAD MONITORING

Table B-1. Maximum Daily Temperature Near the Confluence of the Sultan and Skykomish Rivers During the 2021 Chinook Season

Statistical Week	Date	Sultan RM 0.2	Skykomish RM 14.1	Difference
24	6/16/2021	13.5	11.1	2.4
	6/17/2021	13.9	11.4	2.4
	6/18/2021	13.8	11.6	2.2
	6/19/2021	12.7	11.3	1.4
	6/20/2021	14.1	12.5	1.6
25	6/21/2021	11.5	12.7	-1.2
	6/22/2021	11.5	12.9	-1.4
	6/23/2021	12.4	12.8	-0.4
	6/24/2021	13.9	13.0	0.9
	6/25/2021	14.3	13.9	0.4
	6/26/2021	14.8	14.1	0.7
	6/27/2021	15.0	14.6	0.4
26	6/28/2021	11.8	15.0	-3.2
	6/29/2021	11.5	15.6	-4.1
	6/30/2021	12.6	15.2	-2.6
	7/1/2021	11.4	14.9	-3.5
	7/2/2021	12.1	13.5	-1.4
	7/3/2021	14.2	16.0	-1.8
	7/4/2021	14.1	16.5	-2.4
27	7/5/2021	12.9	15.9	-3.1
	7/6/2021	14.1	17.0	-2.9
	7/7/2021	11.8	16.1	-4.3
	7/8/2021	12.1	15.1	-3.0
	7/9/2021	14.1	17.5	-3.5
	7/10/2021	14.4	18.3	-3.9
	7/11/2021	14.4	18.3	-4.0
28	7/12/2021	14.4	18.5	-4.1
	7/13/2021	14.5	19.0	-4.4
	7/14/2021	14.4	19.0	-4.5
	7/15/2021	12.0	17.2	-5.2
	7/16/2021	11.9	15.9	-4.0
	7/17/2021	13.9	17.3	-3.4

	7/18/2021	14.5	19.1	-4.6
29	7/19/2021	14.6	19.7	-5.1
	7/20/2021	12.9	17.9	-5.0
	7/21/2021	13.3	17.7	-4.4
	7/22/2021	14.9	18.6	-3.8
	7/23/2021	14.9	19.2	-4.3
	7/24/2021	15.5	20.1	-4.6
	7/25/2021	15.6	20.7	-5.1
30	7/26/2021	15.6	20.8	-5.2
	7/27/2021	15.6	21.1	-5.5
	7/28/2021	14.9	20.3	-5.4
	7/29/2021	15.3	21.2	-5.9
	7/30/2021	15.5	21.9	-6.4
	7/31/2021	13.6	20.4	-6.8
	8/1/2021	15.0	19.5	-4.5
31	8/2/2021	16.1	21.1	-5.0
	8/3/2021	15.9	21.4	-5.6
	8/4/2021	16.0	22.1	-6.1
	8/5/2021	15.8	21.3	-5.5
	8/6/2021	15.0	20.1	-5.1
	8/7/2021	14.0	18.5	-4.6
	8/8/2021	14.0	17.1	-3.1
32	8/9/2021	15.5	19.1	-3.6
	8/10/2021	16.6	20.6	-4.1
	8/11/2021	16.5	22.0	-5.5
	8/12/2021	15.2	22.4	-7.2
	8/13/2021	15.2	22.0	-6.8
	8/14/2021	16.3	21.9	-5.5
	8/15/2021	17.5	22.1	-4.6
33	8/16/2021	16.2	20.7	-4.5
	8/17/2021	15.1	19.1	-4.0
	8/18/2021	16.9	19.1	-2.2
	8/19/2021	16.5	19.3	-2.7
	8/20/2021	15.2	17.9	-2.8
	8/21/2021	15.3	16.7	-1.5
	8/22/2021	15.3	16.1	-0.8
34	8/23/2021	16.5	17.7	-1.2
	8/24/2021	16.8	18.2	-1.4
	8/25/2021	16.8	18.4	-1.5
	8/26/2021	16.1	17.4	-1.3
	8/27/2021	15.4	16.6	-1.2

	8/28/2021	16.9	18.2	-1.2
	8/29/2021	17.2	19.0	-1.8
35	8/30/2021	15.5	18.0	-2.4
	8/31/2021	14.9	15.7	-0.9
	9/1/2021	15.6	16.5	-0.9
	9/2/2021	15.9	17.2	-1.3
	9/3/2021	15.7	17.3	-1.6
	9/4/2021	15.9	16.9	-1.0
	9/5/2021	16.0	18.2	-2.2
36	9/6/2021	16.8	19.0	-2.3
	9/7/2021	16.6	18.9	-2.3
	9/8/2021	17.2	19.5	-2.3
	9/9/2021	16.4	18.9	-2.4
	9/10/2021	15.3	18.1	-2.8
	9/11/2021	16.0	17.6	-1.6
	9/12/2021	15.4	16.9	-1.5
37	9/13/2021	15.9	17.0	-1.2
	9/14/2021	15.0	16.2	-1.2
	9/15/2021	14.2	15.8	-1.5
	9/16/2021	14.1	15.6	-1.5
	9/17/2021	13.3	14.9	-1.6
	9/18/2021	13.8	13.7	0.1
	9/19/2021	13.4	12.4	1.0
38	9/20/2021	13.8	13.2	0.6
	9/21/2021	13.9	13.9	0.0
	9/22/2021	13.6	13.5	0.1
	9/23/2021	14.2	14.9	-0.7
	9/24/2021	14.2	15.4	-1.2
	9/25/2021	14.3	15.7	-1.5
	9/26/2021	13.3	14.6	-1.3
39	9/27/2021	12.5	13.8	-1.4
	9/28/2021	13.1	12.2	0.8
	9/29/2021	13.0	11.3	1.7
	9/30/2021	12.6	11.3	1.3
	10/1/2021	12.7	11.8	0.9
	10/2/2021	12.8	11.7	1.1
	10/3/2021	12.5	11.7	0.8
40	10/4/2021	13	12.9	0.1
	10/5/2021	12	11.8	0.2
	10/6/2021	12.3	11	1.3
	10/7/2021	12.3	11.6	0.7

	10/8/2021	12	10.8	1.2
	10/9/2021	11.5	9.5	2.0
	10/10/2021	11.5	9.7	1.8
41	10/11/2021	11.5	9.7	1.8
	10/12/2021	11	9.1	1.9
	10/13/2021	11	9	2.0
	10/14/2021	10.8	8.7	2.1
	10/15/2021	10.9	8.9	2.0
	10/16/2021	11.6	10.4	1.2
	10/17/2021	11.2	10.1	1.1
42	10/18/2021	11	10.3	0.7
	10/19/2021	11.3	10.5	0.8
	10/20/2021	11.3	10.6	0.7
	10/21/2021	11.5	10.5	1.0
	10/22/2021	11.4	10.5	0.9
	10/23/2021	11	9.7	1.3
	10/24/2021	11.1	9.3	1.8
43	10/25/2021	10.5	9	1.5
	10/26/2021	10.4	8.8	1.6
	10/27/2021	10.1	8.6	1.5
	10/28/2021	10.2	8.9	1.3
	10/29/2021	9.9	8.8	1.1
	10/30/2021	9	8.8	0.2
	10/31/2021	8.7	8.9	-0.2

Table B-2. Mean Daily Flow Near the Confluence of the Sultan and Skykomish Rivers During the 2021 Chinook Season

Statistical Week	Date	Sultan Downstream of the Powerhouse	Skykomish near Gold Bar	Sum of Sultan and Skykomish	Sultan Contribution (%) Relative to Flow Downstream of the Confluence
24	6/16/2021	361	7240	7601	5%
	6/17/2021	348	6920	7268	5%
	6/18/2021	346	7100	7446	5%
	6/19/2021	344	7200	7544	5%
	6/20/2021	343	7270	7613	5%
25	6/21/2021	757	8430	9187	8%
	6/22/2021	815	8940	9755	8%
	6/23/2021	497	8650	9147	5%
	6/24/2021	363	7780	8143	4%
	6/25/2021	363	7950	8313	4%

	6/26/2021	362	8620	8982	4%
	6/27/2021	525	9060	9585	5%
26	6/28/2021	1060	8910	9970	11%
	6/29/2021	1260	8180	9440	13%
	6/30/2021	739	6940	7679	10%
	7/1/2021	593	5590	6183	10%
	7/2/2021	402	4460	4862	8%
	7/3/2021	385	3970	4355	9%
	7/4/2021	385	3720	4105	9%
27	7/5/2021	385	3440	3825	10%
	7/6/2021	389	3140	3529	11%
	7/7/2021	386	2910	3296	12%
	7/8/2021	384	2600	2984	13%
	7/9/2021	385	2390	2775	14%
	7/10/2021	385	2310	2695	14%
	7/11/2021	385	2210	2595	15%
28	7/12/2021	384	2050	2434	16%
	7/13/2021	381	1950	2331	16%
	7/14/2021	380	1870	2250	17%
	7/15/2021	380	1750	2130	18%
	7/16/2021	380	1640	2020	19%
	7/17/2021	380	1500	1880	20%
	7/18/2021	380	1410	1790	21%
29	7/19/2021	382	1350	1732	22%
	7/20/2021	353	1310	1663	21%
	7/21/2021	333	1260	1593	21%
	7/22/2021	333	1190	1523	22%
	7/23/2021	333	1130	1463	23%
	7/24/2021	333	1090	1423	23%
	7/25/2021	333	1070	1403	24%
30	7/26/2021	333	1060	1393	24%
	7/27/2021	333	1040	1373	24%
	7/28/2021	417	1000	1417	29%
	7/29/2021	450	966	1416	32%
	7/30/2021	450	935	1385	32%
	7/31/2021	450	942	1392	32%
	8/1/2021	358	966	1324	27%
31	8/2/2021	331	960	1291	26%
	8/3/2021	332	914	1246	27%
	8/4/2021	394	967	1361	29%
	8/5/2021	333	886	1219	27%

	8/6/2021	334	840	1174	28%
	8/7/2021	336	906	1242	27%
	8/8/2021	481	1120	1601	30%
32	8/9/2021	361	1010	1371	26%
	8/10/2021	334	864	1198	28%
	8/11/2021	528	808	1336	40%
	8/12/2021	983	787	1770	56%
	8/13/2021	1140	769	1909	60%
	8/14/2021	650	745	1395	47%
	8/15/2021	370	721	1091	34%
33	8/16/2021	370	694	1064	35%
	8/17/2021	369	675	1044	35%
	8/18/2021	370	660	1030	36%
	8/19/2021	370	635	1005	37%
	8/20/2021	370	621	991	37%
	8/21/2021	370	608	978	38%
	8/22/2021	370	609	979	38%
34	8/23/2021	370	623	993	37%
	8/24/2021	370	594	964	38%
	8/25/2021	371	565	936	40%
	8/26/2021	368	547	915	40%
	8/27/2021	363	583	946	38%
	8/28/2021	363	604	967	38%
	8/29/2021	364	570	934	39%
35	8/30/2021	363	546	909	40%
	8/31/2021	367	541	908	40%
	9/1/2021	378	548	926	41%
	9/2/2021	384	529	913	42%
	9/3/2021	385	509	894	43%
	9/4/2021	385	494	879	44%
	9/5/2021	385	483	868	44%
36	9/6/2021	384	476	860	45%
	9/7/2021	384	471	855	45%
	9/8/2021	382	463	845	45%
	9/9/2021	381	459	840	45%
	9/10/2021	400	456	856	47%
	9/11/2021	384	460	844	45%
	9/12/2021	381	460	841	45%
37	9/13/2021	381	453	834	46%
	9/14/2021	382	443	825	46%
	9/15/2021	413	466	879	47%

	9/16/2021	416	477	893	47%
	9/17/2021	422	610	1032	41%
	9/18/2021	494	2960	3454	14%
	9/19/2021	460	2910	3370	14%
38	9/20/2021	501	3560	4061	12%
	9/21/2021	524	2010	2534	21%
	9/22/2021	524	1450	1974	27%
	9/23/2021	515	1170	1685	31%
	9/24/2021	504	1010	1514	33%
	9/25/2021	395	902	1297	30%
	9/26/2021	892	843	1735	51%
39	9/27/2021	731	2100	2831	26%
	9/28/2021	558	3860	4418	13%
	9/29/2021	528	3760	4288	12%
	9/30/2021	584	5370	5954	10%
	10/1/2021	563	4760	5323	11%
	10/2/2021	500	2730	3230	15%
	10/3/2021	478	2080	2558	19%
40	10/4/2021	507	1730	2237	23%
	10/5/2021	545	1560	2105	26%
	10/6/2021	547	1620	2167	25%
	10/7/2021	542	1800	2342	23%
	10/8/2021	532	1540	2072	26%
	10/9/2021	531	1370	1901	28%
	10/10/2021	564	2320	2884	20%
41	10/11/2021	548	2360	2908	19%
	10/12/2021	535	1900	2435	22%
	10/13/2021	561	1810	2371	24%
	10/14/2021	561	1800	2361	24%
	10/15/2021	578	3020	3598	16%
	10/16/2021	585	2960	3545	17%
	10/17/2021	558	2450	3008	19%
42	10/18/2021	621	2030	2651	23%
	10/19/2021	659	1770	2429	27%
	10/20/2021	660	1750	2410	27%
	10/21/2021	676	1860	2536	27%
	10/22/2021	1040	2230	3270	32%
	10/23/2021	1160	2750	3910	30%
	10/24/2021	1130	2320	3450	33%
43	10/25/2021	1140	2360	3500	33%
	10/26/2021	1480	4700	6180	24%

	10/27/2021	1670	8270	9940	17%
	10/28/2021	1960	23300	25260	8%
	10/29/2021	2210	26900	29110	8%
	10/30/2021	1110	10400	11510	10%
	10/31/2021	612	6260	6872	9%

Table B-3. Maximum Daily Temperature Near the Confluence of the Sultan and Skykomish Rivers During the 2021 Steelhead Season

Statistical Week	Date	Sultan RM 0.2	Skykomish RM 14.1	Difference
9	3/3/2021	4.4	6.2	-1.8
	3/4/2021	4.1	5.6	-1.5
	3/5/2021	4.1	5.7	-1.6
	3/6/2021	4.2	5.6	-1.4
	3/7/2021	4.2	5.8	-1.6
10	3/8/2021	4.2	5.7	-1.5
	3/9/2021	4.2	5.8	-1.6
	3/10/2021	4.2	6.2	-2.0
	3/11/2021	4.2	6.4	-2.2
	3/12/2021	4.3	6.5	-2.2
	3/13/2021	4.4	6.6	-2.2
	3/14/2021	3.8	5.5	-1.7
11	3/15/2021	4.0	5.4	-1.4
	3/16/2021	4.7	7.1	-2.4
	3/17/2021	4.7	7.3	-2.6
	3/18/2021	4.8	6.9	-2.1
	3/19/2021	4.9	6.8	-1.9
	3/20/2021	4.6	6.3	-1.7
	3/21/2021	4.9	5.6	-0.7
12	3/22/2021	5.9	5.2	0.7
	3/23/2021	5.8	6.5	-0.7
	3/24/2021	5.6	5.9	-0.3
	3/25/2021	6.2	6.1	0.1
	3/26/2021	6.3	6.4	-0.1
	3/27/2021	7.5	8.1	-0.6
	3/28/2021	6.6	7.2	-0.6
13	3/29/2021	6.6	5.9	0.7
	3/30/2021	5.3	6.3	-1.0
	3/31/2021	6.1	7.7	-1.6
	4/1/2021	6.5	8.4	-1.9
	4/2/2021	6.5	8.2	-1.7

	4/3/2021	6.1	7.8	-1.7
	4/4/2021	5.9	7.5	-1.6
14	4/5/2021	6.5	7.5	-1.0
	4/6/2021	6.7	8.0	-1.3
	4/7/2021	5.3	6.8	-1.5
	4/8/2021	5.8	6.3	-0.5
	4/9/2021	5.5	6.2	-0.7
	4/10/2021	5.8	6.4	-0.6
	4/11/2021	6.1	7.3	-1.2
15	4/12/2021	6.8	8.0	-1.2
	4/13/2021	7.9	8.8	-0.9
	4/14/2021	8.5	9.5	-1.0
	4/15/2021	8.6	10.3	-1.7
	4/16/2021	9.4	9.8	-0.4
	4/17/2021	9.7	9.0	0.7
	4/18/2021	9.9	8.5	1.4
16	4/19/2021	9.8	8.1	1.7
	4/20/2021	9.2	8.1	1.1
	4/21/2021	9.4	8.4	1.0
	4/22/2021	8.5	8.0	0.5
	4/23/2021	8.8	8.2	0.6
	4/24/2021	8.1	8.0	0.1
	4/25/2021	8.9	7.1	1.8
17	4/26/2021	8.7	7.5	1.2
	4/27/2021	9.5	8.1	1.4
	4/28/2021	8.9	8.2	0.7
	4/29/2021	10.2	9.0	1.2
	4/30/2021	9.1	8.6	0.5
	5/1/2021	8.5	7.5	1.0
	5/2/2021	9.1	7.2	1.9
18	5/3/2021	8.7	7.1	1.6
	5/4/2021	10.2	9.3	0.9
	5/5/2021	10.3	8.6	1.7
	5/6/2021	10.1	8.2	1.9
	5/7/2021	9.1	7.1	2.0
	5/8/2021	9.8	7.4	2.4
	5/9/2021	8.8	8.9	-0.1
19	5/10/2021	10.7	9.9	0.8
	5/11/2021	11.4	9.9	1.5
	5/12/2021	11.0	9.4	1.6
	5/13/2021	12.1	10.0	2.1

	5/14/2021	12.3	9.8	2.5
	5/15/2021	12.4	9.6	2.8
	5/16/2021	12.4	9.6	2.8
20	5/17/2021	10.6	9.1	1.5
	5/18/2021	9.5	7.7	1.8
	5/19/2021	9.8	7.8	2.0
	5/20/2021	9.7	7.7	2.0
	5/21/2021	9.6	9.0	0.6
	5/22/2021	8.2	9.1	-0.9
	5/23/2021	9.8	8.8	1.0
21	5/24/2021	9.0	7.8	1.2
	5/25/2021	9.6	8.4	1.2
	5/26/2021	12.9	9.3	3.6
	5/27/2021	12.5	9.0	3.5
	5/28/2021	11.2	7.9	3.3
	5/29/2021	13.4	9.4	4.0
	5/30/2021	12.8	9.3	3.5
22	5/31/2021	14.8	10.6	4.2
	6/1/2021	15.3	10.7	4.6
	6/2/2021	15.9	10.6	5.3
	6/3/2021	15.5	10.2	5.3
	6/4/2021	13.9	9.7	4.2
	6/5/2021	11.6	9.1	2.5
	6/6/2021	11.3	7.3	4.0
23	6/7/2021	12.3	9.2	3.1
	6/8/2021	12.5	9.2	3.3
	6/9/2021	13.1	10.1	3.0
	6/10/2021	12.1	9.7	2.4
	6/11/2021	11.4	9.1	2.3
	6/12/2021	13.3	11.2	2.1
	6/13/2021	11.4	10.7	0.7
24	6/14/2021	11.1	8.6	2.5
	6/15/2021	11.9	9.0	2.9

Table B-4. Mean Daily Flow Near the Confluence of the Sultan and Skykomish Rivers During the 2021 Steelhead Season

Statistical Week	Date	Sultan Downstream of the Powerhouse	Skykomish Near Gold Bar	Sum of Sultan and Skykomish	Sultan Contribution (%)
9	3/3/2021	831	2,530	3,361	25%
	3/4/2021	814	2,440	3,254	25%

	3/5/2021	827	2,540	3,367	25%
	3/6/2021	825	2,750	3,575	23%
	3/7/2021	809	2,690	3,499	23%
10	3/8/2021	796	2,480	3,276	24%
	3/9/2021	811	2,300	3,111	26%
	3/10/2021	895	2,140	3,035	29%
	3/11/2021	885	2,020	2,905	30%
	3/12/2021	879	1,940	2,819	31%
	3/13/2021	875	1,890	2,765	32%
	3/14/2021	885	1,950	2,835	31%
11	3/15/2021	903	1,990	2,893	31%
	3/16/2021	900	1,900	2,800	32%
	3/17/2021	892	1,850	2,742	33%
	3/18/2021	907	1,950	2,857	32%
	3/19/2021	941	2,470	3,411	28%
	3/20/2021	968	2,590	3,558	27%
	3/21/2021	566	2,690	3,256	17%
12	3/22/2021	614	3,020	3,634	17%
	3/23/2021	456	2,770	3,226	14%
	3/24/2021	446	2,730	3,176	14%
	3/25/2021	468	2,870	3,338	14%
	3/26/2021	411	2,660	3,071	13%
	3/27/2021	377	2,490	2,867	13%
	3/28/2021	392	2,760	3,152	12%
13	3/29/2021	523	2,970	3,493	15%
	3/30/2021	765	2,600	3,365	23%
	3/31/2021	711	2,370	3,081	23%
	4/1/2021	648	2,340	2,988	22%
	4/2/2021	629	2,470	3,099	20%
	4/3/2021	628	2,510	3,138	20%
	4/4/2021	628	2,810	3,438	18%
14	4/5/2021	619	2,810	3,429	18%
	4/6/2021	612	2,640	3,252	19%
	4/7/2021	620	2,650	3,270	19%
	4/8/2021	704	3,000	3,704	19%
	4/9/2021	823	2,680	3,503	23%
	4/10/2021	869	2,650	3,519	25%
	4/11/2021	855	2,400	3,255	26%
15	4/12/2021	836	2,250	3,086	27%
	4/13/2021	711	2,140	2,851	25%
	4/14/2021	621	2,100	2,721	23%

	4/15/2021	622	2,330	2,952	21%
	4/16/2021	625	3,150	3,775	17%
	4/17/2021	623	4,490	5,113	12%
	4/18/2021	557	6,280	6,837	8%
16	4/19/2021	518	7,390	7,908	7%
	4/20/2021	555	6,890	7,445	7%
	4/21/2021	536	6,360	6,896	8%
	4/22/2021	588	6,770	7,358	8%
	4/23/2021	602	6,300	6,902	9%
	4/24/2021	513	6,280	6,793	8%
	4/25/2021	558	6,050	6,608	8%
17	4/26/2021	516	5,300	5,816	9%
	4/27/2021	503	4,830	5,333	9%
	4/28/2021	500	4,660	5,160	10%
	4/29/2021	483	5,160	5,643	9%
	4/30/2021	482	6,820	7,302	7%
	5/1/2021	485	7,810	8,295	6%
	5/2/2021	475	6,650	7,125	7%
18	5/3/2021	484	5,670	6,154	8%
	5/4/2021	481	5,480	5,961	8%
	5/5/2021	453	5,860	6,313	7%
	5/6/2021	416	6,470	6,886	6%
	5/7/2021	429	7,440	7,869	5%
	5/8/2021	434	5,950	6,384	7%
	5/9/2021	431	4,900	5,331	8%
19	5/10/2021	420	4,600	5,020	8%
	5/11/2021	400	4,770	5,170	8%
	5/12/2021	380	5,500	5,880	6%
	5/13/2021	398	6,630	7,028	6%
	5/14/2021	392	8,040	8,432	5%
	5/15/2021	386	9,070	9,456	4%
	5/16/2021	385	9,950	10,335	4%
20	5/17/2021	375	10,600	10,975	3%
	5/18/2021	374	9,770	10,144	4%
	5/19/2021	383	7,500	7,883	5%
	5/20/2021	386	5,910	6,296	6%
	5/21/2021	386	5,250	5,636	7%
	5/22/2021	1,050	5,210	6,260	17%
	5/23/2021	410	5,580	5,990	7%
21	5/24/2021	390	6,170	6,560	6%
	5/25/2021	384	6,820	7,204	5%

	5/26/2021	380	7,060	7,440	5%
	5/27/2021	384	8,030	8,414	5%
	5/28/2021	408	11,200	11,608	4%
	5/29/2021	406	8,620	9,026	4%
	5/30/2021	392	7,830	8,222	5%
22	5/31/2021	383	9,040	9,423	4%
	6/1/2021	445	11,800	12,245	4%
	6/2/2021	367	14,500	14,867	2%
	6/3/2021	359	14,600	14,959	2%
	6/4/2021	358	12,600	12,958	3%
	6/5/2021	398	10,600	10,998	4%
	6/6/2021	397	9,420	9,817	4%
23	6/7/2021	461	7,530	7,991	6%
	6/8/2021	404	6,070	6,474	6%
	6/9/2021	384	5,390	5,774	7%
	6/10/2021	376	5,130	5,506	7%
	6/11/2021	367	4,770	5,137	7%
	6/12/2021	369	4,720	5,089	7%
	6/13/2021	371	6,300	6,671	6%
24	6/14/2021	375	9,910	10,285	4%
	6/15/2021	378	8,500	8,878	4%

APPENDIX C: MEAN DAILY FLOW AND TEMPERATURE AT THE DIVERSION DAM FISH CORRIDOR DURING 2021 CHINOOK AND STEELHEAD MONITORING

Table C-1. Flow at the Diversion Dam During the 2021 Chinook Season

Statistical Week	Date	Return Line	RM 9.8	RM 9.6	Percent Return Line Relative to RM 9.6
24	6/16/2021	63	60	125	50%
	6/17/2021	53	58	111	48%
	6/18/2021	55	55	111	50%
	6/19/2021	57	53	111	51%
	6/20/2021	58	52	111	52%
25	6/21/2021	58	52	111	53%
	6/22/2021	58	52	111	52%
	6/23/2021	59	51	111	53%
	6/24/2021	59	51	111	53%
	6/25/2021	61	50	113	54%
	6/26/2021	60	50	111	55%
	6/27/2021	61	49	111	56%
26	6/28/2021	61	53	115	53%
	6/29/2021	51	61	111	46%
	6/30/2021	53	61	111	48%
	7/1/2021	57	56	111	51%
	7/2/2021	57	56	111	51%
	7/3/2021	57	56	111	51%
	7/4/2021	57	56	110	52%
27	7/5/2021	57	55	111	52%
	7/6/2021	58	55	110	52%
	7/7/2021	59	55	112	53%
	7/8/2021	58	55	111	52%
	7/9/2021	59	55	111	53%
	7/10/2021	58	55	111	52%
	7/11/2021	59	55	111	53%
28	7/12/2021	59	54	111	53%
	7/13/2021	59	54	111	53%
	7/14/2021	59	54	111	53%
	7/15/2021	59	54	111	53%
	7/16/2021	62	51	111	56%
	7/17/2021	62	51	111	56%
	7/18/2021	63	51	111	57%

29	7/19/2021	63	50	111	57%
	7/20/2021	63	50	111	57%
	7/21/2021	64	50	103	62%
	7/22/2021	63	50	12	62%
	7/23/2021	64	49	98	65%
	7/24/2021	65	49	111	58%
	7/25/2021	65	49	111	58%
30	7/26/2021	65	49	111	59%
	7/27/2021	65	49	111	58%
	7/28/2021	64	49	111	58%
	7/29/2021	65	49	111	58%
	7/30/2021	66	49	111	59%
	7/31/2021	63	50	111	57%
	8/1/2021	61	53	111	55%
31	8/2/2021	60	53	111	54%
	8/3/2021	61	53	111	55%
	8/4/2021	60	53	111	54%
	8/5/2021	61	53	111	55%
	8/6/2021	59	54	111	53%
	8/7/2021	56	58	112	50%
	8/8/2021	58	208	255	23%
32	8/9/2021	58	77	128	45%
	8/10/2021	59	54	111	53%
	8/11/2021	60	54	110	54%
	8/12/2021	59	54	111	53%
	8/13/2021	59	55	111	53%
	8/14/2021	58	55	111	52%
	8/15/2021	57	56	111	52%
33	8/16/2021	57	56	111	51%
	8/17/2021	57	56	110	51%
	8/18/2021	57	56	111	52%
	8/19/2021	57	56	111	51%
	8/20/2021	57	56	111	51%
	8/21/2021	57	56	111	51%
	8/22/2021	57	56	111	52%
34	8/23/2021	57	56	111	52%
	8/24/2021	57	56	111	52%
	8/25/2021	57	57	111	51%
	8/26/2021	57	57	111	51%
	8/27/2021	56	57	111	50%
	8/28/2021	56	57	110	51%

	8/29/2021	57	58	111	51%
35	8/30/2021	56	57	111	51%
	8/31/2021	49	71	115	42%
	9/1/2021	38	88	119	32%
	9/2/2021	38	89	119	32%
	9/3/2021	39	88	121	32%
	9/4/2021	39	88	121	32%
	9/5/2021	38	88	120	32%
36	9/6/2021	38	88	119	32%
	9/7/2021	38	89	119	32%
	9/8/2021	37	88	116	32%
	9/9/2021	36	88	116	31%
	9/10/2021	36	111	135	27%
	9/11/2021	35	94	116	30%
	9/12/2021	35	90	116	31%
37	9/13/2021	35	90	116	30%
	9/14/2021	63	90	153	41%
	9/15/2021	117	89	213	55%
	9/16/2021	120	88	214	56%
	9/17/2021	119	91	218	55%
	9/18/2021	116	163	276	42%
	9/19/2021	117	128	249	47%
38	9/20/2021	112	121	236	47%
	9/21/2021	127	99	235	54%
	9/22/2021	119	93	219	55%
	9/23/2021	112	90	210	54%
	9/24/2021	110	89	206	53%
	9/25/2021	111	88	207	54%
	9/26/2021	113	349	460	25%
39	9/27/2021	112	265	347	32%
	9/28/2021	87	184	263	33%
	9/29/2021	71	151	214	33%
	9/30/2021	75	203	263	28%
	10/1/2021	73	165	228	32%
	10/2/2021	91	113	209	43%
	10/3/2021	101	101	209	48%
40	10/4/2021	104	96	208	50%
	10/5/2021	102	112	222	46%
	10/6/2021	99	113	219	45%
	10/7/2021	95	111	212	45%
	10/8/2021	97	101	205	47%

	10/9/2021	95	104	207	46%
	10/10/2021	95	132	232	41%
41	10/11/2021	90	119	213	42%
	10/12/2021	94	105	206	46%
	10/13/2021	91	125	222	41%
	10/14/2021	92	119	218	42%
	10/15/2021	94	136	234	40%
	10/16/2021	93	139	234	40%
	10/17/2021	93	114	214	43%
42	10/18/2021	100	97	207	48%
	10/19/2021	110	85	205	54%
	10/20/2021	108	87	206	53%
	10/21/2021	110	85	206	53%
	10/22/2021	109	134	252	43%
	10/23/2021	111	127	245	45%
	10/24/2021	110	106	227	48%
43	10/25/2021	110	111	232	47%
	10/26/2021	126	147	281	45%
	10/27/2021	130	146	283	46%
	10/28/2021	117	371	497	23%
	10/29/2021	98	463	527	19%
	10/30/2021	82	195	267	31%
	10/31/2021	47	281	321	15%

Table C-2. Mean Daily Temperature at the Diversion Dam During the 2021 Chinook Season

Statistical Week	Date	Return Line	RM 9.6	Difference
24	6/16/2021	8.5	10.0	-1.5
	6/17/2021	8.3	10.2	-1.9
	6/18/2021	8.3	10.3	-2
	6/19/2021	8.5	10.1	-1.6
	6/20/2021	8.4	10.5	-2.1
25	6/21/2021	8.6	11.0	-2.4
	6/22/2021	8.6	11.1	-2.5
	6/23/2021	8.6	10.8	-2.2
	6/24/2021	8.6	10.8	-2.2
	6/25/2021	8.7	11.0	-2.3
	6/26/2021	8.7	11.4	-2.7
	6/27/2021	8.8	11.6	-2.8
26	6/28/2021	9.1	12.1	-3
	6/29/2021	9.2	12.3	-3.1
	6/30/2021	9.2	11.7	-2.5

	7/1/2021	9.2	10.8	-1.6
	7/2/2021	9.3	10.2	-0.9
	7/3/2021	9.2	10.7	-1.5
	7/4/2021	9.3	11.1	-1.8
27	7/5/2021	9.5	10.9	-1.4
	7/6/2021	9.5	11.2	-1.7
	7/7/2021	9.7	10.5	-0.8
	7/8/2021	9.5	10.0	-0.5
	7/9/2021	9.7	10.7	-1
	7/10/2021	9.8	11.2	-1.4
	7/11/2021	9.8	11.3	-1.5
28	7/12/2021	10.0	11.3	-1.3
	7/13/2021	10.0	11.5	-1.5
	7/14/2021	10.1	11.5	-1.4
	7/15/2021	10.2	10.8	-0.6
	7/16/2021	10.3	10.4	-0.1
	7/17/2021	10.3	10.9	-0.6
	7/18/2021	10.4	11.2	-0.8
29	7/19/2021	10.5	11.5	-1
	7/20/2021	10.6	11.1	-0.5
	7/21/2021	10.7	10.9	-0.2
	7/22/2021	10.7	11.2	-0.5
	7/23/2021	10.9	11.4	-0.5
	7/24/2021	11.0	11.8	-0.8
	7/25/2021	11.1	12.0	-0.9
30	7/26/2021	11.2	12.1	-0.9
	7/27/2021	11.3	12.2	-0.9
	7/28/2021	11.5	12.2	-0.7
	7/29/2021	11.7	12.4	-0.7
	7/30/2021	11.8	12.6	-0.8
	7/31/2021	12.0	12.5	-0.5
	8/1/2021	12.0	12.3	-0.3
31	8/2/2021	12.0	12.6	-0.6
	8/3/2021	12.2	12.8	-0.6
	8/4/2021	12.5	13.0	-0.5
	8/5/2021	12.5	12.9	-0.4
	8/6/2021	12.7	12.6	0.1
	8/7/2021	12.8	12.1	0.7
	8/8/2021	13.0	11.1	1.9
32	8/9/2021	13.0	11.8	1.2
	8/10/2021	13.3	12.9	0.4

	8/11/2021	13.5	13.4	0.1
	8/12/2021	13.9	13.8	0.1
	8/13/2021	14.2	14.1	0.1
	8/14/2021	14.4	14.1	0.3
	8/15/2021	14.5	14.1	0.4
33	8/16/2021	14.6	13.8	0.8
	8/17/2021	14.8	13.2	1.6
	8/18/2021	14.9	13.4	1.5
	8/19/2021	15.0	13.8	1.2
	8/20/2021	15.0	13.3	1.7
	8/21/2021	15.1	13.2	1.9
	8/22/2021	15.1	13.1	2
34	8/23/2021	15.3	13.3	2
	8/24/2021	15.3	13.4	1.9
	8/25/2021	15.3	13.6	1.7
	8/26/2021	15.5	13.5	2
	8/27/2021	15.3	13.2	2.1
	8/28/2021	15.6	13.5	2.1
	8/29/2021	15.6	13.7	1.9
35	8/30/2021	15.3	13.4	1.9
	8/31/2021	14.8	12.2	2.6
	9/1/2021	14.8	11.8	3
	9/2/2021	14.8	12.3	2.5
	9/3/2021	14.9	12.6	2.3
	9/4/2021	15.0	12.8	2.2
	9/5/2021	15.1	13.2	1.9
36	9/6/2021	15.1	13.3	1.8
	9/7/2021	15.3	13.1	2.2
	9/8/2021	15.5	13.5	2
	9/9/2021	15.5	13.3	2.2
	9/10/2021	15.6	12.7	2.9
	9/11/2021	15.5	12.5	3
	9/12/2021	15.5	12.9	2.6
37	9/13/2021	15.5	12.7	2.8
	9/14/2021	15.0	12.6	2.4
	9/15/2021	13.5	12.6	0.9
	9/16/2021	13.8	12.3	1.5
	9/17/2021	13.7	12.3	1.4
	9/18/2021	13.5	12.3	1.2
	9/19/2021	13.3	11.9	1.4
38	9/20/2021	13.1	11.9	1.2

	9/21/2021	13.1	11.9	1.2
	9/22/2021	13.1	12.0	1.1
	9/23/2021	13.1	12.1	1
	9/24/2021	13.3	12.0	1.3
	9/25/2021	13.3	12.1	1.2
	9/26/2021	13.5	10.6	2.9
39	9/27/2021	13.5	10.6	2.9
	9/28/2021	13.3	11.2	2.1
	9/29/2021	13.2	11.2	2
	9/30/2021	12.7	11.2	1.5
	10/1/2021	12.5	10.9	1.6
	10/2/2021	12.4	10.9	1.5
	10/3/2021	12.2	11.1	1.1
40	10/4/2021	12.4	11.2	1.2
	10/5/2021	12.3	10.8	1.5
	10/6/2021	12.4	10.7	1.7
	10/7/2021	12.2	10.5	1.7
	10/8/2021	12.2	10.3	1.9
	10/9/2021	12.2	10.3	1.9
	10/10/2021	11.8	10.2	1.6
41	10/11/2021	11.9	10.1	1.8
	10/12/2021	11.7	9.8	1.9
	10/13/2021	11.7	9.7	2
	10/14/2021	11.6	9.7	1.9
	10/15/2021	11.3	9.8	1.5
	10/16/2021	11.3	10.0	1.3
	10/17/2021	10.8	9.9	0.9
42	10/18/2021	10.9	9.8	1.1
	10/19/2021	11.1	10.0	1.1
	10/20/2021	11.1	10.0	1.1
	10/21/2021	11.3	10.0	1.3
	10/22/2021	10.8	9.9	0.9
	10/23/2021	11.0	9.7	1.3
	10/24/2021	10.9	9.7	1.2
43	10/25/2021	10.5	9.4	1.1
	10/26/2021	10.2	9.3	0.9
	10/27/2021	9.9	9.1	0.8
	10/28/2021	9.7	9.3	0.4
	10/29/2021	9.5	9.0	0.5
	10/30/2021	9.4	7.8	1.6
	10/31/2021	6.5	7.4	-0.9

Table C-3. Flow at the Diversion Dam During the 2021 Steelhead Season

Statistical Week	Date	Return Line	RM 9.8	RM 9.6	Percent Return Line Relative to RM 9.6
9	3/3/2021	45	101	154	29%
	3/4/2021	45	94	149	30%
	3/5/2021	45	101	163	28%
	3/6/2021	45	109	160	28%
	3/7/2021	45	102	154	29%
10	3/8/2021	44	94	146	30%
	3/9/2021	45	83	135	33%
	3/10/2021	45	76	128	36%
	3/11/2021	48	71	126	38%
	3/12/2021	51	68	126	40%
	3/13/2021	51	67	125	41%
	3/14/2021	51	75	133	38%
11	3/15/2021	72	81	164	44%
	3/16/2021	79	78	169	47%
	3/17/2021	77	75	164	47%
	3/18/2021	78	94	183	42%
	3/19/2021	78	103	193	41%
	3/20/2021	78	141	227	34%
	3/21/2021	38	294	324	12%
12	3/22/2021	0	501	474	0%
	3/23/2021	0	374	342	0%
	3/24/2021	0	370	338	0%
	3/25/2021	0	368	338	0%
	3/26/2021	0	340	307	0%
	3/27/2021	0	324	293	0%
	3/28/2021	0	340	307	0%
13	3/29/2021	21	262	263	8%
	3/30/2021	51	101	158	32%
	3/31/2021	57	92	155	37%
	4/1/2021	57	91	154	37%
	4/2/2021	58	87	152	39%
	4/3/2021	62	84	153	41%
	4/4/2021	59	87	153	39%
14	4/5/2021	66	80	152	43%
	4/6/2021	69	75	152	45%
	4/7/2021	69	91	166	41%
	4/8/2021	67	138	210	32%

	4/9/2021	70	111	189	37%
	4/10/2021	71	110	189	37%
	4/11/2021	72	100	180	40%
15	4/12/2021	68	90	166	41%
	4/13/2021	63	84	155	41%
	4/14/2021	65	82	152	43%
	4/15/2021	65	82	153	42%
	4/16/2021	66	82	154	43%
	4/17/2021	67	78	152	44%
	4/18/2021	69	76	152	46%
16	4/19/2021	41	138	174	24%
	4/20/2021	4	212	192	2%
	4/21/2021	4	193	176	2%
	4/22/2021	50	220	256	19%
	4/23/2021	103	124	234	44%
	4/24/2021	92	73	173	53%
	4/25/2021	92	96	198	47%
17	4/26/2021	78	78	163	48%
	4/27/2021	75	70	152	49%
	4/28/2021	78	66	151	52%
	4/29/2021	81	63	151	53%
	4/30/2021	75	73	155	49%
	5/1/2021	72	77	155	47%
	5/2/2021	72	73	150	48%
18	5/3/2021	75	72	154	49%
	5/4/2021	78	75	159	49%
	5/5/2021	79	72	158	50%
	5/6/2021	74	72	151	49%
	5/7/2021	61	87	152	40%
	5/8/2021	64	82	149	43%
	5/9/2021	70	76	150	47%
19	5/10/2021	72	73	150	48%
	5/11/2021	76	71	153	50%
	5/12/2021	74	70	149	50%
	5/13/2021	76	69	150	51%
	5/14/2021	77	67	150	51%
	5/15/2021	78	66	149	52%
	5/16/2021	83	59	149	56%
20	5/17/2021	89	53	150	60%
	5/18/2021	85	58	150	56%
	5/19/2021	87	56	150	58%

	5/20/2021	88	55	150	59%
	5/21/2021	86	56	150	58%
	5/22/2021	96	321	419	23%
	5/23/2021	88	56	150	59%
21	5/24/2021	66	84	154	43%
	5/25/2021	66	78	150	44%
	5/26/2021	78	66	150	52%
	5/27/2021	63	83	150	42%
	5/28/2021	47	113	159	30%
	5/29/2021	62	84	149	41%
	5/30/2021	73	72	149	49%
22	5/31/2021	79	66	150	53%
	6/1/2021	84	60	149	56%
	6/2/2021	92	52	150	61%
	6/3/2021	91	52	150	61%
	6/4/2021	88	55	150	59%
	6/5/2021	75	73	153	49%
	6/6/2021	54	102	158	34%
23	6/7/2021	55	154	209	26%
	6/8/2021	56	98	158	36%
	6/9/2021	67	76	150	45%
	6/10/2021	75	68	149	50%
	6/11/2021	79	63	149	53%
	6/12/2021	76	66	149	51%
	6/13/2021	76	67	149	51%
24	6/14/2021	70	72	149	47%
	6/15/2021	78	65	149	52%

Table C-4. Temperature at the Diversion Dam During the 2021 Steelhead Season

Statistical Week	Date	Return Line	RM 9.6	Difference
9	3/3/2021	3.6	2.8	0.8
	3/4/2021	3.6	2.8	0.8
	3/5/2021	3.9	2.9	1.0
	3/6/2021	3.8	2.9	0.9
	3/7/2021	3.7	2.9	0.8
10	3/8/2021	3.3	2.9	0.4
	3/9/2021	3.5	3.0	0.5
	3/10/2021	3.4	2.9	0.5
	3/11/2021	3.3	3.0	0.3
	3/12/2021	3.4	3.0	0.4

	3/13/2021	3.6	3.1	0.5
	3/14/2021	3.6	3.1	0.5
11	3/15/2021	3.4	3.2	0.2
	3/16/2021	3.7	3.3	0.4
	3/17/2021	3.7	3.4	0.3
	3/18/2021	4.0	3.4	0.6
	3/19/2021	4.2	3.5	0.7
	3/20/2021	4.1	3.6	0.5
	3/21/2021	3.8	3.4	0.4
12	3/22/2021	3.9	3.8	0.1
	3/23/2021	4.2	3.6	0.6
	3/24/2021	4.0	3.7	0.3
	3/25/2021	4.5	4.8	-0.3
	3/26/2021	4.5	4.9	-0.4
	3/27/2021	4.9	6.2	-1.3
	3/28/2021	4.3	4.3	0
13	3/29/2021	4.3	3.9	0.4
	3/30/2021	4.3	4.3	0
	3/31/2021	4.5	4.2	0.3
	4/1/2021	4.9	4.1	0.8
	4/2/2021	5.0	4.2	0.8
	4/3/2021	5.0	4.2	0.8
	4/4/2021	5.2	4.4	0.8
14	4/5/2021	4.7	4.3	0.4
	4/6/2021	4.8	4.4	0.4
	4/7/2021	4.8	4.6	0.2
	4/8/2021	4.3	4.5	-0.2
	4/9/2021	4.7	4.8	-0.1
	4/10/2021	4.5	4.7	-0.2
	4/11/2021	4.5	4.5	0
15	4/12/2021	5.1	5.4	-0.3
	4/13/2021	5.7	6.1	-0.4
	4/14/2021	6.1	6.3	-0.2
	4/15/2021	6.3	5.9	0.4
	4/16/2021	6.9	6.6	0.3
	4/17/2021	7.3	6.9	0.4
	4/18/2021	7.3	6.5	0.8
16	4/19/2021	7.1	6.7	0.4
	4/20/2021	6.3	6.7	-0.4
	4/21/2021	6.5	7.6	-1.1
	4/22/2021	6.0	7.4	-1.4

	4/23/2021	6.5	6.4	0.1
	4/24/2021	6.8	6.6	0.2
	4/25/2021	6.9	7.0	-0.1
17	4/26/2021	6.8	6.3	0.5
	4/27/2021	7.0	6.7	0.3
	4/28/2021	7.2	6.7	0.5
	4/29/2021	7.6	6.8	0.8
	4/30/2021	7.3	6.9	0.4
	5/1/2021	7.0	6.2	0.8
	5/2/2021	7.0	6.7	0.3
18	5/3/2021	7.0	6.7	0.3
	5/4/2021	7.5	6.7	0.8
	5/5/2021	8.0	7.8	0.2
	5/6/2021	8.1	7.8	0.3
	5/7/2021	7.1	7.1	0
	5/8/2021	7.1	7.1	0
	5/9/2021	7.2	7.1	0.1
19	5/10/2021	7.4	7.0	0.4
	5/11/2021	7.8	7.2	0.6
	5/12/2021	8.0	7.1	0.9
	5/13/2021	8.1	7.1	1
	5/14/2021	8.4	7.3	1.1
	5/15/2021	8.5	7.3	1.2
	5/16/2021	8.5	7.2	1.3
20	5/17/2021	8.1	7.2	0.9
	5/18/2021	8.0	7.5	0.5
	5/19/2021	7.5	7.2	0.3
	5/20/2021	7.7	7.6	0.1
	5/21/2021	7.6	7.3	0.3
	5/22/2021	7.0	7.4	-0.4
	5/23/2021	7.8	7.9	-0.1
21	5/24/2021	7.8	7.4	0.4
	5/25/2021	8.3	7.7	0.6
	5/26/2021	10.1	10.3	-0.2
	5/27/2021	10.0	10.5	-0.5
	5/28/2021	9.1	9.2	-0.1
	5/29/2021	9.8	10.1	-0.3
	5/30/2021	10.3	10.1	0.2
22	5/31/2021	10.9	10.4	0.5
	6/1/2021	11.3	10.5	0.8
	6/2/2021	11.8	10.8	1

	6/3/2021	11.7	10.5	1.2
	6/4/2021	10.8	10.0	0.8
	6/5/2021	9.9	10.0	-0.1
	6/6/2021	9.4	10.3	-0.9
23	6/7/2021	9.3	9.8	-0.5
	6/8/2021	9.6	9.8	-0.2
	6/9/2021	9.9	9.8	0.1
	6/10/2021	9.7	9.6	0.1
	6/11/2021	9.6	9.7	-0.1
	6/12/2021	9.5	8.3	1.2
	6/13/2021	9.5	8.4	1.1
24	6/14/2021	9.4	8.2	1.2
	6/15/2021	9.4	8.3	1.1

Appendix 2

RCO Grant Match - Approved Project

Presler, Dawn

From: Presler, Dawn
Sent: Tuesday, May 17, 2022 8:08 AM
To: 'Applegate, Brock A (DFW)'; Anne Savery; Jeff Garnett; Jennifer Bailey; Mike Rustay; Kannadaguli, Monika (ECY); Nate Morgan; Richard Vacirca; Tom O'Keefe; elizabeth.babcock@noaa.gov
Cc: McDonnell, Andrew; Binkley, Keith
Subject: RE: JHP (FERC No. 2157) - request concurrence for FHE fund grant match

Hi ARC Members,
Thank you for your support in providing the match requirement if this project is selected for funding through the RCO. We will keep you informed about the progress of 1) if we receive/don't receive the grant and 2) project progress if we do. As Keith mentioned, there is lots of competition for funding so we'll keep our fingers crossed.

Dawn

From: Applegate, Brock A (DFW) <Brock.Applegate@dfw.wa.gov>
Sent: Monday, May 16, 2022 4:28 PM
To: Presler, Dawn <DJPresler@SNOPUD.com>; Anne Savery <asavery@tulaliptribes-nsn.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Jennifer Bailey <JBailey@everettwa.gov>; Mike Rustay <mike.rustay@co.snohomish.wa.us>; Kannadaguli, Monika (ECY) <MKAN461@ECY.WA.GOV>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Tom O'Keefe <okeefe@americanwhitewater.org>; elizabeth.babcock@noaa.gov
Cc: McDonnell, Andrew <AWMcdonnell@SNOPUD.com>; Binkley, Keith <KMBinkley@SNOPUD.com>
Subject: RE: JHP (FERC No. 2157) - request concurrence for FHE fund grant match

Hi Everyone, WDFW concurs with the Fish Habitat and Enhancement (FHE) fund match for a grant with the WA Recreation and Conservation Office (RCO) for the side channel extension project as described below.

Sincerely, Brock Applegate

Brock Applegate
Energy, Water, and Major Projects Mitigation Biologist
Washington Department of Fish and Wildlife
P.O. Box 1100
La Conner, WA 98257-9612

(360) 789-0578 (cell)
(360) 466-0515 (fax)

From: Presler, Dawn <DJPresler@SNOPUD.com>
Sent: Monday, May 2, 2022 1:45 PM
To: Applegate, Brock A (DFW) <Brock.Applegate@dfw.wa.gov>; Anne Savery <asavery@tulaliptribes-nsn.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Jennifer Bailey <JBailey@everettwa.gov>; Mike Rustay <mike.rustay@co.snohomish.wa.us>; Kannadaguli, Monika (ECY) <MKAN461@ECY.WA.GOV>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Tom O'Keefe <okeefe@americanwhitewater.org>; elizabeth.babcock@noaa.gov

Cc: McDonnell, Andrew <AWMcdonnell@SNOPUD.com>; Binkley, Keith <KMBinkley@SNOPUD.com>
Subject: RE: JHP (FERC No. 2157) - request concurrence for FHE fund grant match

External Email

Hi – this is building off of the just completed grant design work (60%, $200K, no match with RCO) and the priority list of FHE projects for the lower river developed by the ARC. The short answers are:

1) 1,900 feet of additional side channel off of SC-1 (btwn RM0.5-1.6)

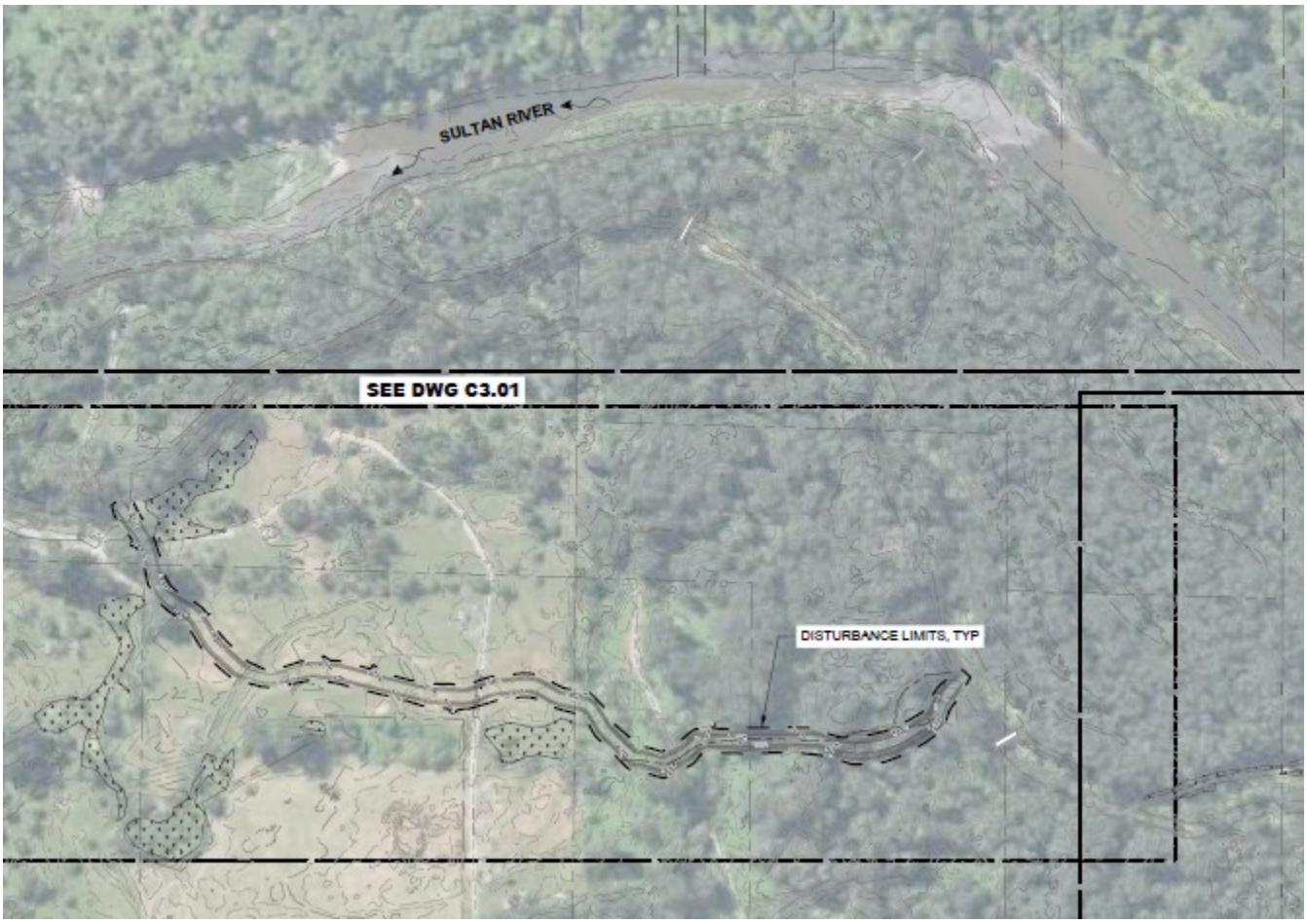
General objectives:

1. Modify the distribution of streamflow in the mainstem Sultan River to enhance existing and engage new off-channel areas to provide for diverse habitat conditions for both juvenile and adult salmonids over the full range of hydrologic conditions.
2. Expand the geographic (spatial) and temporal extent of the side channel network by manipulating the hydraulic inlet controls.
3. Incorporate the use of woody debris and boulders to improve roughness to increase both adult and juvenile habitat availability in the side channels.
4. Develop a healthy native riparian corridor adjacent to the new channel.
5. Eradicate noxious weeds in project area in proximity to the new channel.

Specific design elements:

- Increase flow delivery to floodplain by 5-8 cfs during low flow.
- Provide flood refugia during high flow conditions.
- Expand side channel network by ~1,900 feet.
- Increase channel roughness and substrate diversity in the new channel by placing a minimum of six log structures and integrating the use of boulders in at least four locations.
- Establish a native riparian corridor along each bank of the new channel.

2) Map:



Dawn

From: Applegate, Brock A (DFW) <Brock.Applegate@dfw.wa.gov>
Sent: Monday, May 2, 2022 1:17 PM
To: Presler, Dawn <DJPresler@SNOPUD.com>; Anne Savery <asavery@tulaliptribes-nsn.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Jennifer Bailey <JBailey@everettwa.gov>; Mike Rustay <mike.rustay@co.snohomish.wa.us>; Kannadaguli, Monika (ECY) <MKAN461@ECY.WA.GOV>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Tom O'Keefe <okeefe@americanwhitewater.org>; elizabeth.babcock@noaa.gov
Cc: McDonnell, Andrew <AWMcdonnell@SNOPUD.com>; Binkley, Keith <KMBinkley@SNOPUD.com>
Subject: RE: JHP (FERC No. 2157) - request concurrence for FHE fund grant match

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Hi Dawn, Could we get a map or link with a map about the project? I would also like to know the amount of channel and habitat the project will affect? I would like to see some more quantitative descriptions in the project that I would concur with, whether just a link or quick e-mail description with map. Also, the project information “location” in the proposal sheet also calls for a map.

Thanks, Brock

From: Presler, Dawn <DJPresler@SNOPUD.com>
Sent: Monday, May 2, 2022 12:41 PM
To: Anne Savery <asavery@tulaliptribes-nsn.gov>; Applegate, Brock A (DFW) <Brock.Applegate@dfw.wa.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Jennifer Bailey <JBailey@everettwa.gov>; Mike Rustay <mike.rustay@co.snohomish.wa.us>; Kannadaguli, Monika (ECY) <MKAN461@ECY.WA.GOV>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Tom O'Keefe <okeefe@americanwhitewater.org>; elizabeth.babcock@noaa.gov
Cc: McDonnell, Andrew <AWMcdonnell@SNOPUD.com>; Binkley, Keith <KMBinkley@SNOPUD.com>
Subject: JHP (FERC No. 2157) - request concurrence for FHE fund grant match

External Email

Hi ARC Members,
Per the ARC meeting, please take the next business 10 days (by May 16) to provide your concurrence on using Fish Habitat Enhancement Funds to match for a grant with the WA Recreation and Conservation Office for the side channel extension grant project that was identified by the ARC as a priority project for the lower Sultan River. The grant match is for 20% ($153,000) towards the estimated total cost of $765,000. As mentioned, we'd like to get concurrence now to show the application selection committee that there are dedicated funds and ARC support. No objections were heard at the meeting. **Silence will be deemed as abstaining from voting; however, I'd love to hear your concurrence so there's no ambiguity.** Let me know if you have questions on this.

Thanks again for your support.

Dawn

From: Presler, Dawn
Sent: Monday, May 2, 2022 12:24 PM
To: Anne Savery <asavery@tulaliptribes-nsn.gov>; Brock Applegate <brock.applegate@dfw.wa.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Jennifer Bailey <JBailey@everettwa.gov>; Mike Rustay <mike.rustay@co.snohomish.wa.us>; Monica Kannadaguli <mkan461@ecy.wa.gov>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Tom O'Keefe <okeefe@americanwhitewater.org>
Cc: Andrew McDonnell <AWMcdonnell@SNOPUD.com>; Keith Binkley <KMBinkley@SNOPUD.com>
Subject: JHP (FERC No. 2157) - ARC mtg summary

Hi ARC Members,
Attached is the draft meeting summary for your review. Please send me any edits by May 9.

I'll send a separate email requesting concurrence for grant matching from the FHE fund per the meeting summary shortly.

Cheers,
Dawn Presler
Sr. Environmental Coordinator
Generation – Natural Resources
Snohomish County PUD No. 1
Everett, WA

(425) 783-1709 (work)

Appendix 3

Consultation Documentation Regarding Draft Report

Presler, Dawn

From: Presler, Dawn
Sent: Friday, May 20, 2022 9:29 AM
To: Anne Savery; Brock Applegate; Jeff Garnett; Jennifer Bailey; Mike Rustay; Monica Kannadaguli; Nate Morgan; Richard Vacirca; Tom O'Keefe; elizabeth.babcock@noaa.gov
Cc: Andrew McDonnell; Keith Binkley
Subject: JHP (FERC No. 2157) - draft FHE Annual Rpt for your 30day review and comment
Attachments: 2021 FHEP DRAFT Annual Report.pdf

Dear ARC Members,
Attached is the very brief draft 2021 annual report for the Fish Habitat Enhancement Plan for your 30-day review. Please send comments/edits, if any, to me by June 20, 2022. Concurrence emails are always appreciated too!

As you can see there is approximately $1.45M of funds available currently for proposed projects that benefit fish of the Sultan River and Basin. An additional $200K (adjusted for CPI from 2011 dollars) will be added this September.

Dawn Presler
Sr. Environmental Coordinator
Generation – Natural Resources
Snohomish County PUD No. 1
Everett, WA

(425) 783-1709 (work)