SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

Your Northwest renewables utility

May 28, 2014

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
Fisheries and Habitat Monitoring Plan – 2013 Annual Report
License Article 410

Dear Secretary Bose:

Enclosed is Public Utility District No. 1 of Snohomish County's Fisheries and Habitat Monitoring Plan Annual Report for 2013 pursuant to License Article 410 for the Jackson Hydroelectric Project. The draft report was provided to the Aquatic Resource Committee for a 30-day review and comment period. No comments were received; consultation documentation is included in the report's appendix.

If you have any questions on the Fisheries and Habitat Monitoring Plan Annual Report for 2013, please contact Keith Binkley, Natural Resources Manager, at (425) 783-1769 or KMBinkley@snopud.com.

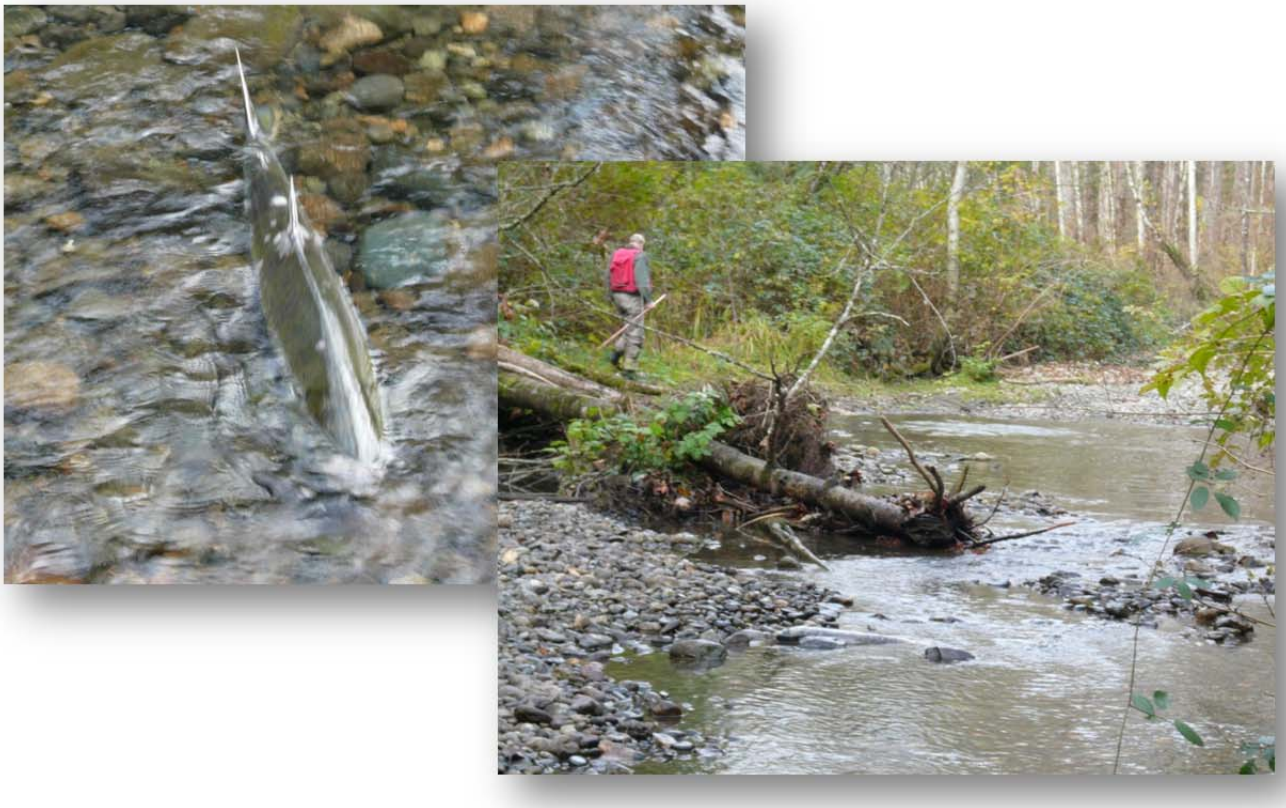
Sincerely,

Kim D. Moore, P.E.
Assistant General Manager of Generation, Water, and Corporate Services
KDMoore@snopud.com
(425) 783-8606

Enclosed: Fisheries and Habitat Monitoring Plan Annual Report for 2013

cc: Keith Binkley, District

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



License Article 410: Fisheries and Habitat Monitoring Plan – 2013 Annual Report

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1
Everett, WA

May 2014

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

District. 2014. License Article 410: Fisheries and Habitat Monitoring Plan 2013 Annual Report, Henry M. Jackson Hydroelectric Project, FERC No. 2157. May 2014.

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List of Figures

1. 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) (FERC 2011). License Article 410 approved the Fisheries and Habitat Monitoring Plan (FHM Plan) filed with the FERC on September 2, 2010, with modification. Per Section 4.1 of the FHM Plan, the District is to prepare a report by June 30 of each year detailing the monitoring efforts of the previous calendar year.

This FHM Plan Annual Report covers activities conducted in calendar year 2013. Appendices A, B, and C contain water temperature data. Appendix A contains mean daily temperature in graphical format and Appendix B contains the same data in tabular format. Appendix C contains seven-day average of the daily maximum water temperature (7-DAD Max) in tabular format. Appendix D is the Smolt Screw Trap Report for 2013. This Annual Report was provided to the Aquatic Resources Committee (ARC) [consisting 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] for a 30-day review and comment period; no comments were received on the draft report. Consultation documentation is included in Appendix E.

2. MONITORING OF FISH HABITAT IN THE SULTAN RIVER

2.1. Riverine Habitat Monitoring

No formal monitoring of aquatic habitat conditions in the lower Sultan River (downstream of river mile (RM) 2.7 occurred in 2013. Informal surveys indicated that the baseline survey conducted in 2008 by Stillwater Sciences continued to accurately reflect habitat conditions in the lower Sultan River during 2013 (Stillwater 2008). The Stillwater Sciences survey also defined habitat conditions prior to implementation of the Side Channel Enhancement and Placement of Large Woody Debris Plan.

As articulated in the FHM Plan, the District is to conduct a habitat survey after a high flow event or other major event causing changes in habitat conditions. The flow event of March 16, 2014, warrants this survey and the District is proposing to contract for data collection during summer 2014. In 2014, the District will also contract for an aerial survey of the entire Sultan River downstream of Culmback Dam.

2.2. Water Temperature Monitoring

Water temperature was continuously monitored at 13 locations with the Project area during 2013 (Figure 1). Monitoring at 10 of these locations was conducted by the District. The remaining monitoring was conducted by the U.S. Geological Survey (USGS) through a cooperative agreement. These locations, in order from upstream to downstream, include:

- South Fork Sultan River, upstream of Culmback Dam, near river mile (RM) 18.2 (USGS Gage No. 12137290);
- Sultan River, within the bypass reach immediately downstream of Culmback Dam, at RM 15.8;
- Sultan River, within the bypass reach, near RM 14.3;
- Sultan River, within the bypass reach, near RM 12.8;
- Sultan River, within the bypass reach, near RM 11.3;
- Big Four Creek, tributary to Sultan River, near RM 11.3;
- Sultan River, within the bypass reach immediately upstream of the Diversion Dam, near RM 9.8;
- Sultan River, immediately downstream of the Diversion Dam, near RM 9.6 (USGS Gage No. 12137800);
- Sultan River, upstream of the Powerhouse, near RM 4.9;
- Sultan River, downstream of the Powerhouse, near RM 4.4,
- Sultan River, near the confluence with the Skykomish River, at RM 0.2;
- Skykomish River, upstream of the confluence with the Sultan River, at RM 14.1; and
- Skykomish River, downstream of the confluence with the Sultan River, at RM 13.2.

Water temperature monitoring at Sultan River RM 14.3, 12.8 and 11.3, are part of the Water Temperature Conditioning Plan monitoring sites; the others are requirements under the FHM Plan.

In general, water temperatures observed during 2013 were consistent with those collected during 2008 and 2009 by CH2M Hill and presented in the Water Quality Final Technical Report (CH2M 2009). No exceedences of state water temperature criteria were documented during 2013. Figures depicting mean daily water temperature during 2013 are presented in Appendix A. A tabulation of all mean daily temperature data for 2013 is presented in Appendix B. The seven-day average of the daily maximum temperature (7-DAD Max) is presented in Appendix C. Data gaps are attributed to malfunctioning equipment or equipment lost due to vandalism.

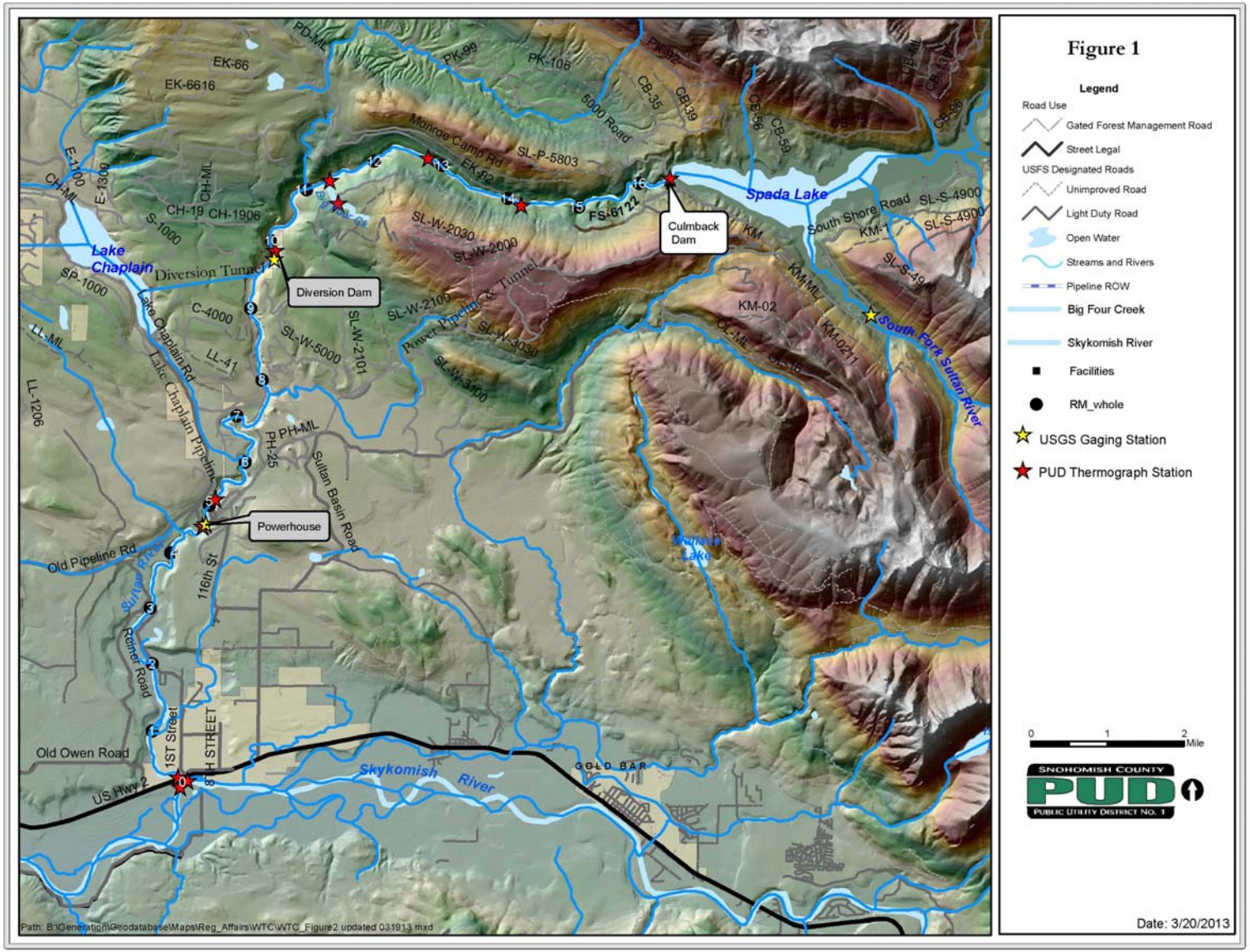


Figure 1. Locations of water temperature monitoring.

3. MONITORING OF FISH POPULATIONS IN THE SULTAN RIVER

3.1. Spawner Abundance, Distribution, and Timing in the Sultan River

In the Sultan River, steelhead and salmon escapement surveys are conducted during the spring and fall, respectively. These surveys are conducted, as conditions allow, within four index areas located downstream of the Diversion Dam (RM 9.7) (Figure 2). During 2013, conditions were generally favorable during both the spring and fall surveys. Spring surveys were used to develop an escapement estimate of 94 steelhead based on the direct observation of 47 redds and expanded count of 59 redds. Five steelhead redds were observed in the Diversion Dam Index Area (DDIA). The "passage trigger" for the initiation of actions to implement volitional passage at the Diversion Dam was met during 2013. The "passage trigger" is met when the spawning escapement Chinook salmon or steelhead trout within the DDIA equals or exceeds in any one (1) year, ten (10) percent of the combined total spawning escapement for either Chinook salmon or steelhead trout within the four (4) established index areas of the Sultan River, downstream of the Diversion Dam.

Fall surveys occurred between September and November 2013. These surveys were used to generate an escapement estimate of 460 Chinook based on field observations and extrapolation to a total 184 redds. Of the 141 redds observed in index areas, 3 (2%) were observed in the Diversion Dam Index Area. Both the steelhead estimate and Chinook estimate were developed cooperatively with WDFW.

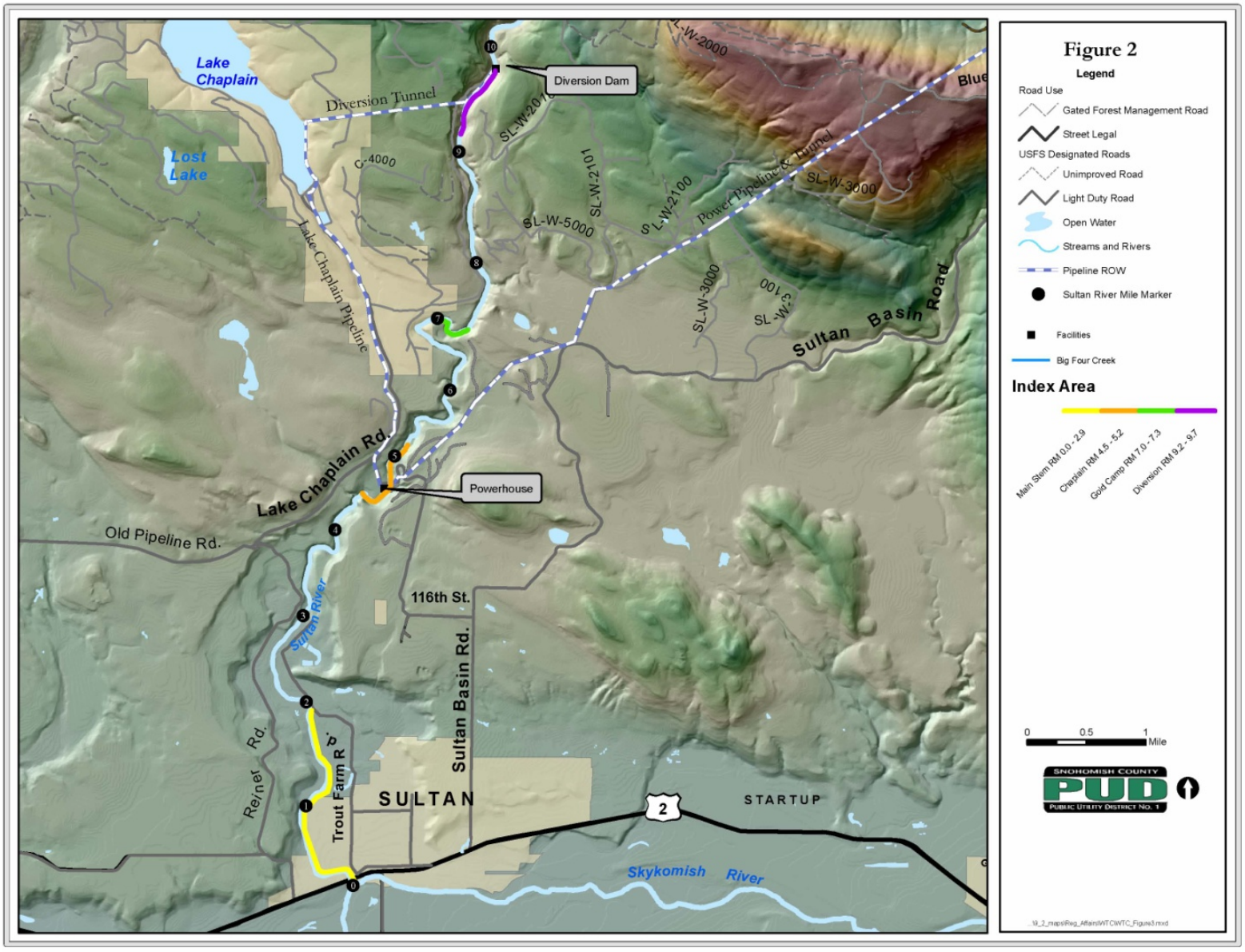


Figure 2. Locations of steelhead and salmon escapement surveys.

3.2. Flow Ceiling, Implemented for Chinook Salmon

A flow ceiling of 550 cfs is implemented annually between September 15 and October 15 in the reach of the Sultan River downstream of the Powerhouse (RM 4.7). This ceiling ensures that areas used by spawning Chinook salmon remain wetted through incubation and emergence should flows from the Project approach the minimum instream flow of 300 cfs. Mean daily discharge downstream of the Powerhouse averaged 492 cfs during the period however, there was a flow increase as high as 955 cfs (September 16) during this period (Figure 3). The initial excursion above the salmon ceiling on September 16 was due to an ARC-approved delay of a scheduled process flow release due to an unforeseen and extended period of dry weather; FERC was notified of this modification on September 25, 2014, in accordance with the Adaptive Management Plan and on October 25, 2014, as a 30-day follow-up. In its letter dated November 14, 2013, FERC stated that this deviation was not a violation of the license since the District took the necessary steps required by the AM Plan to manage several water use conflicts to satisfy the process flow requirement. The other observed excursions above the ceiling during this period were directly attributed to precipitation.

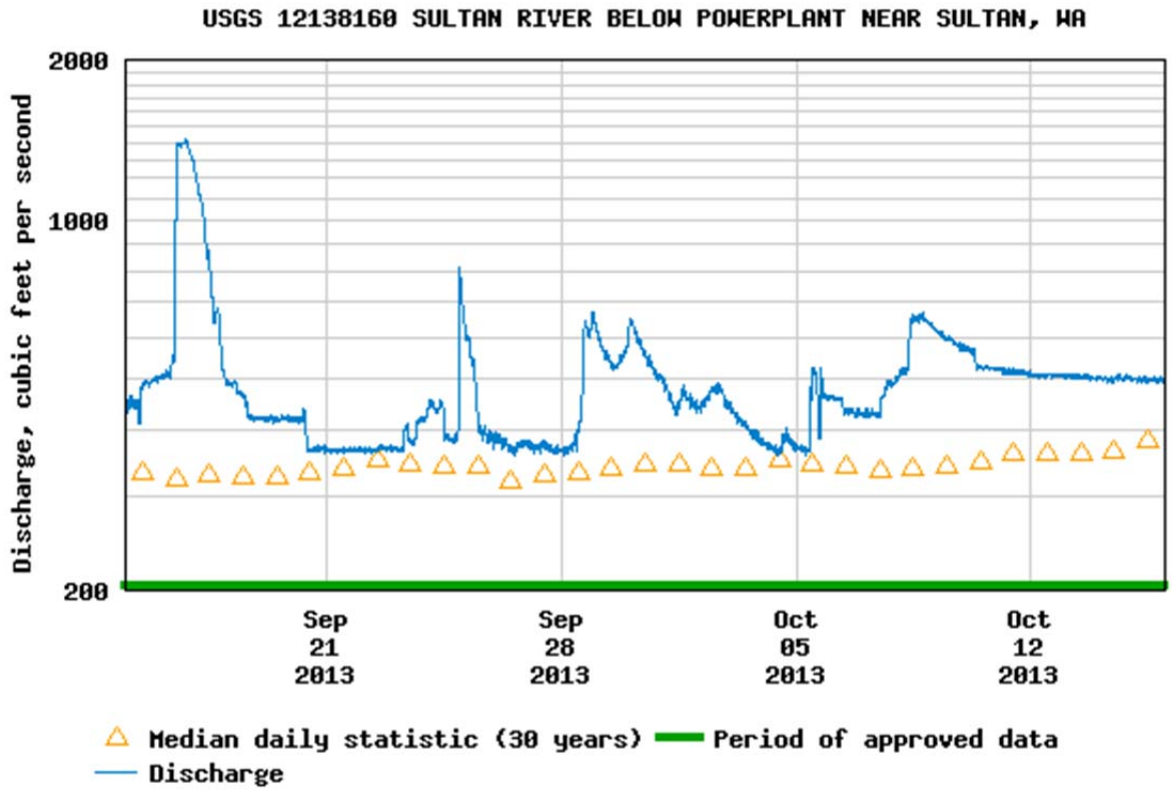


Figure 3. Mean Daily Discharge in the Sultan River downstream of the Powerhouse.

3.3. Juvenile Production in the Sultan River

The second year of smolt trapping efforts to estimate the outmigration of juvenile salmonids and production within the Sultan River was initiated on January 22, 2013. A five-foot diameter rotary screw trap operation was established in the Sultan River near RM 0.2, just upstream of the confluence with the Skykomish River. Sampling continued until June 30. A report presenting the results of the 2013 sampling season is presented in Appendix D.

4. SIDE CHANNEL MAINTENANCE AND MONITORING

On October 31, 2013, the District filed with the FERC a comprehensive Side Channel Enhancement Ramping Rate Evaluation Report pursuant to the License Article 405 and the FERC-approved Ramping Rate Evaluation Plan. During 2013, the District conducted detailed quantitative and qualitative surveys of side channels in the lower Sultan River to assess flow behavior and distribution and to determine whether additional ramping rate restrictions were necessary to prevent juvenile fish stranding within existing and newly constructed side channel habitats. The surveys included measurements of: 1) topography at side channel inlets, 2) water surface and channel elevation at point of hydraulic control near inlet, 3) flow routing and distribution into and within side channels under conditions of low to moderate mainstem discharge, 4) wetted width and depth at systematic intervals along each channel, and 5) photo documentation of low flow habitat conditions along the length of each side channel. Detailed quantitative monitoring of physical habitat will be conducted to document changes in the lower Sultan River tied to the large scale side channel enhancement project and placement of engineered log jams. This information will be presented in future reports specifically tied to those monitoring efforts. Monthly qualitative monitoring to assess the performance of both newly constructed and modified side channels, as well as the engineered log jams, was initiated after construction was completed. No maintenance has been required to date.

5. FUTURE MONITORING

The 2013 calendar year marks the second calendar year under the new license. Monitoring methodologies employed in 2013 were consistent with those identified in the FHM Plan. Monitoring of physical habitat and water quality conditions will continue through 2014 and 2015. In addition, riverine habitat monitoring will take place in 2014 as prescribed in the Process Flow Plan, Fisheries and Habitat Monitoring Plan, Marsh Creek Slide Modification Plan, Side Channel Enhancement/Large Woody Debris Plan, and the Side Channel Ramping Rate Evaluation Report since there was a high flow event on March 16, 2014. Spawner abundance, distribution and timing monitoring and juvenile production (smolt trap) monitoring will take place per the FHM Plan.

6. REFERENCES

CH2M Hill. 2009. Water Quality Final Technical Report. Henry M. Jackson Hydroelectric Project, FERC No. 2157. Water Quality Parameter Study (RSP 1). Prepared for Public Utility District No. 1 of Snohomish County. August 2009. Available at: http://www.snopud.com/Site/Content/Documents/relicensing/Study%20Reports/Jackson2157_SP1WQ_FTR_Aug2009.pdf

FERC. 2011. Order Issuing New License, Project No. 2157-188. 136 FERC ¶ 62,188. September 2, 2011. Available at: http://www.snopud.com/Site/Content/Documents/relicensing/License/20110902LICENSE.pdf

Stillwater Sciences. 2008. Study Plan 18: Riverine, Riparian, and Wetland Habitat Assessment Technical Report. Prepared for Public Utility District No. 1 of Snohomish County. March 2008. Available at: http://www.snopud.com/Site/Content/Documents/relicensing/Study%20Reports/Jackson2157_SP18_FINAL_compiled.pdf

APPENDIX A

2013 Water Temperature Figures

Figure A-1. Mean Daily Water Temperature in the South Fork Sultan River, upstream of Culmback Dam (RM 18.2), and in the mainstem Sultan River immediately downstream of Culmback Dam (RM 15.8) during 2013

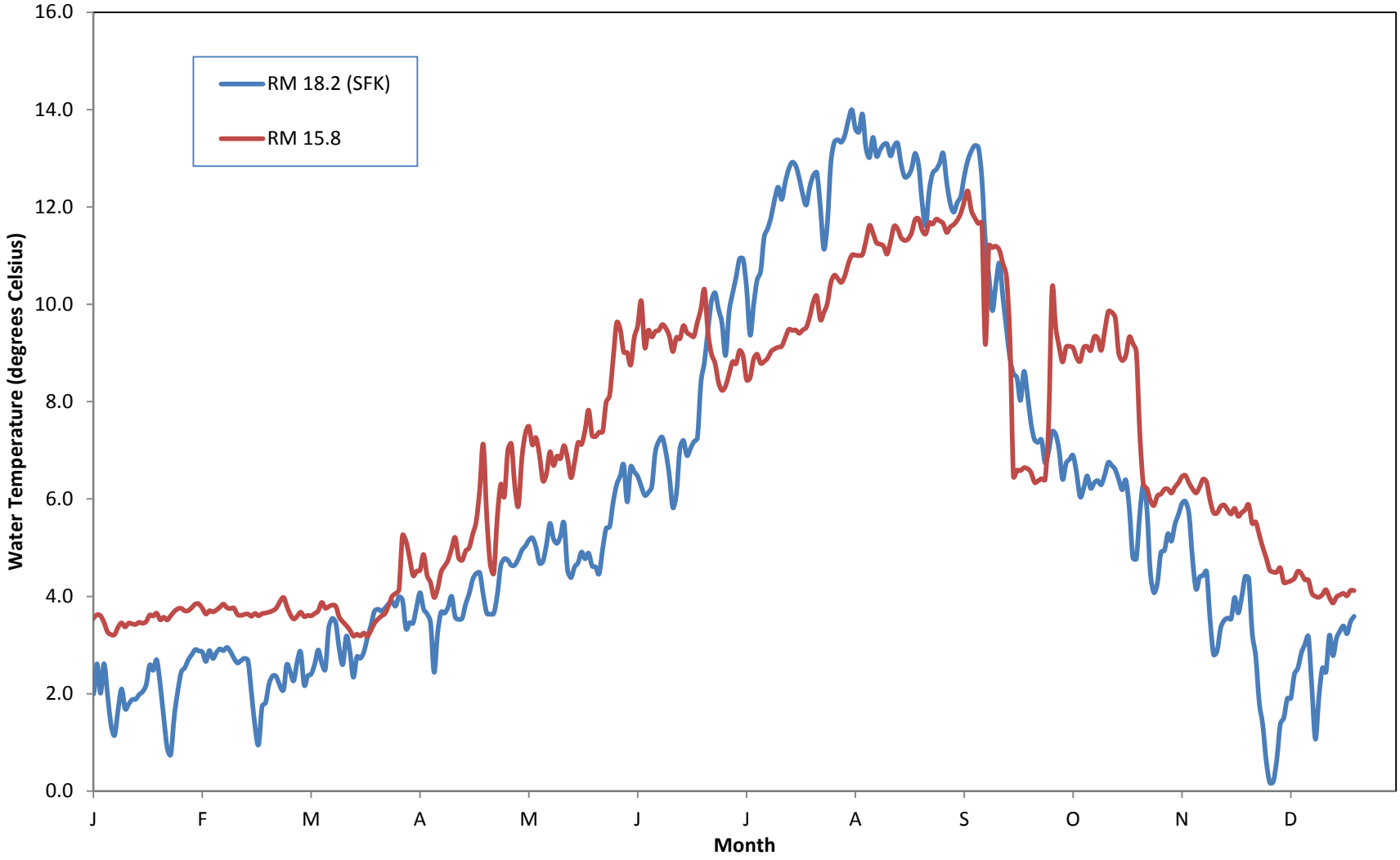


Figure A-2. Longitudinal Depiction of Mean Daily Water Temperature in the Bypass Reach (Reach 3) of the Sultan River during 2013

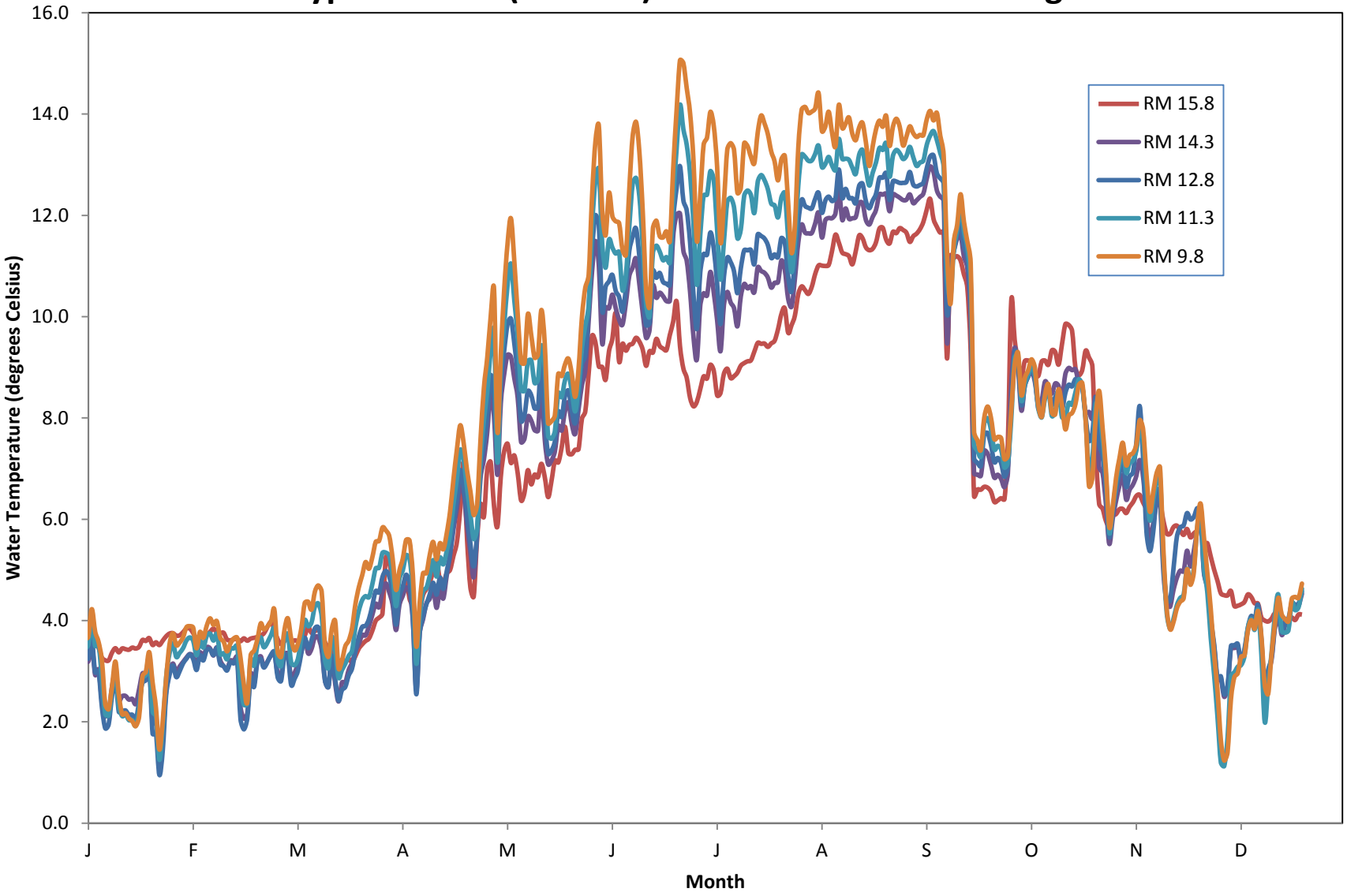


Figure A-3. Longitudinal Depiction of Mean Daily Water Temperature, Sultan River downstream of Culmback Dam, 2013

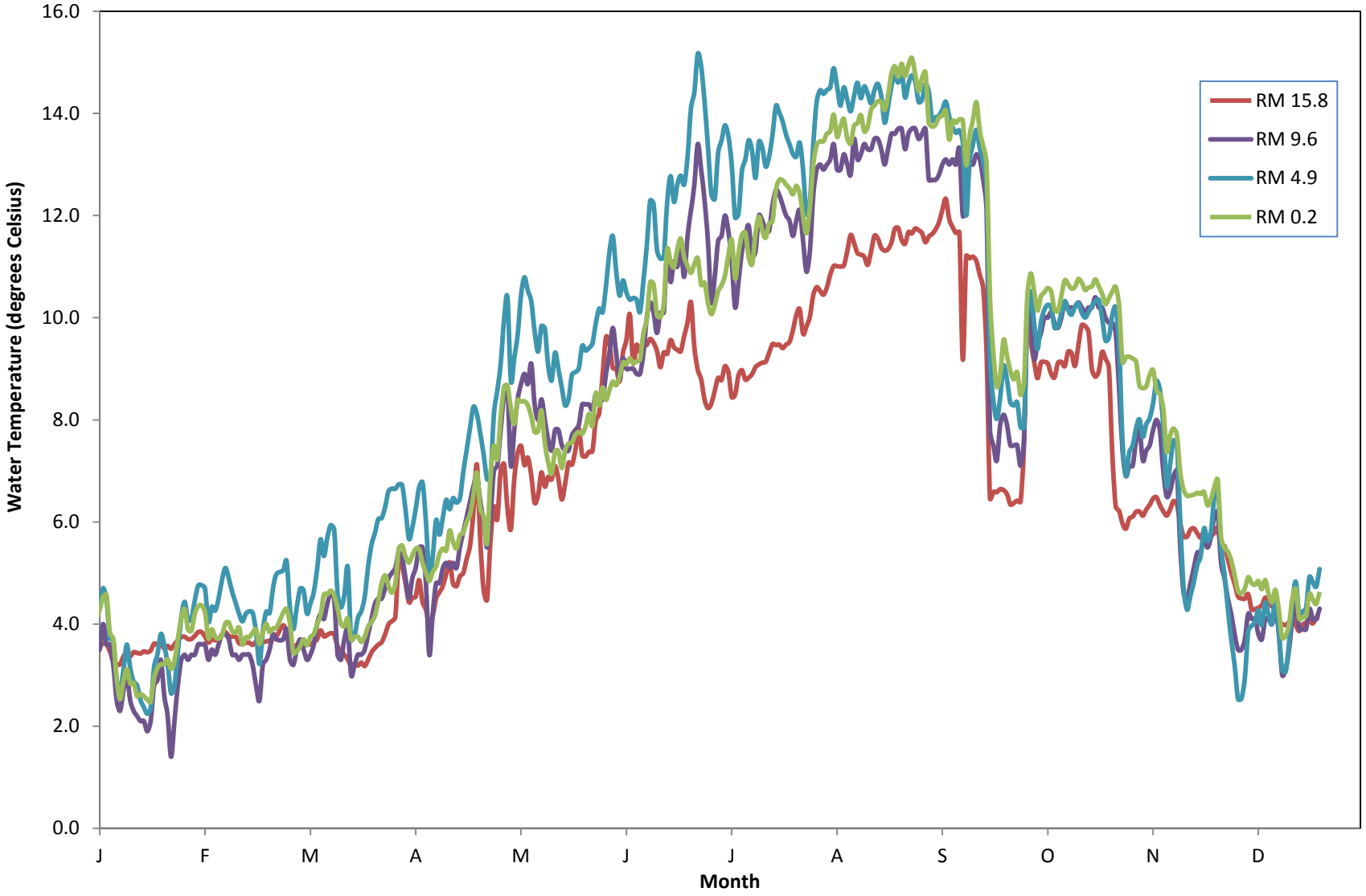
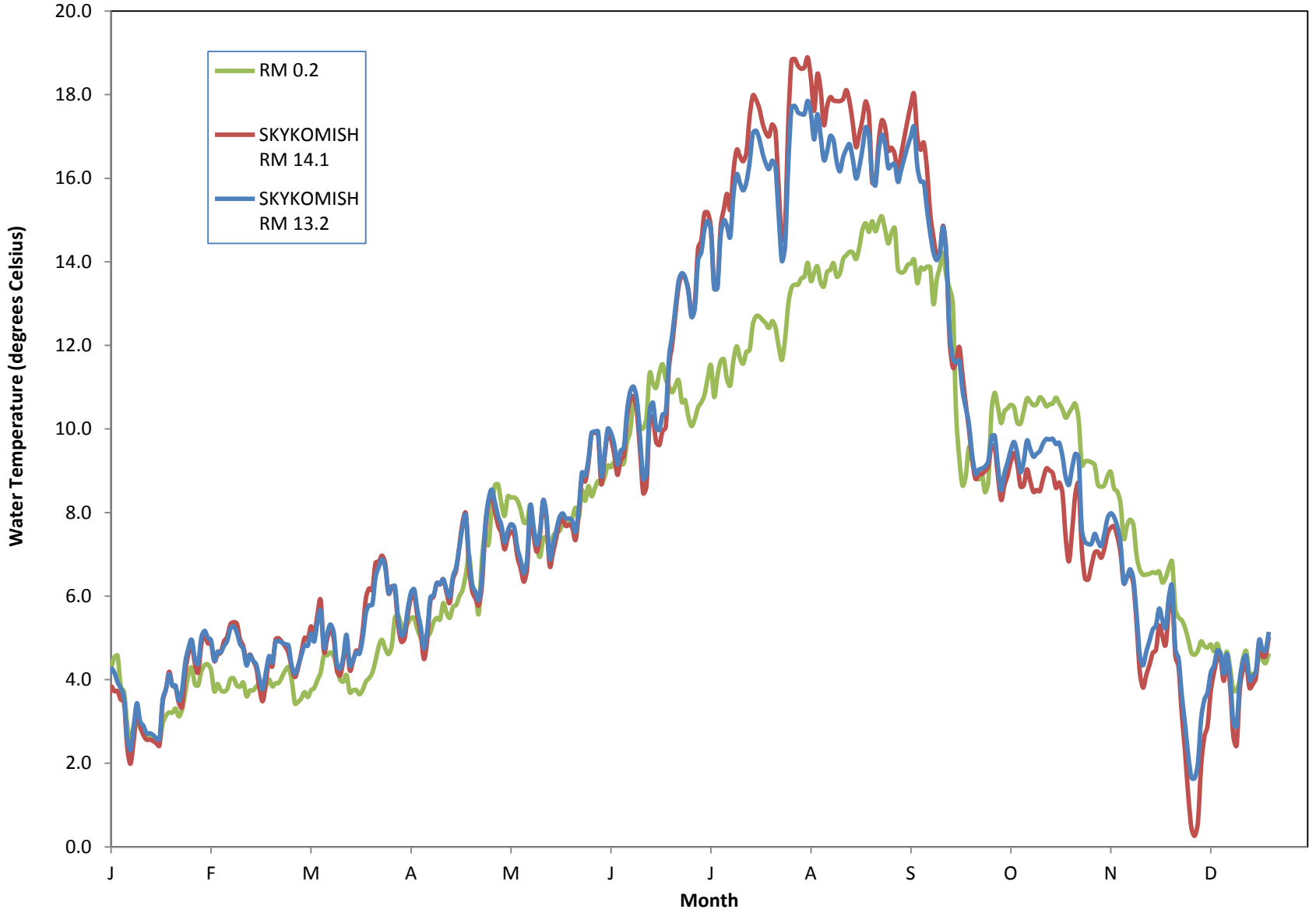


Figure A-4. Mean Daily Water Temperature near confluence of Sultan and Skykomish rivers, 2013



APPENDIX B

2013 Mean Daily Water Temperature Data in Tabular Format

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
1/1	1.7	3.7	2.9	2.7	2.9	3.1	3.1	3.6	3.5	3.4	3.0	2.7	3.1
1/2	1.6	3.3	2.8	2.6	2.6	2.7	2.8	3.3	3.3	3.2	3.0	2.2	2.7
1/3	1.6	3.2	2.4	2.2	2.1	2.3	2.6	3.0	3.2	3.2	2.6	1.5	2.2
1/4	1.9	3.6	3.0	2.9	2.9	3.0	3.0	3.7	3.6	3.7	3.2	1.8	2.7
1/5	2.2	3.5	3.3	3.2	3.3	3.4	3.3	4.0	3.7	3.9	3.5	2.8	3.5
1/6	2.5	3.5	3.3	3.2	3.4	3.6	3.5	4.4	4.0	4.1	3.6	3.5	4.0
1/7	2.0	3.6	3.2	3.3	3.5	3.7	3.5	4.3	4.2	4.3	3.8	3.8	4.3
1/8	2.6	3.6	3.5	3.6	4.0	4.2	4.0	4.7	4.5	4.5	4.1	3.7	4.2
1/9	2.0	3.6	2.9	3.0	3.5	3.8	3.6	4.5	4.4	4.6	3.7	3.7	3.9
1/10	2.6	3.5	3.0	3.0	3.5	3.6	3.6	3.7	3.6	3.8	3.4	3.5	3.8
1/11	2.0	3.3	2.4	2.3	2.9	3.2	3.2	3.7	3.6	3.7	2.8	3.5	3.6
1/12	1.4	3.2	2.1	1.9	2.2	2.3	2.5	2.9	2.9	2.9	2.3	2.4	2.6
1/13	1.1	3.2	2.2	2.0	2.1	2.2	2.3	2.7	2.5	2.5	2.0	2.0	2.3
1/14	1.7	3.4	2.7	2.5	2.6	2.7	2.7	3.1	2.8	2.9	2.3	2.5	2.9
1/15	2.1	3.5	3.0	2.9	3.0	3.2	3.0	3.6	3.0	3.1	2.5	3.3	3.4
1/16	1.7	3.4	2.4	2.2	2.3	2.5	2.5	3.1	2.8	2.8	2.2	2.9	3.0
1/17	1.8	3.4	2.5	2.2	2.1	2.2	2.3	2.9	2.7	2.8	2.4	2.7	2.9
1/18	1.9	3.4	2.5	2.2	2.1	2.2	2.2	2.8	2.6	2.6	2.6	2.6	2.7
1/19	1.9	3.4	2.4	2.1	2.0	2.1	2.1	2.5	2.5	2.6	2.5	2.6	2.7
1/20	2.0	3.5	2.5	2.1	2.0	2.0	2.1	2.4	2.5	2.6	2.8	2.5	2.7
1/21	2.0	3.4	2.4	2.0	1.9	1.9	1.9	2.2	2.5	2.5	2.8	2.5	2.6
1/22	2.2	3.5	2.6	2.4	2.3	2.1	2.1	2.4	2.4	2.5	3.1	2.4	2.6
1/23	2.6	3.6	3.0	2.8	2.9	2.9	2.8	3.2	2.9	2.9	3.4	3.5	3.5
1/24	2.5	3.6	2.9	2.8	2.9	3.0	2.9	3.4	2.9	3.1	3.4	3.8	3.8
1/25	2.7	3.7	3.1	3.1	3.3	3.4	3.3	3.8	2.9	3.2	3.8	4.2	4.1
1/26	2.2	3.5	2.0	1.8	2.2	2.8	2.6	3.6	3.0	3.2	3.2	3.9	3.9
1/27	1.5	3.6	2.0	1.8	2.1	2.3	2.2	3.2	3.1	3.3	3.1	3.8	3.9
1/28	0.9	3.5	1.3	1.0	1.3	1.5	1.4	2.6	2.8	3.1	2.2	3.4	3.5
1/29	0.8	3.6	1.7	1.4	1.9	2.0	2.1	2.8	2.9	3.3	2.1	3.3	3.7
1/30	1.5	3.7	2.6	2.5	2.9	2.9	2.8	3.4	3.4	3.7	2.9	4.2	4.4
1/31	2.1	3.7	3.0	2.9	3.3	3.5	3.3	4.1	4.0	4.1	3.3	4.6	4.8

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
2/1	2.4	3.8	3.2	3.1	3.6	3.8	3.4	4.4	4.3	4.3	3.4	4.8	5.0
2/2	2.5	3.7	3.0	2.9	3.3	3.5	3.3	4.1	3.8	3.9	3.5	4.4	4.5
2/3	2.7	3.7	3.1	3.0	3.4	3.6	3.4	4.1	3.8	3.9	3.5	4.2	4.4
2/4	2.8	3.8	3.2	3.2	3.5	3.7	3.4	4.5	4.2	4.2	3.5	4.9	5.0
2/5	2.9	3.8	3.3	3.2	3.6	3.9	3.6	4.8	4.3	4.3	3.7	5.1	5.2
2/6	2.9	3.8	3.3	3.3	3.7	3.9	3.6	4.8	4.3	4.4	3.7	4.9	5.0
2/7	2.9	3.8	3.3	3.2	3.6	3.9	3.6	4.7	4.2	4.2	3.6	4.9	4.9
2/8	2.7	3.6	3.1	3.0	3.3	3.5	3.3	4.0	3.6	3.7	3.2	4.4	4.5
2/9	2.9	3.7	3.4	3.3	3.6	3.8	3.5	4.3	3.7	3.9	3.4	4.6	4.7
2/10	2.7	3.7	3.3	3.2	3.5	3.7	3.4	4.3	3.5	3.8	3.3	4.6	4.7
2/11	2.8	3.7	3.5	3.4	3.7	3.9	3.6	4.5	3.4	3.7	3.4	4.9	4.8
2/12	2.9	3.8	3.4	3.4	3.7	4.0	3.8	4.9	3.5	3.8	3.7	5.0	4.9
2/13	2.9	3.8	3.3	3.3	3.6	3.9	3.8	5.1	3.7	4.0	3.8	5.3	5.2
2/14	3.0	3.8	3.5	3.5	3.7	4.0	3.7	4.9	3.7	4.0	3.8	5.4	5.3
2/15	2.9	3.8	3.2	3.1	3.3	3.7	3.4	4.6	3.6	3.9	3.8	5.3	5.1
2/16	2.7	3.8	3.1	3.1	3.4	3.6	3.4	4.4	3.6	3.8	3.9	5.0	4.9
2/17	2.6	3.6	3.0	3.0	3.2	3.4	3.3	4.2	3.7	3.9	3.4	4.8	4.7
2/18	2.7	3.6	3.2	3.2	3.4	3.5	3.4	4.1	3.5	3.6	3.4	4.4	4.3
2/19	2.7	3.6	3.2	3.2	3.4	3.6	3.4	4.2	3.8	3.7	3.4	4.6	4.6
2/20	2.7	3.6	3.3	3.2	3.5	3.7	3.4	4.2	3.7	3.7	3.4	4.5	4.5
2/21	2.0	3.6	2.3	2.1	2.7	3.3	3.2	4.2	3.6	3.8	3.0	4.3	4.4
2/22	1.3	3.6	2.1	1.9	2.3	2.7	2.8	3.9	3.6	3.9	3.1	3.8	4.0
2/23	1.0	3.6	2.2	2.1	2.4	2.4	2.5	3.2	3.2	3.6	2.7	3.5	3.8
2/24	1.7	3.6	3.0	2.9	3.2	3.3	3.2	3.9	3.6	3.8	3.1	3.9	4.2
2/25	1.8	3.7	2.7	2.7	3.1	3.4	3.3	4.2	3.9	4.0	3.2	4.5	4.6
2/26	2.2	3.7	3.2	3.2	3.5	3.6	3.5	4.2	3.8	3.8	3.2	4.3	4.4
2/27	2.4	3.7	3.3	3.2	3.7	3.9	3.8	4.7	4.0	3.9	3.4	5.0	4.9
2/28	2.4	3.8	3.1	3.1	3.5	3.8	3.7	5.0	4.1	3.9	3.6	5.0	4.9

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
3/1	2.1	4.0	3.3	3.3	3.7	4.0	3.7	5.1	4.4	4.2	4.0	4.8	4.8
3/2	2.6	3.8	3.4	3.4	3.8	4.2	3.9	5.2	4.5	4.3	4.1	4.6	4.8
3/3	2.5	3.6	3.0	2.9	3.2	3.4	3.3	4.3	4.0	4.0	3.3	4.3	4.3
3/4	2.3	3.5	2.9	2.8	3.1	3.3	3.2	3.9	3.3	3.4	3.1	4.1	4.1
3/5	2.7	3.6	3.3	3.3	3.7	3.8	3.5	4.3	3.3	3.5	3.5	4.3	4.3
3/6	2.9	3.7	3.3	3.3	3.7	4.0	3.7	4.7	3.4	3.6	3.7	4.7	4.6
3/7	2.2	3.6	2.9	2.7	3.2	3.6	3.5	4.7	3.5	3.7	3.3	5.0	4.8
3/8	2.4	3.6	3.0	2.9	3.1	3.4	3.3	4.2	3.5	3.6	3.4	5.0	4.8
3/9	2.4	3.6	3.2	3.0	3.2	3.5	3.4	4.4	3.8	3.7	3.5	5.3	5.1
3/10	2.6	3.6	3.4	3.4	3.7	3.9	3.6	4.6	3.9	3.8	3.8	5.1	4.9
3/11	2.9	3.7	3.7	3.7	4.0	4.3	4.0	5.1	3.8	4.0	3.9	5.6	5.4
3/12	2.6	3.9	3.4	3.5	3.9	4.4	4.2	5.7	4.1	4.2	4.4	5.9	5.6
3/13	2.5	3.8	3.4	3.6	4.0	4.2	4.1	5.3	4.7	4.6	4.5	4.7	4.8
3/14	3.4	3.8	3.7	3.8	4.3	4.6	4.4	5.7	4.6	4.6	4.8	5.0	5.1
3/15	3.5	3.8	3.7	3.9	4.3	4.7	4.6	5.9	4.8	4.7	4.9	5.2	5.3
3/16	3.5	3.8	3.4	3.6	4.1	4.6	4.5	5.9	4.9	4.6	4.7	5.0	5.1
3/17	2.9	3.6	2.8	2.8	3.2	3.5	3.4	4.6	4.2	4.3	3.6	4.2	4.4
3/18	2.6	3.5	2.7	2.7	3.1	3.3	3.3	4.3	3.8	4.0	3.2	4.1	4.3
3/19	3.2	3.4	3.3	3.3	3.7	3.8	3.7	4.6	3.7	4.0	3.6	4.5	4.5
3/20	2.9	3.3	2.8	2.8	3.4	4.0	3.9	5.1	3.9	4.1	3.7	5.0	5.1
3/21	2.3	3.2	2.4	2.4	2.9	3.1	3.0	3.7	3.4	3.7	3.1	4.2	4.3
3/22	2.8	3.2	2.8	2.6	3.0	3.2	3.2	3.8	3.5	3.7	2.9	4.4	4.5
3/23	2.7	3.2	2.8	2.7	3.1	3.5	3.4	4.1	3.5	3.8	2.8	4.7	4.7
3/24	2.9	3.2	3.0	2.9	3.3	3.6	3.4	4.3	3.4	3.7	2.9	4.7	4.6
3/25	3.2	3.2	3.2	3.1	3.4	3.8	3.5	4.5	3.5	3.8	3.3	5.2	5.0
3/26	3.4	3.3	3.4	3.4	3.9	4.3	3.8	5.1	3.7	4.0	3.7	5.9	5.6
3/27	3.7	3.4	3.5	3.7	4.2	4.7	4.1	5.6	3.8	4.0	4.1	6.2	5.8
3/28	3.7	3.5	3.7	3.9	4.4	4.9	4.4	5.8	3.9	4.2	4.3	6.2	5.8
3/29	3.7	3.6	3.7	3.9	4.5	5.2	4.5	6.1	4.4	4.5	4.6	6.8	6.5
3/30	3.8	3.6	3.9	4.0	4.5	5.0	4.5	6.1	5.0	4.8	4.9	6.8	6.7
3/31	3.8	3.8	4.1	4.3	4.7	5.3	4.7	6.3	5.2	5.0	5.4	7.0	6.9

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
4/1	3.9	4.0	4.3	4.6	5.0	5.6	4.9	6.6	4.6	4.7	5.7	6.8	6.7
4/2	3.8	4.1	4.3	4.6	5.0	5.6	5.0	6.7	4.4	4.6	5.8	6.1	6.1
4/3	4.0	4.1	4.6	4.9	5.3	5.8	5.1	6.6	4.5	4.8	5.9	6.2	6.2
4/4	3.9	5.3	4.7	5.0	5.3	5.8	5.4	6.7	5.3	5.5	6.3	6.2	6.2
4/5	3.3	5.1	4.6	4.9	5.3	5.7	5.3	6.7	5.4	5.5	6.2	5.3	5.5
4/6	3.5	4.8	4.3	4.5	4.9	5.2	4.9	6.2	5.2	5.3	5.6	4.9	5.1
4/7	3.5	4.4	3.8	3.9	4.3	4.6	4.5	5.7	5.0	5.2	4.8	5.0	5.2
4/8	3.8	4.5	4.3	4.5	4.8	5.0	4.9	5.9	5.1	5.3	4.8	5.6	5.7
4/9	4.1	4.5	4.5	4.7	5.0	5.2	5.1	6.3	5.2	5.5	5.1	6.0	6.1
4/10	3.7	4.9	4.7	4.9	5.3	5.6	5.5	6.7	5.3	5.5	5.4	6.0	6.2
4/11	3.6	4.4	4.6	4.8	5.2	5.6	5.5	6.8	5.0	5.2	5.2	5.5	5.6
4/12	3.5	4.3	4.0	4.0	4.6	4.9	4.8	6.0	4.8	5.0	4.7	5.1	5.3
4/13	2.4	4.0	2.6	2.5	3.2	3.5	3.4	5.0	4.6	4.8	3.8	4.5	4.7
4/14	3.2	4.2	3.7	3.7	4.1	4.4	4.2	5.3	4.7	5.0	4.2	4.9	5.2
4/15	3.7	4.5	4.0	4.1	4.6	4.9	4.8	6.0	4.9	5.1	4.4	5.9	6.0
4/16	3.7	4.6	4.3	4.3	4.6	4.9	4.8	5.8	5.1	5.4	4.3	6.0	6.0
4/17	3.8	4.7	4.4	4.5	4.9	5.3	5.1	6.1	5.1	5.5	4.5	6.3	6.3
4/18	4.0	5.0	4.6	4.7	5.2	5.6	5.2	6.4	5.2	5.4	4.8	6.3	6.3
4/19	3.6	5.2	4.3	4.5	4.9	5.2	5.1	6.2	5.6	5.8	5.0	6.4	6.4
4/20	3.5	4.8	4.6	4.9	5.2	5.5	5.2	6.5	5.4	5.6	5.2	6.1	6.2
4/21	3.6	4.7	4.4	4.6	5.1	5.4	5.1	6.4	5.3	5.5	5.0	5.8	6.0
4/22	3.8	4.9	4.9	5.0	5.4	5.7	5.5	6.5	5.4	5.7	5.0	6.4	6.5
4/23	4.1	5.0	5.3	5.3	5.7	6.2	5.8	7.0	5.5	5.8	5.2	6.6	6.7
4/24	4.4	5.3	5.8	5.9	6.3	6.8	6.1	7.4	5.7	6.0	5.6	7.2	7.2
4/25	4.5	5.5	6.2	6.4	6.8	7.4	6.4	7.8	5.8	6.2	6.0	7.8	7.7
4/26	4.5	6.2	6.7	7.0	7.4	7.9	6.7	8.3	6.2	6.5	6.6	8.0	7.9
4/27	4.0	7.1	6.5	6.6	7.2	7.5	6.9	8.1	6.8	7.0	6.7	6.7	6.9
4/28	3.7	5.6	5.9	6.1	6.6	7.0	6.4	7.7	6.0	6.3	6.3	6.1	6.2
4/29	3.6	4.7	5.3	5.5	6.1	6.6	6.0	7.3	5.6	6.1	5.7	5.9	6.1
4/30	3.7	4.5	4.9	5.1	5.6	6.1	5.5	6.8	5.1	5.6	5.1	5.8	5.9

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
5/1	4.0	5.6	5.7	5.8	5.8	6.3	6.1	6.9	6.4	6.9	5.1	6.3	6.5
5/2	4.6	6.3	6.8	7.0	7.2	7.6	7.0	8.1	6.9	7.5	6.1	7.5	7.7
5/3	4.8	6.1	7.2	7.5	7.9	8.6	7.1	8.6	6.5	7.2	6.5	8.2	8.3
5/4	4.7	7.0	7.7	8.0	8.5	9.2	7.8	9.1	7.5	8.1	7.2	8.4	8.6
5/5	4.6	7.1	8.5	8.8	9.3	10.0	8.5	10.0	7.9	8.6	8.0	8.0	8.3
5/6	4.6	6.3	8.0	8.4	9.7	10.5	8.6	10.4	7.8	8.7	8.7	7.7	7.9
5/7	4.8	5.9	6.9	7.3	7.1	7.7	7.1	8.8	7.5	8.2	9.0	7.5	7.7
5/8	4.9	6.8	8.3	8.7	9.0	9.2	7.8	9.2	7.4	7.9	8.9	7.1	7.3
5/9	5.0	7.3	8.9	9.3	9.8	10.5	8.4	9.7	7.7	8.4	8.7	7.4	7.6
5/10	5.2	7.5	9.2	9.9	10.6	11.4	8.7	10.4	8.0	8.4	9.2	7.6	7.7
5/11	5.2	7.1	9.2	10.0	11.0	11.9	8.9	10.8	8.4	8.4	9.9	7.5	7.6
5/12	5.0	7.3	8.8	9.5	10.3	11.1	8.7	10.5	8.3	8.3	10.2	6.9	7.1
5/13	4.7	6.9	8.4	8.8	9.6	10.1	9.1	10.3	8.1	8.1	9.9	6.7	6.9
5/14	4.7	6.4	7.5	7.9	8.6	9.1	8.3	9.7	7.6	7.8	8.4	6.3	6.5
5/15	5.1	6.5	7.6	8.1	8.5	9.1	8.0	9.3	7.5	7.8	8.2	6.7	6.9
5/16	5.5	7.0	8.0	8.5	9.1	10.0	8.4	9.8	7.8	8.2	8.7	8.0	8.2
5/17	5.2	6.7	8.0	8.5	9.1	9.6	8.0	9.8	7.3	7.5	8.9	7.5	7.7
5/18	5.1	6.9	7.8	8.2	8.7	9.2	7.6	9.0	6.9	7.2	8.6	7.1	7.2
5/19	5.2	6.8	7.7	8.2	8.8	9.3	7.4	8.8	6.7	6.9	8.6	7.5	7.6
5/20	5.5	7.1	8.6	9.1	9.4	10.1	7.8	9.3	7.0	7.4	8.5	8.3	8.3
5/21	4.5	6.8	7.6	8.0	9.0	9.5	7.8	9.0	7.3	7.4	8.3	7.8	7.9
5/22	4.4	6.4	7.1	7.3	7.6	7.9	7.5	8.6	6.9	7.1	7.5	6.7	6.9
5/23	4.6	6.8	7.2	7.4	7.6	7.9	7.4	8.3	7.2	7.4	7.3	7.0	7.2
5/24	4.7	7.2	7.3	7.5	7.7	8.1	7.4	8.4	7.3	7.5	7.4	7.4	7.6
5/25	4.9	7.1	7.8	8.1	8.5	8.9	7.7	8.9	7.3	7.6	7.8	7.7	7.9
5/26	4.8	7.4	7.8	8.0	8.4	8.8	7.8	8.9	7.5	7.7	8.0	7.8	8.0
5/27	4.9	7.8	8.1	8.4	8.7	9.1	7.9	9.0	7.6	7.8	8.2	7.7	7.9
5/28	4.6	7.3	8.3	8.5	8.9	9.2	8.3	9.4	7.5	7.7	8.3	7.7	7.9
5/29	4.6	7.3	7.9	8.1	8.5	8.9	8.3	9.4	7.7	7.9	8.1	7.6	7.8
5/30	4.5	7.4	7.7	7.9	8.1	8.4	8.3	9.4	8.1	8.1	7.9	7.3	7.5
5/31	5.0	7.4	8.2	8.4	8.6	9.0	8.2	9.5	7.7	7.9	8.1	8.0	8.1

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
6/1	5.4	8.0	8.6	9.1	9.4	10.0	8.5	9.9	8.5	8.5	8.5	8.8	9.0
6/2	5.4	8.1	8.9	9.2	9.8	10.6	8.4	10.2	8.5	8.3	8.8	8.7	8.9
6/3	5.9	8.9	9.9	10.2	10.2	10.8	8.4	10.1	8.5	8.6	8.9	9.2	9.3
6/4	6.3	9.6	10.9	11.3	11.8	12.4	8.9	10.6	8.2	8.4	9.4	9.9	9.9
6/5	6.5	9.5	11.5	12.0	12.7	13.5	9.3	11.3	8.2	8.6	10.1	9.9	9.9
6/6	6.7	9.0	11.0	11.8	12.9	13.8	9.8	11.6	8.4	8.7	10.3	9.9	9.9
6/7	5.9	9.0	9.5	10.1	11.4	12.1	9.3	10.9	8.7	8.7	10.2	8.7	8.9
6/8	6.7	8.8	10.2	10.6	11.0	11.6	8.8	10.4	8.7	8.9	9.9	9.3	9.4
6/9	6.6	9.3	10.2	10.7	11.5	12.4	9.2	10.7	9.1	9.1	9.7	9.9	10.0
6/10	6.5	9.6	10.4	10.8	11.4	12.0	9.0	10.5	8.9	9.1	9.2	9.8	9.9
6/11	6.3	10.1	10.2	10.5	11.2	11.9	9.0	10.4	8.9	9.2	9.2	9.4	9.6
6/12	6.1	9.1	9.9	10.4	11.3	11.8	9.0	10.4	8.5	9.1	9.1	8.9	9.2
6/13	6.1	9.5	9.8	10.1	10.5	11.3	8.9	10.4	8.7	9.1	9.2	9.3	9.5
6/14	6.3	9.3	10.3	10.6	10.8	11.2	8.9	10.1	8.6	9.2	9.3	9.4	9.6
6/15	7.0	9.4	10.8	11.3	11.8	12.5	9.3	10.7	8.9	9.7	9.4	10.3	10.4
6/16	7.2	9.5	11.0	11.6	12.6	13.6	10.0	11.4	9.2	10.0	10.1	10.7	10.9
6/17	7.3	9.6	11.1	11.7	12.7	13.8	10.3	12.3	9.9	10.7	10.4	10.8	11.0
6/18	7.0	9.5	10.6	11.2	12.4	13.2	10.1	12.2	10.0	10.7	10.5	10.4	10.7
6/19	6.5	9.3	10.1	10.5	11.4	12.1	9.7	11.3	9.7	10.0	10.3	9.5	9.8
6/20	5.8	9.0	9.6	9.8	10.2	10.5	10.1	11.2	10.1	10.0	9.8	8.5	8.8
6/21	6.1	9.3	9.7	9.9	10.0	10.2	10.1	11.2	10.0	10.3	9.5	8.6	8.9
6/22	7.0	9.3	10.6	10.9	11.3	11.7	11.3	12.3	10.8	11.3	9.9	10.2	10.5
6/23	7.2	9.6	10.4	10.8	11.4	11.9	10.7	12.8	11.0	11.1	10.6	10.3	10.6
6/24	6.9	9.4	10.5	10.9	11.3	11.6	11.1	12.3	10.8	11.0	10.6	9.7	10.0
6/25	7.0	9.4	10.4	10.7	11.1	11.6	11.0	12.6	10.8	11.3	10.4	9.6	10.0
6/26	7.2	9.3	10.3	10.7	11.2	11.7	11.4	12.8	11.1	11.5	10.6	10.0	10.3
6/27	7.3	9.6	10.3	10.6	11.1	11.5	10.8	12.6	10.8	11.2	10.8	10.1	10.4
6/28	8.4	9.9	11.6	11.9	12.3	12.9	11.6	13.2	9.9	11.0	11.6	11.5	11.7
6/29	8.8	10.3	12.0	12.5	13.3	14.1	12.1	14.1	9.9	10.9	12.4	12.0	12.3
6/30	9.5	9.4	12.0	13.0	14.2	15.1	12.6	14.4	10.0	11.0	13.0	12.8	12.9

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
7/1	10.1	9.0	11.3	12.3	13.7	15.0	13.4	15.2	10.3	11.2	13.6	13.4	13.6
7/2	10.2	8.8	11.1	12.1	13.4	14.5	12.9	14.9	10.8	10.6	13.6	13.7	13.7
7/3	9.9	8.4	10.5	11.5	12.8	14.0	12.3	14.2	10.9	10.7	12.7	13.6	13.6
7/4	9.6	8.2	9.6	10.4	11.8	13.1	11.5	13.4	10.5	10.3	12.0	13.3	13.3
7/5	8.9	8.3	9.2	9.8	10.6	11.5	10.3	12.4	10.1	10.1	11.7	12.7	12.7
7/6	9.8	8.6	10.2	10.9	11.6	12.4	10.8	12.3	10.0	10.2	11.8	13.0	12.9
7/7	10.2	8.8	10.5	11.2	12.4	13.4	11.5	13.2	10.5	10.5	12.1	14.3	14.0
7/8	10.6	8.8	10.4	11.2	12.4	13.5	11.6	13.5	10.6	10.6	12.3	14.5	14.2
7/9	10.9	9.1	10.9	11.7	12.9	14.0	12.0	13.8	10.7	10.8	12.5	15.2	14.8
7/10	10.9	8.9	10.5	11.3	12.7	13.8	11.7	13.6	11.1	11.2	12.4	15.2	15.0
7/11	10.3	8.4	9.9	10.7	11.7	13.0	11.1	13.0	10.5	11.5	11.8	14.8	14.7
7/12	9.4	8.5	9.3	9.9	10.7	11.5	10.2	12.0	10.2	10.8	11.1	13.4	13.4
7/13	10.0	8.9	10.2	10.8	11.5	12.3	10.7	12.0	10.2	11.3	10.9	13.4	13.4
7/14	10.5	9.0	10.5	11.2	12.3	13.3	11.3	12.9	10.6	11.6	11.1	14.8	14.6
7/15	10.7	8.8	10.3	11.1	12.3	13.4	11.6	13.1	10.6	11.7	11.1	15.3	15.0
7/16	11.4	8.8	10.2	10.9	12.2	13.3	11.8	13.5	10.5	11.2	11.6	15.6	14.8
7/17	11.6	8.9	9.8	10.5	11.5	12.4	11.2	13.3	10.7	11.0	12.0	15.2	14.6
7/18	11.8	9.0	10.4	11.0	11.7	12.5	11.3	12.7	10.6	11.7	12.0	16.2	15.6
7/19	12.2	9.1	10.6	11.3	12.4	13.4	12.0	13.4	10.9	12.0	12.1	16.7	16.1
7/20	12.4	9.1	10.6	11.3	12.5	13.4	11.9	13.3	11.0	11.7	12.2	16.5	15.9
7/21	12.2	9.1	10.6	11.3	12.4	13.2	11.7	13.0	10.9	11.6	12.1	16.4	15.7
7/22	12.5	9.3	10.5	11.0	12.0	13.0	11.7	13.2	11.1	11.8	12.2	16.6	15.9
7/23	12.8	9.5	11.0	11.6	12.7	13.6	12.2	13.6	10.9	11.9	12.4	17.5	16.4
7/24	12.9	9.5	10.9	11.6	12.8	14.0	12.5	14.1	11.5	12.5	12.5	18.0	17.1
7/25	12.8	9.5	10.9	11.5	12.7	13.8	12.4	14.0	11.9	12.7	12.3	17.9	17.1
7/26	12.6	9.4	10.8	11.4	12.5	13.6	12.2	13.8	11.9	12.7	12.1	17.7	16.9
7/27	12.3	9.5	10.6	11.2	12.2	13.3	12.0	13.6	11.8	12.6	11.7	17.3	16.6
7/28	12.0	9.5	10.7	11.2	12.2	13.1	11.9	13.4	11.7	12.5	11.5	17.1	16.4
7/29	12.4	9.8	10.7	11.2	12.0	12.7	11.6	13.2	11.6	12.4	11.6	17.0	16.2
7/30	12.6	10.1	11.1	11.6	12.4	13.1	11.9	13.2	11.7	12.6	11.7	17.3	16.4
7/31	12.7	10.2	10.9	11.5	12.4	13.2	12.1	13.4	11.8	12.4	11.9	17.1	16.3

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
8/1	12.0	9.7	10.4	10.8	11.6	12.3	11.5	12.9	11.6	12.0	11.8	15.8	15.1
8/2	11.1	9.8	10.2	10.5	10.9	11.3	10.9	12.0	11.3	11.7	11.7	14.5	14.0
8/3	11.7	10.0	10.7	11.1	11.5	11.8	11.3	12.3	11.4	12.2	11.8	14.9	14.4
8/4	12.9	10.4	11.5	11.9	12.6	13.3	12.4	13.4	12.0	13.0	12.2	17.4	16.4
8/5	13.3	10.6	11.8	12.3	13.2	14.1	12.9	14.2	12.5	13.4	12.5	18.8	17.7
8/6	13.4	10.5	11.7	12.2	13.2	14.1	13.0	14.5	12.6	13.5	12.5	18.9	17.7
8/7	13.3	10.5	11.6	12.2	13.1	14.0	12.9	14.4	12.6	13.5	12.5	18.7	17.6
8/8	13.5	10.6	11.7	12.1	13.1	14.1	13.0	14.5	12.7	13.6	12.6	18.6	17.5
8/9	13.8	10.8	11.8	12.3	13.2	14.1	13.1	14.5	12.8	13.7	12.6	18.7	17.5
8/10	14.0	11.0	12.1	12.4	13.4	14.4	13.4	14.9	13.1	14.0	12.9	18.9	17.9
8/11	13.6	11.0	11.6	12.1	13.0	13.7	12.9	14.5	12.9	13.5	12.8	18.4	17.6
8/12	13.5	11.0	11.9	12.3	13.0	13.8	12.9	14.2	12.8	13.7	12.7	17.6	16.9
8/13	13.9	11.0	11.9	12.4	13.2	14.0	13.2	14.5	13.0	13.9	12.7	18.5	17.5
8/14	13.2	11.3	11.9	12.3	13.0	13.6	13.0	14.3	13.0	13.5	12.8	18.1	17.0
8/15	13.0	11.6	12.0	12.3	12.9	13.4	12.8	14.0	13.0	13.4	12.9	17.3	16.4
8/16	13.4	11.5	12.5	12.9	13.5	14.2	13.5	14.3	13.1	13.8	13.1	17.7	16.6
8/17	13.0	11.3	11.9	12.3	13.1	13.7	13.1	14.6	13.2	13.8	13.1	17.9	17.0
8/18	13.2	11.2	12.1	12.5	13.1	13.8	13.2	14.3	13.1	14.0	13.0	17.9	16.9
8/19	13.3	11.2	11.9	12.3	13.1	13.9	13.4	14.5	13.2	13.6	12.9	17.8	16.4
8/20	13.3	11.0	11.9	12.3	12.9	13.6	13.3	14.4	13.3	13.7	12.5	17.8	16.2
8/21	13.0	11.3	12.0	12.2	12.8	13.5	13.3	14.2	13.4	14.1	12.2	17.9	16.5
8/22	13.2	11.6	12.2	12.6	13.2	13.7	13.5	14.5	13.6	14.2	12.6	18.1	16.7
8/23	13.3	11.6	12.2	12.6	13.3	13.8	13.5	14.6	13.7	14.2	12.8	17.8	16.8
8/24	12.9	11.4	11.9	12.3	12.9	13.4	13.3	14.3	13.7	14.2	12.5	17.3	16.5
8/25	12.6	11.3	11.8	12.1	12.6	13.0	13.0	13.8	13.5	14.1	12.2	16.7	16.0
8/26	12.6	11.3	12.0	12.3	12.8	13.4	13.3	14.1	13.7	14.3	12.2	17.1	16.3
8/27	12.8	11.5	12.1	12.4	13.0	13.7	13.6	14.5	14.1	14.8	12.4	17.4	16.7
8/28	13.1	11.7	12.4	12.7	13.3	13.9	13.6	14.7	14.2	14.9	12.8	17.8	17.2
8/29	12.9	11.8	12.4	12.7	13.3	13.8	13.7	14.6	14.2	14.7	13.2	17.5	17.0
8/30	12.1	11.5	12.4	12.8	13.4	14.0	13.7	14.8	14.3	15.0	13.7	15.9	16.0
8/31	11.6	11.4	12.1	12.3	12.8	13.4	13.3	14.3	14.0	14.7	13.1	15.9	15.8

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
9/1	12.3	11.7	12.4	12.7	13.2	13.8	13.6	14.6	14.2	14.9	13.2	16.9	16.6
9/2	12.7	11.6	12.4	12.7	13.3	13.9	13.7	14.7	14.3	15.1	13.3	17.4	17.0
9/3	12.8	11.7	12.3	12.6	13.2	13.8	13.7	14.6	14.2	14.8	13.4	17.2	16.8
9/4	12.9	11.7	12.3	12.6	13.1	13.4	13.5	14.2	14.0	14.4	13.3	16.7	16.2
9/5	13.1	11.7	12.3	12.7	13.2	13.6	13.6	14.3	14.1	14.7	13.3	16.7	16.3
9/6	12.5	11.5	12.4	12.9	13.4	13.8	13.7	14.6	14.0	14.8	13.6	16.6	16.3
9/7	12.1	11.6	12.2	12.6	13.2	13.6	12.7	14.4	13.3	13.8	13.5	16.1	15.9
9/8	11.9	11.6	12.3	12.6	13.0	13.5	12.7	13.9	13.0	13.7	13.4	16.6	16.2
9/9	12.1	11.7	12.4	12.6	13.0	13.6	12.7	13.9	13.0	13.8	13.5	17.0	16.5
9/10	12.2	11.9	12.4	12.6	13.1	13.6	12.8	14.0	13.2	13.9	13.5	17.4	16.8
9/11	12.6	12.1	12.7	12.9	13.4	13.9	13.0	14.1	13.3	14.0	14.0	17.8	17.0
9/12	13.0	12.3	13.0	13.2	13.6	14.1	13.1	14.2	13.4	14.1	14.2	18.0	17.2
9/13	13.1	11.9	12.9	13.2	13.7	13.9	13.0	13.9	13.3	13.5	14.1	17.0	16.3
9/14	13.3	11.8	12.5	12.8	13.5	14.0	13.1	13.7	13.4	13.9	14.0	16.7	15.9
9/15	13.2	11.7	12.4	12.7	13.2	13.6	13.0	13.6	13.4	13.8	13.9	16.8	15.9
9/16	12.6	11.7	12.3	12.6	13.0	13.2	13.3	13.7	13.6	13.9	13.7	16.2	15.3
9/17	11.3	9.2	9.5	10.1	10.8	11.3	12.0	13.4	13.5	13.9	12.7	15.2	14.7
9/18	10.6	11.2	11.0	10.8	10.4	10.2	12.5	12.0	12.3	13.0	12.2	14.6	14.2
9/19	9.9	11.2	11.3	11.3	11.3	11.5	13.0	13.1	13.2	13.6	11.6	14.1	14.0
9/20	10.4	11.2	11.5	11.6	11.7	11.8	13.0	13.4	13.4	13.9	11.8	14.2	14.2
9/21	10.8	11.1	11.6	11.8	12.2	12.4	13.2	13.7	13.6	14.2	12.1	14.9	14.8
9/22	10.1	10.8	11.2	11.4	11.7	11.9	13.1	13.3	13.3	13.7	11.8	14.2	14.1
9/23	9.5	10.6	11.0	11.2	11.4	11.5	12.7	13.1	13.1	13.4	11.4	12.1	12.3
9/24	8.9	9.3	9.9	10.3	10.7	11.1	12.1	12.6	12.6	13.0	11.0	11.5	11.7
9/25	8.6	6.5	6.9	7.2	7.5	7.7	7.8	9.2	9.3	10.4	10.7	11.6	11.6
9/26	8.5	6.6	6.9	7.1	7.4	7.6	7.5	8.4	8.4	9.3	10.4	12.0	11.6
9/27	8.0	6.6	6.9	7.1	7.2	7.4	7.2	8.0	8.0	8.6	10.2	11.3	10.9
9/28	8.6	6.6	7.3	7.7	7.9	8.0	7.9	8.4	8.4	8.9	10.6	10.6	10.5
9/29	8.1	6.6	7.3	7.7	8.0	8.2	8.1	9.1	9.0	9.6	10.4	10.0	10.1
9/30	7.6	6.5	7.1	7.5	7.8	8.0	7.9	8.8	8.8	9.3	10.1	9.3	9.4

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
10/1	7.2	6.3	6.8	7.1	7.4	7.6	7.5	8.3	8.3	9.0	9.6	8.8	8.9
10/2	7.2	6.4	6.9	7.2	7.5	7.6	7.5	8.3	8.3	8.8	9.6	8.9	9.0
10/3	7.2	6.4	6.8	7.1	7.4	7.6	7.5	8.3	8.3	8.9	9.5	8.9	9.1
10/4	6.7	6.4	6.6	6.8	7.0	7.2	7.1	7.9	7.9	8.5	9.1	9.0	9.1
10/5	7.0	7.5	6.9	7.0	7.1	7.3	7.6	7.8	8.1	8.7	9.4	9.1	9.2
10/6	7.4	10.3	8.7	8.2	8.0	8.2	10.2	10.0	10.1	10.4	9.8	9.6	9.8
10/7	7.3	9.5	9.4	9.3	9.2	9.1	10.1	10.5	10.6	10.9	9.8	9.6	9.8
10/8	7.0	9.1	9.0	9.1	9.2	9.3	9.2	9.9	10.0	10.5	9.5	8.9	9.1
10/9	6.4	8.8	8.1	8.3	8.3	8.5	9.5	9.4	9.7	10.1	8.7	8.3	8.5
10/10	6.7	9.1	8.6	8.6	8.7	8.8	9.7	9.9	10.0	10.4	9.0	8.6	8.9
10/11	6.8	9.1	8.8	8.8	8.9	8.9	10.0	10.2	10.2	10.5	8.9	8.9	9.2
10/12	6.9	9.1	8.9	8.9	9.0	9.2	10.0	10.3	10.3	10.6	8.9	9.2	9.5
10/13	6.5	8.9	8.7	8.8	8.8	9.0	10.1	10.2	10.2	10.5	8.5	9.4	9.7
10/14	6.0	8.8	8.3	8.2	8.2	8.3	9.9	9.8	9.9	10.2	8.0	9.2	9.4
10/15	6.2	9.1	8.3	8.2	8.0	8.0	9.8	9.8	9.9	10.1	8.1	8.6	9.0
10/16	6.5	9.1	8.7	8.5	8.4	8.5	10.0	10.1	10.3	10.4	8.3	8.7	9.2
10/17	6.2	9.1	8.6	8.6	8.5	8.7	10.3	10.3	10.5	10.7	8.1	9.0	9.7
10/18	6.3	9.3	8.5	8.3	8.0	8.1	10.2	10.1	10.5	10.7	8.1	8.8	9.5
10/19	6.4	9.3	8.7	8.4	8.1	8.1	10.2	10.1	10.4	10.6	8.2	8.5	9.3
10/20	6.3	9.1	8.6	8.5	8.5	8.6	10.2	10.2	10.4	10.6	7.7	8.5	9.4
10/21	6.5	9.5	8.4	8.2	8.0	8.3	10.3	10.3	10.6	10.8	7.7	8.5	9.5
10/22	6.7	9.9	8.9	8.5	8.0	7.8	10.2	10.1	10.4	10.7	8.2	8.8	9.7
10/23	6.7	9.8	9.0	8.7	8.3	8.0	10.1	10.0	10.3	10.5	8.5	9.1	9.8
10/24	6.6	9.7	8.9	8.6	8.3	8.1	10.2	10.1	10.4	10.6	8.5	9.0	9.7
10/25	6.4	9.0	9.0	8.8	8.5	8.3	10.2	10.2	10.4	10.6	8.1	8.9	9.8
10/26	6.2	8.8	8.7	8.7	8.8	8.7	10.4	10.3	10.6	10.8	7.8	8.6	9.6
10/27	6.4	8.9	8.6	8.6	8.6	8.7	10.2	10.4	10.5	10.6	7.7	8.7	9.7
10/28	5.8	9.3	8.1	8.0	8.0	8.0	10.2	10.0	10.3	10.5	7.4	8.5	9.3
10/29	4.8	9.2	8.1	7.5	7.0	6.7	10.0	9.6	10.2	10.3	6.5	7.4	8.8
10/30	4.8	9.0	8.0	7.7	7.2	6.8	9.9	9.6	10.2	10.4	6.3	6.8	8.7
10/31	5.7	7.3	8.4	8.4	8.3	8.0	9.9	10.1	10.3	10.5	6.9	7.6	9.1

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
11/1	6.3	6.3	7.0	7.5	8.1	8.5	9.7	10.2	10.3	10.6	7.5	8.4	9.4
11/2	5.8	6.2	6.9	7.2	7.6	7.8	8.6	9.5	9.9	10.2	7.8	8.7	9.3
11/3	4.5	6.0	6.3	6.6	6.9	7.0	7.4	7.6	8.3	9.1	7.4	7.1	7.6
11/4	4.1	5.9	5.5	5.6	5.7	5.8	6.9	6.9	8.9	9.2	6.5	6.4	7.3
11/5	4.3	6.1	6.0	6.1	6.2	6.2	7.1	7.4	8.6	9.2	6.9	6.4	7.2
11/6	4.9	6.1	6.4	6.6	6.7	6.8	7.1	7.5	8.7	9.2	7.2	6.7	7.3
11/7	4.9	6.2	6.7	6.9	7.1	7.2	7.6	7.8	8.6	9.1	7.6	7.0	7.5
11/8	5.3	6.2	6.9	7.2	7.4	7.5	7.8	8.0	8.1	8.7	7.7	7.1	7.3
11/9	5.1	6.1	6.4	6.6	6.9	7.1	7.2	7.7	8.1	8.6	7.4	6.9	7.2
11/10	5.5	6.2	6.6	6.9	7.1	7.3	7.4	7.9	8.2	8.7	7.6	7.1	7.5
11/11	5.7	6.3	6.7	6.9	7.2	7.3	7.5	8.0	8.7	8.9	7.8	7.5	7.9
11/12	5.9	6.5	6.9	7.5	7.4	7.5	7.8	8.3	8.6	9.0	8.1	7.6	8.0
11/13	5.9	6.5	7.2	8.2	7.8	8.0	8.0	8.8	8.3	8.6	8.3	7.7	7.9
11/14	5.7	6.3	6.8	7.2	7.5	7.8	7.8	8.6	8.4	8.5	7.8	7.4	7.7
11/15	4.8	6.2	6.1	5.8	6.6	6.9	7.0	7.9	8.0	8.2	7.0	7.0	7.3
11/16	4.2	6.1	5.6	5.4	6.0	6.1	6.5	6.7	6.8	7.4	6.8	6.3	6.3
11/17	4.4	6.2	5.9	5.7	6.4	6.5	6.6	7.1	7.3	7.7	6.9	6.5	6.5
11/18	4.4	6.4	6.3	6.4	6.7	6.9	6.9	7.6	7.6	7.8	7.2	6.5	6.6
11/19	4.5	6.4	6.4	6.6	6.9	7.0	7.0	7.5	7.5	7.7	7.1	6.3	6.4
11/20	3.5	6.0	5.0	5.1	5.2	5.4	5.5	6.0	6.8	7.0	5.6	5.3	5.6
11/21	2.8	5.7	4.3	4.4	4.1	4.2	4.6	4.7	6.5	6.6	4.7	4.2	4.6
11/22	2.9	5.7	4.3	4.4	3.8	3.8	4.5	4.3	6.4	6.5	4.4	3.8	4.3
11/23	3.3	5.8	4.6	5.0	4.0	4.0	4.8	4.6	6.4	6.5	4.6	4.1	4.7
11/24	3.5	5.9	4.8	5.7	4.3	4.2	5.1	4.8	6.4	6.5	4.9	4.4	4.9
11/25	3.6	5.8	5.0	5.8	4.4	4.4	5.4	5.2	6.5	6.6	5.1	4.6	5.2
11/26	3.5	5.7	5.0	5.9	4.5	4.4	5.4	5.3	6.4	6.5	5.1	4.7	5.3
11/27	4.0	5.8	5.4	6.1	5.0	5.0	5.7	5.9	6.4	6.6	5.7	5.3	5.7
11/28	3.7	5.6	5.1	6.0	4.7	4.7	5.5	5.6	6.2	6.3	5.4	5.0	5.4
11/29	4.0	5.7	5.4	6.0	5.0	4.9	5.7	5.8	6.2	6.4	5.6	4.8	5.3
11/30	4.4	5.8	5.8	6.2	5.8	5.9	6.1	6.5	6.4	6.7	6.0	5.7	6.0

		Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 14.3	RM 12.8	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Big Four Creek	RM 14.1	RM 13.2
12/1	4.4	5.9	6.0	6.2	6.2	6.3	6.2	6.7	6.6	6.8	6.7	6.1	6.2
12/2	3.2	5.5	4.9	5.0	5.1	5.6	5.2	5.5	5.8	5.7	5.5	4.6	4.7
12/3	2.8	5.5	4.6	4.7	4.6	4.9	4.9	5.0	5.3	5.5	4.6	4.3	4.5
12/4	1.8	5.3	4.0	4.0	3.7	4.2	4.5	4.3	5.4	5.4	3.5	3.2	3.6
12/5	1.4	5.0	3.5	3.5	2.9	3.4	4.2	3.7	5.3	5.2	2.6	2.3	2.9
12/6	0.6	4.8	2.8	2.9	2.1	2.6	3.8	3.2	5.1	5.0	1.5	1.2	2.2
12/7	0.2	4.5	2.9	2.9	1.2	1.6	3.5	2.5	4.8	4.6	0.7	0.4	1.7
12/8	0.2	4.5	2.5	2.5	1.1	1.2	3.5	2.5	4.7	4.6	0.5	0.3	1.6
12/9	0.6	4.5	2.7	2.7	1.7	1.4	3.7	2.9	4.7	4.7	0.8	0.6	2.0
12/10	1.4	4.6	3.5	3.5	2.9	2.5	4.2	3.9	4.9	4.9	1.6	1.9	3.1
12/11	1.5	4.3	3.5	3.5	3.0	2.9	4.1	4.0	4.8	4.8	2.0	2.6	3.5
12/12	1.9	4.3	3.5	3.5	3.1	3.0	4.1	4.0	4.7	4.8	2.4	2.9	3.7
12/13	1.9	4.3	3.1	3.2	3.1	3.3	3.8	4.3	4.7	4.8	2.8	3.7	4.2
12/14	2.4	4.4	3.4	3.4	3.3	3.3	3.7	4.0	4.4	4.7	3.5	4.2	4.3
12/15	2.5	4.5	3.8	3.9	3.9	3.8	4.1	4.4	4.6	4.9	3.9	4.5	4.7
12/16	2.8	4.5	4.0	4.1	4.0	4.0	4.1	4.2	4.4	4.6	4.0	4.5	4.6
12/17	3.0	4.3	4.0	4.0	3.8	3.8	4.0	4.0	4.3	4.4	3.9	4.0	4.1
12/18	3.2	4.3	4.3	4.3	4.2	4.2	4.3	4.6	4.5	4.7	4.0	4.5	4.6
12/19	2.1	4.1	3.6	3.6	3.3	3.7	3.8	3.8	4.3	4.3	2.9	3.8	4.0
12/20	1.1	4.0	2.6	2.6	2.0	2.7	3.0	3.1	3.8	3.7	2.1	2.6	3.0
12/21	1.9	4.0	3.0	3.0	2.7	2.5	3.1	3.1	3.5	3.8	3.2	2.4	2.9
12/22	2.5	4.0	3.2	3.3	3.4	3.3	3.5	3.6	3.8	4.0	3.9	3.8	4.0
12/23	2.4	4.1	3.9	3.9	4.1	3.9	4.1	4.4	4.4	4.5	4.6	4.2	4.5
12/24	3.2	4.0	4.2	4.2	4.5	4.4	4.4	4.8	4.7	4.7	4.5	4.4	4.6
12/25	2.8	3.9	3.7	3.8	3.8	4.1	3.9	4.2	4.2	4.1	4.0	3.8	4.0
12/26	3.1	4.0	3.9	4.0	3.8	4.0	3.9	4.2	4.2	4.1	4.3	3.9	4.1
12/27	3.3	4.0	4.0	4.0	3.8	4.0	3.9	4.3	4.2	4.2	4.6	4.0	4.2
12/28	3.4	4.1	4.3	4.3	4.4	4.4	4.3	4.9	4.5	4.6	4.7	4.8	5.0
12/29	3.2	4.0	4.3	4.3	4.2	4.5	4.1	4.8	4.5	4.5	4.4	4.6	4.7
12/30	3.5	4.1	4.3	4.3	4.3	4.5	4.1	4.7	4.4	4.4	4.7	4.6	4.7
12/31	3.6	4.1	4.5	4.6	4.6	4.7	4.3	5.1	4.6	4.6	4.9	5.0	5.1

APPENDIX C

2013 Seven-Day Average of the Daily Maximum (7-DAD Max) Water Temperature in Tabular Format

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
1/1	2.0	3.8	3.3	3.2	3.3	3.5	3.4	4.0	3.8	4.0	3.4	3.1	3.7
1/2	2.0	3.7	3.3	3.1	3.2	3.4	3.3	4.0	3.8	3.9	3.4	3.0	3.6
1/3	2.1	3.7	3.2	3.1	3.2	3.3	3.3	3.9	3.7	3.9	3.3	2.9	3.5
1/4	2.2	3.7	3.2	3.1	3.2	3.4	3.3	4.0	3.8	3.9	3.4	3.0	3.5
1/5	2.4	3.7	3.3	3.2	3.3	3.5	3.5	4.1	4.0	4.1	3.6	3.1	3.7
1/6	2.5	3.7	3.4	3.4	3.6	3.7	3.7	4.4	4.2	4.3	3.7	3.4	3.9
1/7	2.6	3.7	3.5	3.5	3.7	3.9	3.8	4.5	4.3	4.4	3.8	3.7	4.1
1/8	2.4	3.7	3.4	3.4	3.8	4.0	3.9	4.5	4.3	4.4	3.8	3.9	4.2
1/9	2.3	3.6	3.3	3.3	3.6	3.8	3.8	4.3	4.2	4.3	3.6	3.8	4.1
1/10	2.2	3.6	3.1	3.1	3.4	3.7	3.6	4.1	4.0	4.1	3.4	3.6	3.8
1/11	2.1	3.5	3.0	3.0	3.3	3.5	3.5	4.0	3.8	3.8	3.2	3.4	3.7
1/12	2.1	3.5	3.0	2.9	3.2	3.4	3.3	3.8	3.6	3.7	3.0	3.4	3.6
1/13	1.9	3.4	2.8	2.7	3.0	3.2	3.1	3.6	3.3	3.4	2.7	3.2	3.4
1/14	1.9	3.4	2.7	2.5	2.8	3.0	2.9	3.5	3.1	3.2	2.6	3.1	3.3
1/15	1.9	3.4	2.7	2.5	2.6	2.8	2.7	3.3	2.9	3.1	2.5	3.0	3.1
1/16	2.0	3.5	2.7	2.5	2.6	2.7	2.7	3.2	2.8	3.0	2.5	3.0	3.1
1/17	2.1	3.5	2.7	2.5	2.5	2.7	2.7	3.2	2.8	3.0	2.6	3.0	3.2
1/18	2.1	3.5	2.7	2.4	2.4	2.6	2.6	3.1	2.8	2.9	2.7	3.0	3.1
1/19	2.2	3.5	2.6	2.4	2.3	2.4	2.4	2.9	2.7	2.8	2.8	2.9	3.0
1/20	2.3	3.6	2.7	2.4	2.4	2.4	2.5	2.9	2.7	2.9	2.9	3.0	3.1
1/21	2.4	3.6	2.8	2.5	2.5	2.6	2.6	3.0	2.8	2.9	3.1	3.1	3.2
1/22	2.5	3.6	2.9	2.7	2.7	2.7	2.7	3.2	2.8	3.0	3.3	3.4	3.4
1/23	2.5	3.6	3.0	2.8	2.8	2.9	2.8	3.3	2.9	3.1	3.4	3.5	3.6
1/24	2.3	3.6	2.9	2.8	2.9	3.0	2.9	3.4	3.0	3.2	3.5	3.7	3.8
1/25	2.2	3.6	2.9	2.7	2.9	3.0	2.9	3.5	3.1	3.3	3.5	3.9	3.9
1/26	2.0	3.7	2.7	2.6	2.8	3.0	2.9	3.6	3.2	3.4	3.4	4.0	4.1
1/27	2.0	3.7	2.7	2.5	2.9	3.0	2.9	3.7	3.3	3.5	3.3	4.1	4.2
1/28	1.9	3.7	2.7	2.5	2.9	3.1	3.0	3.8	3.4	3.6	3.3	4.2	4.3
1/29	1.9	3.7	2.7	2.5	2.9	3.2	3.0	3.9	3.6	3.8	3.2	4.3	4.4
1/30	2.1	3.7	2.7	2.5	3.0	3.2	3.0	3.9	3.8	3.9	3.2	4.5	4.5
1/31	2.3	3.8	2.8	2.7	3.1	3.4	3.2	4.1	3.9	4.0	3.2	4.5	4.6

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
2/1	2.6	3.8	3.0	2.9	3.3	3.6	3.4	4.3	4.1	4.2	3.3	4.7	4.8
2/2	2.8	3.8	3.2	3.2	3.6	3.8	3.6	4.5	4.3	4.3	3.5	4.9	5.0
2/3	2.9	3.9	3.3	3.3	3.6	3.9	3.7	4.7	4.3	4.4	3.6	5.0	5.1
2/4	2.9	3.9	3.4	3.3	3.7	4.0	3.7	4.7	4.4	4.5	3.7	5.1	5.2
2/5	3.0	3.8	3.4	3.3	3.7	3.9	3.7	4.7	4.3	4.4	3.7	5.0	5.1
2/6	3.0	3.8	3.5	3.4	3.7	4.0	3.7	4.7	4.2	4.4	3.6	5.0	5.1
2/7	3.0	3.8	3.5	3.4	3.7	4.0	3.7	4.7	4.2	4.3	3.6	5.1	5.1
2/8	3.0	3.8	3.5	3.5	3.8	4.0	3.7	4.7	4.1	4.3	3.6	5.1	5.1
2/9	3.0	3.8	3.6	3.5	3.8	4.1	3.7	4.7	3.9	4.2	3.6	5.0	5.0
2/10	3.0	3.8	3.6	3.5	3.8	4.1	3.8	4.8	3.9	4.1	3.7	5.1	5.1
2/11	3.0	3.8	3.6	3.6	3.8	4.1	3.8	4.8	3.8	4.1	3.7	5.2	5.1
2/12	3.0	3.9	3.6	3.6	3.8	4.2	3.8	4.9	3.8	4.1	3.8	5.4	5.3
2/13	3.0	3.9	3.6	3.5	3.8	4.1	3.8	5.0	3.8	4.1	3.9	5.4	5.3
2/14	3.0	3.9	3.5	3.5	3.8	4.1	3.8	4.9	3.8	4.1	3.9	5.4	5.3
2/15	3.0	3.9	3.5	3.5	3.8	4.1	3.8	4.9	3.8	4.1	3.9	5.4	5.3
2/16	3.0	3.8	3.5	3.5	3.7	4.0	3.8	4.8	3.9	4.2	3.9	5.4	5.3
2/17	2.9	3.8	3.5	3.5	3.7	4.0	3.8	4.7	3.9	4.1	3.8	5.3	5.2
2/18	2.7	3.8	3.4	3.4	3.6	3.9	3.7	4.5	3.8	4.1	3.7	5.1	5.0
2/19	2.4	3.8	3.3	3.3	3.5	3.7	3.5	4.4	3.8	4.1	3.6	4.8	4.8
2/20	2.3	3.7	3.2	3.2	3.4	3.6	3.4	4.2	3.8	4.0	3.5	4.6	4.6
2/21	2.2	3.7	3.2	3.1	3.4	3.6	3.4	4.2	3.8	4.0	3.4	4.5	4.6
2/22	2.1	3.7	3.1	3.0	3.3	3.5	3.4	4.2	3.8	4.1	3.4	4.5	4.6
2/23	2.1	3.7	3.1	3.0	3.3	3.5	3.4	4.2	3.8	4.0	3.3	4.4	4.5
2/24	2.1	3.7	3.1	3.0	3.4	3.6	3.5	4.3	3.9	4.1	3.3	4.5	4.6
2/25	2.2	3.8	3.1	3.0	3.4	3.7	3.5	4.5	3.9	4.1	3.4	4.6	4.7
2/26	2.4	3.8	3.3	3.2	3.6	3.8	3.7	4.6	4.1	4.1	3.5	4.7	4.8
2/27	2.5	3.8	3.4	3.4	3.8	4.1	3.9	4.9	4.2	4.3	3.7	4.9	4.9
2/28	2.6	3.8	3.4	3.4	3.8	4.1	3.9	5.0	4.3	4.3	3.8	5.0	5.0

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
3/1	2.7	3.8	3.5	3.4	3.8	4.1	3.9	5.0	4.3	4.2	3.8	5.0	5.0
3/2	2.7	3.8	3.5	3.5	3.8	4.2	3.9	5.0	4.2	4.2	3.8	5.0	5.0
3/3	2.8	3.8	3.5	3.5	3.8	4.2	3.9	5.0	4.1	4.1	3.9	4.9	4.9
3/4	2.8	3.8	3.5	3.5	3.8	4.2	3.9	5.0	4.0	4.1	3.9	5.0	4.9
3/5	2.8	3.8	3.5	3.5	3.8	4.2	3.9	4.9	3.9	4.0	3.9	5.1	5.0
3/6	2.8	3.8	3.5	3.5	3.7	4.2	3.8	4.8	3.9	4.0	3.8	5.3	5.2
3/7	2.9	3.8	3.6	3.5	3.8	4.2	3.9	4.8	3.8	4.0	3.8	5.4	5.2
3/8	2.9	3.8	3.7	3.7	3.9	4.4	4.0	5.0	3.8	4.1	3.9	5.6	5.4
3/9	2.9	3.8	3.7	3.6	4.0	4.4	4.1	5.1	4.0	4.2	4.1	5.8	5.6
3/10	3.0	3.8	3.7	3.7	4.0	4.5	4.2	5.2	4.2	4.3	4.1	5.9	5.6
3/11	3.2	3.9	3.8	3.8	4.1	4.6	4.3	5.4	4.4	4.4	4.3	5.9	5.7
3/12	3.3	3.9	3.8	3.9	4.3	4.7	4.5	5.6	4.5	4.6	4.5	5.8	5.6
3/13	3.3	3.9	3.8	4.0	4.4	4.8	4.6	5.8	4.7	4.6	4.6	5.6	5.6
3/14	3.3	3.9	3.8	3.9	4.3	4.7	4.6	5.8	4.7	4.8	4.6	5.6	5.5
3/15	3.4	3.8	3.6	3.8	4.2	4.6	4.5	5.7	4.7	4.7	4.5	5.3	5.3
3/16	3.4	3.8	3.7	3.8	4.2	4.5	4.4	5.6	4.6	4.8	4.4	5.2	5.3
3/17	3.3	3.7	3.6	3.8	4.2	4.5	4.4	5.6	4.5	4.7	4.3	5.2	5.3
3/18	3.2	3.6	3.5	3.6	4.0	4.3	4.2	5.3	4.3	4.7	4.1	5.1	5.2
3/19	3.2	3.6	3.4	3.5	3.9	4.2	4.1	5.1	4.1	4.6	3.8	5.1	5.2
3/20	3.2	3.5	3.4	3.4	3.8	4.1	4.0	4.9	3.9	4.5	3.5	5.1	5.2
3/21	3.3	3.5	3.5	3.4	3.8	4.2	4.0	4.8	3.8	4.4	3.4	5.2	5.3
3/22	3.3	3.4	3.6	3.5	3.9	4.4	4.0	4.9	3.8	4.4	3.4	5.5	5.4
3/23	3.4	3.4	3.7	3.5	4.0	4.6	4.1	5.0	3.8	4.4	3.5	5.8	5.7
3/24	3.6	3.5	3.8	3.6	4.1	4.7	4.2	5.0	3.7	4.3	3.5	5.9	5.7
3/25	3.8	3.5	4.0	3.9	4.4	5.0	4.4	5.3	3.8	4.4	3.7	6.3	6.0
3/26	3.9	3.6	4.2	4.1	4.6	5.4	4.6	5.7	4.0	4.5	4.1	6.7	6.3
3/27	4.1	3.7	4.4	4.4	4.9	5.6	4.8	6.0	4.2	4.8	4.4	7.0	6.7
3/28	4.2	3.8	4.6	4.6	5.1	5.9	5.0	6.3	4.5	5.0	4.8	7.3	7.0
3/29	4.2	4.0	4.7	4.9	5.3	6.1	5.2	6.5	4.8	5.2	5.2	7.5	7.2
3/30	4.3	4.1	4.8	5.0	5.4	6.1	5.3	6.7	4.9	5.2	5.4	7.5	7.3
3/31	4.3	4.2	5.0	5.2	5.6	6.4	5.4	6.9	5.0	5.4	5.7	7.6	7.4

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
4/1	4.3	4.4	5.0	5.3	5.7	6.4	5.5	7.0	5.2	5.5	5.9	7.6	7.5
4/2	4.2	4.6	5.1	5.3	5.7	6.3	5.6	7.0	5.2	5.6	6.1	7.3	7.2
4/3	4.0	4.8	5.0	5.3	5.6	6.2	5.5	7.0	5.2	5.6	6.2	6.9	6.9
4/4	4.0	4.8	4.8	5.1	5.5	6.0	5.4	6.9	5.2	5.5	6.1	6.5	6.5
4/5	4.1	4.8	4.8	5.1	5.4	5.9	5.4	6.8	5.1	5.5	5.9	6.4	6.4
4/6	4.0	4.9	4.8	5.1	5.4	5.8	5.4	6.7	5.3	5.7	5.9	6.3	6.3
4/7	4.0	5.0	4.7	5.0	5.3	5.7	5.5	6.7	5.4	5.7	5.8	6.1	6.2
4/8	4.1	4.9	4.7	5.0	5.3	5.7	5.5	6.7	5.3	5.7	5.6	6.0	6.1
4/9	4.0	4.8	4.7	4.9	5.3	5.6	5.5	6.7	5.2	5.6	5.4	6.0	6.1
4/10	4.0	4.7	4.5	4.7	5.1	5.5	5.4	6.6	5.2	5.5	5.2	5.9	6.1
4/11	4.0	4.7	4.6	4.7	5.2	5.6	5.5	6.6	5.2	5.6	5.1	6.1	6.2
4/12	3.9	4.7	4.6	4.7	5.2	5.6	5.5	6.6	5.1	5.5	5.0	6.1	6.2
4/13	3.9	4.7	4.7	4.8	5.3	5.7	5.5	6.6	5.1	5.6	5.0	6.2	6.3
4/14	4.0	4.7	4.8	4.8	5.3	5.8	5.5	6.6	5.1	5.6	4.9	6.3	6.4
4/15	4.0	4.8	4.8	4.8	5.2	5.7	5.4	6.5	5.1	5.6	4.8	6.3	6.4
4/16	4.1	4.9	4.8	4.8	5.3	5.7	5.4	6.4	5.2	5.8	4.8	6.5	6.5
4/17	4.1	5.0	5.0	5.0	5.5	5.9	5.6	6.6	5.4	5.9	4.9	6.7	6.7
4/18	4.2	5.1	5.0	5.1	5.6	6.0	5.6	6.6	5.4	5.9	5.0	6.6	6.6
4/19	4.3	5.2	5.2	5.3	5.7	6.2	5.7	6.8	5.5	6.0	5.2	6.8	6.9
4/20	4.4	5.3	5.4	5.5	5.9	6.4	5.9	7.0	5.6	6.1	5.3	6.9	6.9
4/21	4.6	5.4	5.8	5.8	6.2	6.7	6.1	7.2	5.7	6.2	5.4	7.1	7.1
4/22	4.8	5.5	6.2	6.2	6.7	7.2	6.4	7.5	5.8	6.4	5.7	7.5	7.4
4/23	4.9	5.7	6.7	6.7	7.1	7.7	6.7	7.9	6.0	6.6	5.9	7.8	7.7
4/24	4.9	6.1	6.9	6.9	7.5	8.0	7.0	8.2	6.2	6.9	6.2	8.0	8.0
4/25	4.8	6.4	7.1	7.1	7.7	8.3	7.2	8.4	6.4	7.0	6.4	8.1	8.0
4/26	4.7	6.4	7.1	7.1	7.7	8.3	7.2	8.4	6.5	7.1	6.5	7.9	7.9
4/27	4.6	6.3	7.0	7.0	7.7	8.2	7.1	8.3	6.5	7.1	6.4	7.8	7.8
4/28	4.7	6.4	7.0	7.0	7.7	8.2	7.1	8.3	6.7	7.3	6.4	7.7	7.7
4/29	4.7	6.5	7.0	7.1	7.7	8.2	7.2	8.3	6.8	7.5	6.4	7.6	7.7
4/30	5.0	6.4	7.2	7.3	7.9	8.4	7.2	8.4	6.8	7.7	6.4	7.7	7.8

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
5/1	5.3	6.5	7.7	7.7	8.2	8.8	7.5	8.6	7.0	8.0	6.5	7.9	8.0
5/2	5.5	6.6	8.3	8.2	8.9	9.5	7.9	9.1	7.2	8.4	6.8	8.2	8.4
5/3	5.8	6.9	8.9	8.9	9.6	10.2	8.2	9.6	7.4	8.9	7.3	8.6	8.8
5/4	5.9	7.2	9.3	9.4	10.0	10.7	8.6	10.1	7.8	9.4	7.8	8.9	9.1
5/5	6.0	7.4	9.7	9.7	10.3	10.9	8.8	10.3	8.0	9.5	8.3	9.0	9.2
5/6	6.1	7.7	10.1	10.1	10.8	11.4	9.1	10.6	8.3	9.8	8.6	9.0	9.2
5/7	6.1	8.1	10.4	10.4	11.1	11.9	9.4	10.9	8.7	10.1	9.0	9.0	9.1
5/8	6.0	8.1	10.5	10.6	11.4	12.2	9.5	11.1	8.7	10.1	9.4	8.8	9.0
5/9	5.9	8.0	10.3	10.5	11.3	12.1	9.5	11.1	8.8	9.9	9.6	8.7	8.8
5/10	5.8	8.1	10.1	10.4	11.1	11.8	9.6	11.0	8.9	9.7	9.7	8.4	8.6
5/11	5.8	8.0	10.0	10.3	11.1	11.8	9.7	10.9	8.9	9.7	9.7	8.2	8.3
5/12	5.8	7.9	9.8	10.2	11.1	11.9	9.7	10.9	8.8	9.6	9.6	8.0	8.2
5/13	5.7	7.8	9.5	9.9	10.8	11.8	9.6	10.9	8.8	9.5	9.6	8.1	8.3
5/14	5.6	7.4	9.0	9.6	10.4	11.3	9.4	10.8	8.6	9.1	9.5	8.1	8.3
5/15	5.6	7.3	8.7	9.2	10.0	10.7	9.1	10.4	8.4	8.8	9.3	8.0	8.1
5/16	5.9	7.2	8.6	9.1	9.7	10.5	8.8	10.2	8.1	8.6	9.0	8.0	8.2
5/17	5.8	7.3	8.8	9.3	9.9	10.8	8.6	10.2	7.9	8.5	8.8	8.4	8.5
5/18	5.7	7.4	8.8	9.3	10.0	10.8	8.5	10.1	7.7	8.3	8.9	8.7	8.8
5/19	5.6	7.3	8.6	9.0	9.8	10.5	8.4	9.9	7.7	8.2	8.8	8.7	8.7
5/20	5.6	7.3	8.5	8.9	9.5	10.1	8.1	9.7	7.5	7.9	8.6	8.5	8.5
5/21	5.6	7.4	8.5	8.8	9.3	9.9	8.1	9.4	7.6	8.0	8.4	8.3	8.3
5/22	5.6	7.4	8.5	8.8	9.3	9.9	8.2	9.4	7.6	8.1	8.3	8.4	8.4
5/23	5.3	7.5	8.5	8.7	9.2	9.8	8.2	9.5	7.7	8.2	8.2	8.4	8.4
5/24	5.4	7.7	8.2	8.4	8.9	9.4	8.2	9.2	7.8	8.2	8.1	8.1	8.2
5/25	5.4	7.9	8.2	8.4	8.7	9.3	8.2	9.3	7.8	8.2	8.0	8.0	8.0
5/26	5.3	8.0	8.4	8.6	8.8	9.4	8.4	9.4	7.9	8.3	8.1	8.1	8.1
5/27	5.4	8.1	8.4	8.6	8.9	9.4	8.5	9.5	8.0	8.3	8.2	8.1	8.2
5/28	5.5	8.0	8.5	8.8	9.1	9.5	8.6	9.6	8.0	8.3	8.3	8.3	8.3
5/29	5.6	8.2	8.7	9.0	9.3	9.8	8.7	9.8	8.2	8.5	8.4	8.4	8.5
5/30	5.9	8.3	8.9	9.2	9.6	10.3	8.9	10.0	8.3	8.7	8.5	8.6	8.7
5/31	6.4	8.5	9.4	9.7	10.0	10.8	9.0	10.3	8.5	9.0	8.7	9.1	9.1

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
6/1	6.8	8.8	10.1	10.3	10.8	11.6	9.2	10.6	8.6	9.3	8.9	9.5	9.5
6/2	7.3	9.3	10.8	11.0	11.6	12.6	9.4	11.1	8.7	9.4	9.3	9.9	9.9
6/3	7.4	9.7	11.6	11.8	12.5	13.6	9.6	11.6	8.9	9.6	9.6	10.4	10.4
6/4	7.7	10.2	11.8	12.0	13.0	14.1	9.8	11.9	9.1	9.8	9.9	10.6	10.6
6/5	7.9	10.3	12.1	12.3	13.2	14.2	9.8	11.9	9.2	9.8	10.1	10.8	10.7
6/6	7.9	10.5	12.4	12.7	13.5	14.5	9.9	12.2	9.3	9.9	10.2	11.0	10.9
6/7	7.7	10.6	12.4	12.7	13.6	14.6	9.9	12.2	9.3	10.0	10.2	11.0	11.0
6/8	7.5	10.6	12.1	12.5	13.2	14.3	9.8	12.1	9.4	10.0	10.1	10.9	10.9
6/9	7.2	10.6	11.8	12.2	12.9	14.0	9.9	12.0	9.4	10.1	9.9	10.7	10.8
6/10	7.4	10.6	11.3	11.7	12.4	13.3	9.7	11.6	9.3	10.1	9.7	10.5	10.6
6/11	7.5	10.5	11.4	11.8	12.3	13.2	9.5	11.5	9.2	10.1	9.6	10.5	10.7
6/12	7.7	10.6	11.6	12.0	12.5	13.5	9.6	11.7	9.2	10.3	9.6	10.6	10.8
6/13	7.8	10.6	11.7	12.1	12.6	13.7	9.8	11.7	9.2	10.5	9.6	10.7	10.9
6/14	7.9	10.5	11.9	12.3	12.9	14.0	10.1	12.1	9.3	10.9	9.8	10.8	11.0
6/15	7.9	10.4	11.9	12.3	13.1	14.2	10.2	12.3	9.5	11.2	10.0	10.9	11.2
6/16	7.8	10.2	11.8	12.2	13.0	14.1	10.2	12.4	9.7	11.3	10.1	11.0	11.3
6/17	7.8	10.1	11.8	12.2	12.9	14.0	10.4	12.5	9.9	11.4	10.3	10.9	11.2
6/18	7.7	10.0	11.7	12.0	12.8	13.8	10.7	12.6	10.1	11.5	10.3	10.8	11.1
6/19	7.6	9.9	11.7	12.0	12.7	13.6	11.2	12.7	10.4	11.8	10.4	10.9	11.1
6/20	7.3	9.9	11.4	11.7	12.5	13.2	11.1	12.8	10.7	11.9	10.5	10.9	11.2
6/21	7.4	9.8	11.1	11.4	12.1	12.6	11.3	12.6	10.8	11.8	10.5	10.6	10.9
6/22	7.6	9.7	11.1	11.4	12.0	12.4	11.5	12.7	11.0	11.8	10.5	10.5	10.8
6/23	7.8	9.7	11.2	11.5	12.0	12.4	11.8	12.9	11.2	12.1	10.6	10.5	10.9
6/24	8.2	9.8	11.3	11.6	12.1	12.5	11.9	13.1	11.2	12.3	10.7	10.7	11.1
6/25	8.4	9.8	11.7	12.0	12.6	13.1	12.3	13.5	11.2	12.5	11.0	11.3	11.6
6/26	8.9	10.0	11.8	12.2	12.8	13.3	12.3	13.6	11.1	12.2	11.4	11.4	11.7
6/27	9.6	10.0	12.3	12.7	13.4	14.1	12.8	14.0	11.0	12.3	11.8	11.8	12.1
6/28	10.1	10.0	12.6	13.2	14.0	14.7	13.3	14.6	11.0	12.4	12.3	12.5	12.8
6/29	10.6	10.0	12.8	13.5	14.4	15.2	13.6	15.0	11.1	12.2	12.7	13.1	13.3
6/30	11.1	9.9	13.0	13.8	14.9	15.7	13.8	15.3	11.2	12.0	13.0	13.7	13.8

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
7/1	11.0	9.7	13.0	13.9	15.2	16.1	14.0	15.5	11.2	11.9	13.3	14.3	14.3
7/2	11.3	9.5	12.4	13.3	14.7	15.6	13.6	15.3	11.3	11.7	13.2	14.3	14.3
7/3	11.3	9.3	12.3	13.2	14.6	15.5	13.5	15.1	11.3	11.6	13.1	14.6	14.5
7/4	11.4	9.1	11.9	12.9	14.3	15.1	13.1	14.9	11.4	11.5	12.9	14.8	14.6
7/5	11.5	9.1	11.8	12.7	14.1	15.0	12.8	14.6	11.3	11.4	12.7	14.9	14.7
7/6	11.7	9.1	11.9	12.7	14.1	15.0	12.8	14.5	11.3	11.5	12.5	15.1	14.8
7/7	11.8	9.1	11.8	12.6	14.0	14.8	12.6	14.3	11.3	11.7	12.4	15.3	15.0
7/8	11.9	9.2	11.9	12.6	13.9	14.8	12.5	14.3	11.3	12.0	12.4	15.5	15.3
7/9	12.0	9.2	12.0	12.7	13.9	14.8	12.4	14.3	11.3	12.2	12.3	15.6	15.4
7/10	12.1	9.2	12.1	12.8	13.9	14.8	12.4	14.3	11.3	12.4	12.2	15.7	15.4
7/11	12.1	9.2	12.2	12.8	14.0	14.8	12.4	14.3	11.3	12.7	12.0	15.9	15.7
7/12	12.2	9.2	12.2	12.8	14.0	14.8	12.4	14.3	11.3	13.0	11.9	16.0	15.9
7/13	12.3	9.2	12.1	12.6	13.8	14.6	12.3	14.2	11.2	13.2	11.8	16.1	15.9
7/14	12.6	9.2	11.9	12.4	13.6	14.5	12.3	14.1	11.1	13.0	11.7	16.1	15.7
7/15	13.1	9.2	12.0	12.6	13.8	14.5	12.4	14.1	11.1	13.0	11.7	16.4	16.0
7/16	13.4	9.2	12.3	12.9	14.2	15.0	12.8	14.4	11.1	13.3	11.8	16.9	16.5
7/17	13.7	9.3	12.3	12.9	14.3	15.0	13.0	14.5	11.3	13.2	12.0	17.2	16.7
7/18	13.9	9.4	12.3	12.9	14.3	15.0	13.0	14.4	11.3	13.1	12.1	17.3	16.7
7/19	14.1	9.4	12.2	12.9	14.2	14.8	12.9	14.3	11.4	13.0	12.3	17.5	16.8
7/20	14.4	9.6	12.4	13.0	14.4	14.9	13.0	14.4	11.5	13.0	12.4	17.8	17.0
7/21	14.5	9.6	12.8	13.3	14.7	15.3	13.2	14.7	11.6	13.5	12.5	18.4	17.6
7/22	14.6	9.7	12.9	13.4	14.8	15.5	13.4	14.9	11.8	13.8	12.5	18.6	17.8
7/23	14.5	9.7	12.9	13.4	14.9	15.4	13.3	15.0	12.0	13.9	12.5	18.8	18.0
7/24	14.5	9.8	12.9	13.4	14.8	15.4	13.4	15.1	12.0	14.2	12.5	19.0	18.2
7/25	14.5	9.8	12.9	13.4	14.7	15.4	13.4	15.2	12.1	14.5	12.4	19.2	18.4
7/26	14.4	9.9	12.9	13.3	14.6	15.2	13.3	15.1	12.2	14.6	12.3	19.3	18.4
7/27	14.2	10.0	12.8	13.3	14.5	15.1	13.2	15.0	12.3	14.7	12.2	19.2	18.5
7/28	13.9	10.2	12.7	13.2	14.2	14.8	13.0	14.8	12.3	14.6	12.1	19.0	18.2
7/29	13.5	10.4	12.4	12.8	13.9	14.4	12.8	14.4	12.3	14.3	12.0	18.6	17.8
7/30	13.4	10.4	12.1	12.4	13.4	13.9	12.5	14.0	12.2	13.8	11.9	17.9	17.2
7/31	13.5	10.5	11.9	12.3	13.1	13.5	12.3	13.7	12.1	13.5	11.9	17.5	16.8

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
8/1	13.7	10.6	12.0	12.4	13.1	13.6	12.4	13.7	12.2	13.6	12.0	17.7	16.9
8/2	13.8	10.7	12.3	12.6	13.4	14.0	12.8	13.9	12.3	13.8	12.2	18.0	17.2
8/3	13.9	10.8	12.4	12.7	13.5	14.2	12.9	14.1	12.4	14.0	12.3	18.2	17.4
8/4	14.3	10.8	12.6	12.8	13.8	14.4	13.1	14.3	12.5	14.3	12.4	18.6	17.7
8/5	14.8	10.8	13.0	13.2	14.1	14.8	13.4	14.7	12.6	14.7	12.5	19.1	18.2
8/6	15.1	11.0	13.5	13.7	14.6	15.3	13.9	15.2	12.8	15.3	12.7	19.9	18.9
8/7	15.1	11.1	13.7	13.9	14.9	15.8	14.2	15.7	13.1	15.7	12.8	20.5	19.4
8/8	15.0	11.2	13.5	13.8	14.8	15.6	14.2	15.7	13.2	15.6	12.9	20.4	19.4
8/9	15.1	11.2	13.4	13.7	14.7	15.6	14.1	15.7	13.2	15.5	12.9	20.2	19.2
8/10	14.9	11.3	13.4	13.6	14.7	15.5	14.1	15.7	13.3	15.6	12.9	20.2	19.2
8/11	14.7	11.4	13.3	13.5	14.5	15.4	14.1	15.6	13.4	15.4	13.0	20.0	19.0
8/12	14.6	11.5	13.1	13.4	14.3	15.1	13.9	15.4	13.4	15.1	13.0	19.7	18.6
8/13	14.4	11.5	13.1	13.4	14.4	15.2	14.0	15.4	13.5	15.1	13.1	19.6	18.5
8/14	14.3	11.6	13.0	13.3	14.3	14.9	13.9	15.2	13.5	14.9	13.1	19.4	18.3
8/15	14.3	11.6	13.1	13.4	14.4	15.1	14.0	15.2	13.5	15.0	13.1	19.4	18.3
8/16	14.1	11.6	13.1	13.4	14.3	15.0	14.0	15.2	13.6	14.9	13.1	19.3	18.1
8/17	14.2	11.6	13.1	13.3	14.2	14.9	14.0	15.1	13.6	14.7	13.1	19.2	17.8
8/18	14.3	11.6	13.2	13.4	14.3	15.0	14.1	15.2	13.7	14.9	13.1	19.3	17.8
8/19	14.2	11.7	13.3	13.5	14.4	15.2	14.2	15.4	13.8	15.1	13.0	19.5	17.9
8/20	14.2	11.7	13.2	13.4	14.2	15.0	14.1	15.3	13.8	15.1	13.0	19.3	17.8
8/21	14.1	11.7	13.1	13.4	14.2	15.0	14.1	15.3	13.9	15.2	12.9	19.3	17.8
8/22	14.0	11.7	13.1	13.3	14.0	14.8	14.0	15.2	13.9	15.1	12.8	19.0	17.6
8/23	13.9	11.7	13.0	13.2	14.0	14.7	13.9	15.1	14.0	15.3	12.7	18.9	17.6
8/24	13.8	11.7	12.9	13.2	14.0	14.7	14.0	15.1	14.1	15.5	12.7	18.7	17.7
8/25	13.6	11.7	12.9	13.2	14.0	14.6	13.9	15.1	14.2	15.5	12.7	18.6	17.7
8/26	13.4	11.7	12.8	13.1	13.9	14.5	13.9	15.1	14.2	15.5	12.9	18.5	17.7
8/27	13.3	11.7	12.9	13.2	13.9	14.6	14.1	15.1	14.3	15.8	13.0	18.2	17.6
8/28	13.3	11.8	13.0	13.2	13.9	14.7	14.2	15.2	14.4	16.0	13.1	18.1	17.6
8/29	13.4	11.9	13.2	13.4	14.1	14.9	14.3	15.3	14.5	16.2	13.2	18.3	17.8
8/30	13.4	11.9	13.3	13.5	14.2	15.0	14.3	15.4	14.6	16.4	13.4	18.4	18.0
8/31	13.4	12.0	13.3	13.5	14.2	15.0	14.3	15.4	14.6	16.4	13.5	18.3	18.0

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
9/1	13.5	11.9	13.3	13.4	14.0	14.8	14.2	15.2	14.6	16.2	13.5	18.0	17.7
9/2	13.6	11.9	13.3	13.5	14.0	14.8	14.2	15.2	14.6	16.3	13.5	18.0	17.7
9/3	13.6	11.9	13.3	13.5	14.0	14.7	14.2	15.2	14.5	16.2	13.5	18.0	17.7
9/4	13.5	11.9	13.2	13.4	13.9	14.7	14.0	15.1	14.4	16.0	13.5	17.9	17.6
9/5	13.4	11.9	13.1	13.4	13.8	14.6	13.9	15.0	14.2	15.7	13.5	17.9	17.5
9/6	13.4	11.9	13.1	13.4	13.8	14.6	13.8	14.9	14.0	15.5	13.5	17.8	17.5
9/7	13.4	12.0	13.2	13.4	13.8	14.6	13.7	14.8	13.9	15.5	13.6	17.9	17.5
9/8	13.3	12.1	13.3	13.5	13.9	14.8	13.7	14.9	13.8	15.6	13.7	18.3	17.8
9/9	13.4	12.2	13.5	13.6	14.1	15.0	13.6	15.0	13.8	15.6	13.9	18.5	18.0
9/10	13.6	12.3	13.6	13.7	14.1	14.9	13.4	14.8	13.6	15.2	14.0	18.6	18.0
9/11	13.8	12.3	13.7	13.7	14.2	14.9	13.5	14.7	13.7	15.2	14.0	18.6	18.0
9/12	13.8	12.3	13.6	13.7	14.2	14.8	13.6	14.6	13.7	15.0	14.1	18.5	17.7
9/13	13.6	12.2	13.4	13.6	14.0	14.5	13.6	14.5	13.8	14.8	14.1	18.2	17.4
9/14	13.2	12.1	13.3	13.4	13.9	14.2	13.7	14.4	13.8	14.7	14.0	17.7	16.9
9/15	12.7	12.0	13.0	13.2	13.5	13.8	13.7	14.1	13.7	14.5	13.7	17.2	16.4
9/16	12.3	11.8	12.7	12.9	13.2	13.4	13.7	13.9	13.7	14.3	13.4	16.6	15.9
9/17	11.9	11.7	12.5	12.6	12.9	13.2	13.7	13.9	13.8	14.5	13.1	16.2	15.7
9/18	11.4	11.6	12.3	12.4	12.7	13.0	13.6	13.9	13.8	14.6	12.8	16.1	15.6
9/19	10.9	11.4	12.1	12.2	12.4	12.8	13.6	13.8	13.8	14.6	12.5	15.8	15.4
9/20	10.6	11.3	11.9	12.0	12.2	12.5	13.4	13.8	13.7	14.5	12.2	15.3	15.1
9/21	10.3	11.2	11.7	11.8	12.0	12.4	13.3	13.6	13.6	14.5	11.9	14.7	14.7
9/22	10.1	10.5	11.0	11.2	11.4	11.8	12.7	13.5	13.5	14.3	11.7	14.2	14.2
9/23	9.6	9.8	10.3	10.5	10.8	11.1	11.9	12.8	12.7	13.6	11.5	13.9	13.8
9/24	9.3	9.1	9.6	9.8	10.1	10.4	11.0	12.0	12.0	12.8	11.3	13.3	13.3
9/25	9.0	8.5	9.0	9.2	9.5	9.8	10.4	11.3	11.3	11.9	11.1	12.6	12.5
9/26	8.7	7.8	8.4	8.7	9.0	9.3	9.7	10.7	10.7	11.3	10.9	11.9	11.9
9/27	8.5	7.3	7.9	8.2	8.5	8.8	9.0	10.0	10.1	10.7	10.8	11.4	11.4
9/28	8.3	6.7	7.3	7.7	8.0	8.3	8.3	9.4	9.4	10.1	10.6	11.1	11.0
9/29	8.0	6.7	7.3	7.6	7.9	8.2	8.1	8.9	8.9	9.5	10.4	10.6	10.6
9/30	7.9	6.6	7.2	7.6	7.9	8.2	8.1	8.8	8.8	9.4	10.2	10.1	10.1

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
10/1	7.7	6.6	7.2	7.6	7.9	8.2	8.1	8.8	8.8	9.5	10.1	9.8	9.9
10/2	7.6	7.1	7.2	7.5	7.8	8.0	8.2	8.7	8.7	9.5	9.9	9.6	9.7
10/3	7.6	7.7	7.5	7.7	7.8	8.1	8.5	8.9	8.9	9.8	9.8	9.6	9.8
10/4	7.5	8.2	7.8	7.9	8.0	8.2	8.8	9.1	9.2	10.0	9.8	9.7	9.8
10/5	7.5	8.6	8.1	8.2	8.3	8.5	9.1	9.3	9.4	10.2	9.8	9.7	9.8
10/6	7.4	9.1	8.4	8.4	8.5	8.6	9.3	9.5	9.6	10.5	9.7	9.6	9.8
10/7	7.4	9.5	8.7	8.7	8.7	8.9	9.7	9.8	9.9	10.7	9.6	9.6	9.8
10/8	7.4	9.9	9.0	9.0	8.9	9.1	10.1	10.1	10.2	10.9	9.6	9.5	9.8
10/9	7.2	9.8	9.3	9.2	9.2	9.5	10.1	10.4	10.4	11.1	9.5	9.6	9.8
10/10	7.1	9.6	9.2	9.2	9.3	9.5	10.1	10.4	10.4	11.1	9.3	9.5	9.7
10/11	7.0	9.6	9.0	9.1	9.1	9.4	10.1	10.3	10.3	11.1	9.0	9.5	9.7
10/12	7.0	9.6	8.9	9.0	9.0	9.3	10.1	10.3	10.3	11.0	8.9	9.5	9.8
10/13	6.9	9.6	9.0	9.0	8.9	9.3	10.2	10.4	10.4	11.0	8.8	9.5	9.8
10/14	6.9	9.6	9.0	8.9	8.9	9.3	10.2	10.5	10.4	11.0	8.7	9.5	10.0
10/15	6.8	9.7	8.9	8.8	8.7	9.2	10.3	10.5	10.5	11.1	8.5	9.6	10.0
10/16	6.8	9.8	8.9	8.8	8.6	9.0	10.3	10.4	10.4	11.0	8.4	9.4	9.9
10/17	6.8	9.8	8.8	8.7	8.5	9.0	10.3	10.4	10.5	10.9	8.3	9.2	9.8
10/18	6.9	9.9	8.9	8.7	8.5	9.0	10.4	10.5	10.5	10.9	8.3	9.1	9.8
10/19	6.9	9.9	8.9	8.7	8.5	8.9	10.4	10.5	10.6	10.9	8.3	9.0	9.8
10/20	7.0	10.1	9.0	8.7	8.5	8.9	10.4	10.5	10.6	11.0	8.3	9.2	9.9
10/21	6.9	10.1	9.0	8.7	8.4	8.8	10.4	10.5	10.6	10.9	8.4	9.1	9.9
10/22	6.9	10.1	9.1	8.8	8.5	8.8	10.4	10.4	10.6	10.9	8.4	9.1	9.9
10/23	6.9	9.9	9.1	8.8	8.6	8.8	10.4	10.5	10.6	10.9	8.3	9.1	9.9
10/24	6.7	9.9	9.1	8.8	8.6	8.8	10.4	10.5	10.6	10.9	8.3	9.2	10.0
10/25	6.5	10.0	9.0	8.8	8.6	8.7	10.4	10.4	10.6	10.9	8.3	9.2	10.0
10/26	6.2	9.8	8.9	8.7	8.5	8.5	10.4	10.4	10.6	10.9	8.1	9.1	10.0
10/27	6.1	9.8	8.8	8.6	8.4	8.4	10.3	10.3	10.5	10.9	7.7	8.8	9.8
10/28	6.1	9.7	8.7	8.6	8.4	8.4	10.3	10.3	10.5	10.8	7.5	8.5	9.7
10/29	6.2	9.2	8.4	8.4	8.4	8.4	10.2	10.3	10.5	10.9	7.4	8.5	9.7
10/30	5.9	8.8	8.2	8.2	8.2	8.3	10.1	10.3	10.5	10.8	7.5	8.6	9.7
10/31	5.6	8.4	7.9	7.9	8.0	8.1	9.7	9.9	10.2	10.6	7.4	8.4	9.4

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
11/1	5.5	7.7	7.5	7.6	7.7	7.8	9.3	9.5	10.0	10.4	7.3	8.1	9.1
11/2	5.5	7.2	7.2	7.4	7.6	7.7	9.0	9.2	9.8	10.3	7.4	7.8	8.8
11/3	5.4	6.6	6.9	7.2	7.5	7.6	8.6	8.8	9.6	10.1	7.5	7.8	8.6
11/4	5.2	6.2	6.7	7.0	7.3	7.5	8.3	8.5	9.4	9.9	7.5	7.7	8.3
11/5	5.0	6.2	6.6	6.9	7.1	7.3	8.0	8.2	9.1	9.6	7.5	7.4	8.0
11/6	5.1	6.2	6.6	6.8	7.0	7.1	7.7	7.9	8.8	9.3	7.5	7.2	7.7
11/7	5.4	6.2	6.6	6.8	7.0	7.2	7.7	7.9	8.8	9.2	7.5	7.1	7.6
11/8	5.6	6.3	6.7	7.0	7.2	7.3	7.7	8.0	8.7	9.2	7.7	7.3	7.7
11/9	5.7	6.3	6.9	7.3	7.3	7.5	7.8	8.1	8.7	9.1	7.8	7.4	7.8
11/10	5.8	6.4	7.0	7.6	7.5	7.6	7.9	8.3	8.6	9.1	8.0	7.6	7.9
11/11	5.8	6.4	7.0	7.8	7.5	7.7	7.9	8.4	8.5	9.0	8.0	7.6	7.9
11/12	5.6	6.4	6.9	7.6	7.5	7.7	7.8	8.4	8.5	8.9	7.9	7.6	7.9
11/13	5.5	6.4	6.8	7.5	7.4	7.5	7.7	8.3	8.3	8.8	7.9	7.5	7.8
11/14	5.3	6.4	6.7	7.4	7.3	7.4	7.6	8.2	8.2	8.6	7.8	7.4	7.7
11/15	5.1	6.4	6.7	7.4	7.2	7.4	7.5	8.1	8.0	8.4	7.7	7.3	7.5
11/16	4.9	6.4	6.6	7.1	7.2	7.3	7.4	8.0	7.9	8.2	7.6	7.1	7.2
11/17	4.4	6.4	6.4	6.7	6.9	7.1	7.1	7.7	7.7	8.0	7.3	6.8	7.0
11/18	4.1	6.3	6.0	6.3	6.5	6.6	6.7	7.2	7.5	7.7	6.9	6.4	6.6
11/19	4.0	6.2	5.8	6.1	6.0	6.1	6.3	6.7	7.2	7.5	6.5	6.0	6.2
11/20	3.9	6.2	5.6	6.0	5.7	5.8	6.1	6.4	7.1	7.3	6.2	5.6	5.9
11/21	3.8	6.1	5.4	5.9	5.4	5.5	5.8	6.0	7.0	7.2	5.9	5.4	5.7
11/22	3.6	6.1	5.2	5.8	5.1	5.1	5.6	5.7	6.8	7.0	5.6	5.1	5.5
11/23	3.6	5.9	5.0	5.7	4.7	4.8	5.4	5.4	6.6	6.9	5.2	4.9	5.4
11/24	3.7	5.9	5.0	5.7	4.6	4.6	5.3	5.3	6.5	6.8	5.2	4.9	5.4
11/25	3.9	5.9	5.1	5.8	4.6	4.7	5.4	5.4	6.5	6.8	5.3	5.0	5.5
11/26	4.0	5.9	5.2	6.0	4.9	4.9	5.6	5.6	6.4	6.8	5.5	5.1	5.6
11/27	4.2	5.9	5.4	6.1	5.1	5.1	5.8	5.9	6.5	6.8	5.6	5.3	5.8
11/28	4.2	5.9	5.6	6.2	5.4	5.4	5.9	6.2	6.5	6.8	5.9	5.6	5.9
11/29	4.1	5.8	5.7	6.2	5.6	5.7	6.0	6.3	6.5	6.8	6.0	5.7	6.0
11/30	3.8	5.8	5.7	6.0	5.6	5.7	5.9	6.2	6.4	6.6	6.0	5.6	5.8

DATE	RM 18.2 (SFK) 7 Day Avg Max	RM 15.8 7 Day Avg Max	RM 14.3 7 Day Avg Max	RM 12.8 7 Day Avg Max	RM 11.3 7 Day Avg Max	RM 9.8 7 Day Avg Max	RM 9.6 7 Day Avg Max	RM 4.9 7 Day Avg Max	RM 4.4 7 Day Avg Max	RM 0.2 7 Day Avg Max	Big Four 7 Day Avg Max	Skykomish Above 7 Day Avg Max	Skykomish Below 7 Day Avg Max
12/1	3.5	5.8	5.5	5.8	5.5	5.6	5.8	6.1	6.3	6.4	5.7	5.3	5.6
12/2	3.0	5.7	5.3	5.4	5.2	5.5	5.6	5.8	6.1	6.3	5.3	4.9	5.2
12/3	2.4	5.5	5.0	5.1	4.8	5.1	5.3	5.4	6.0	6.1	4.8	4.4	4.8
12/4	1.8	5.4	4.6	4.6	4.2	4.6	5.0	4.8	5.8	5.8	4.1	3.7	4.2
12/5	1.4	5.2	4.1	4.1	3.4	3.8	4.5	4.3	5.5	5.5	3.2	2.9	3.5
12/6	1.2	5.0	3.7	3.7	2.9	3.2	4.3	3.8	5.2	5.2	2.5	2.2	3.0
12/7	1.1	4.9	3.5	3.6	2.7	2.8	4.1	3.7	5.1	5.1	2.0	1.9	2.9
12/8	1.2	4.7	3.4	3.4	2.5	2.6	4.1	3.6	5.0	5.0	1.8	1.8	2.8
12/9	1.3	4.6	3.4	3.4	2.6	2.5	4.0	3.6	4.9	4.9	1.7	1.9	2.9
12/10	1.6	4.5	3.4	3.4	2.7	2.5	4.0	3.7	4.8	4.9	1.8	2.2	3.2
12/11	2.0	4.5	3.5	3.5	3.0	2.7	4.1	3.9	4.8	4.9	2.2	2.7	3.5
12/12	2.3	4.5	3.7	3.7	3.4	3.1	4.2	4.2	4.8	4.9	2.7	3.3	3.9
12/13	2.5	4.5	3.8	3.8	3.6	3.4	4.2	4.3	4.7	4.9	3.1	3.8	4.3
12/14	2.7	4.5	3.9	3.9	3.7	3.6	4.2	4.3	4.6	4.9	3.4	4.0	4.4
12/15	2.8	4.5	4.0	4.0	3.9	3.8	4.2	4.4	4.6	4.9	3.7	4.3	4.6
12/16	2.8	4.4	4.0	4.1	4.0	3.9	4.2	4.4	4.6	4.8	3.8	4.4	4.6
12/17	2.7	4.4	4.0	4.0	3.9	3.9	4.1	4.3	4.5	4.7	3.8	4.3	4.5
12/18	2.7	4.4	3.9	4.0	3.8	3.8	4.0	4.2	4.3	4.6	3.7	4.1	4.4
12/19	2.7	4.3	3.8	3.9	3.8	3.8	4.0	4.1	4.3	4.5	3.8	4.1	4.3
12/20	2.8	4.2	3.9	3.9	3.9	3.8	4.0	4.2	4.3	4.5	3.9	4.0	4.3
12/21	2.7	4.2	3.9	3.9	3.9	3.9	4.0	4.3	4.3	4.5	3.9	4.1	4.3
12/22	2.8	4.1	3.8	3.9	3.9	3.9	4.0	4.3	4.3	4.4	3.9	4.0	4.3
12/23	3.1	4.1	3.8	3.9	3.9	3.9	4.0	4.3	4.3	4.4	4.1	4.0	4.3
12/24	3.2	4.1	4.0	4.0	4.0	4.1	4.1	4.4	4.3	4.4	4.4	4.2	4.4
12/25	3.3	4.1	4.1	4.2	4.2	4.3	4.2	4.7	4.5	4.6	4.6	4.5	4.7
12/26	3.4	4.1	4.3	4.3	4.3	4.4	4.3	4.8	4.6	4.6	4.6	4.6	4.8
12/27	3.5	4.1	4.3	4.3	4.3	4.4	4.3	4.8	4.5	4.6	4.6	4.6	4.8
12/28	3.5	4.1	4.3	4.4	4.3	4.5	4.2	4.9	4.5	4.6	4.7	4.7	4.9
12/29	3.6	4.2	4.4	4.5	4.4	4.6	4.3	4.9	4.5	4.6	4.8	4.9	5.0
12/30	3.5	4.2	4.5	4.6	4.5	4.7	4.3	5.1	4.6	4.7	4.9	5.0	5.1
12/31	3.5	4.2	4.5	4.6	4.6	4.8	4.4	5.2	4.7	4.7	4.9	5.1	5.2

APPENDIX D

Smolt Outmigration Report, Sultan River

Smolt Outmigration Report
Sultan River

Annual Monitoring Report 2013

SNOHOMISH COUNTY PUD
PUBLIC UTILITY DISTRICT NO. 1

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1. Introduction

In 2012, Public Utility District No. 1 of Snohomish County (the District) began monitoring the outmigration of juvenile salmonids (smolts) as a measure (index) of reproductive success in the Sultan River near Sultan, Washington. This monitoring is one component of the Fisheries and Habitat Monitoring Plan (FHMP), as outlined in Article 410 of the License issued by the Federal Energy Regulatory Commission (FERC) on September 2, 2011, for the continued operation of the Jackson Hydroelectric Project (Project). This report presents the results of the second year (Year 2) of operation of the rotary screw trap (smolt trap) located on the lower Sultan River. Year 2 is the second of six consecutive years of initial operation, as outlined in the FHMP. Beginning in 2018 and extending to the end of the 45-year License term, the District will continue to operate the smolt trap for 2 of every 6 years.

The FHMP also stipulates that, subject to the results of monitoring, the District will commence operation of the smolt trap on February 1 and continue operations through June 30 of each sampling year. The District will operate the trap between 30 and 40 percent of the hours in any given week during the sampling year, except during severe flow events; and scheduled to fish for four day and four night periods per week, with each fishing period lasting a minimum of six hours. During periods when few fish are emigrating, trapping frequency can be reduced to fewer days per week. The FHMP also stipulates that the trap will be located in the lower mile of the Sultan River and that the District will collect, compile, analyze and report the following trap data by species and life stage: number captured, size distribution, timing (diel and seasonal), fish population estimates and trap efficiency.

2. Methods

Trap description, location, and operation

The Sultan River smolt trap, manufactured by E.G. Solutions, is 5 feet in diameter and designed to sample outmigrating fish over a range of flow conditions (discharge, depth, and velocity). The trap is seasonally positioned in the Sultan River at a location approximately 0.2 miles upstream of the confluence with the Skykomish River (Figure 1).

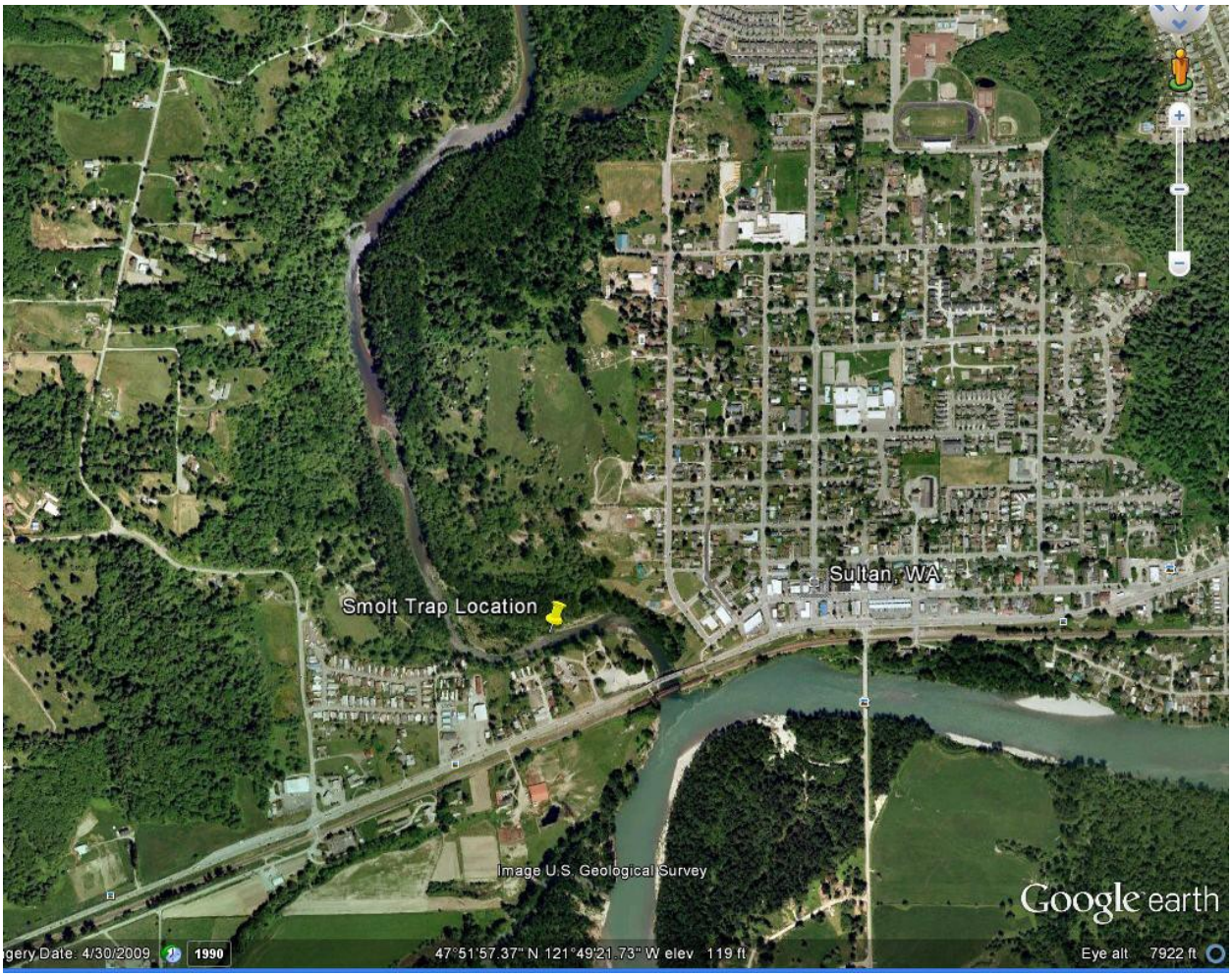

Figure 1. Aerial photograph depicting the location of the Sultan River smolt trap at River Mile 0.2 on the Sultan River.

During 2013, the trap was operated from January 22 to June 27, fishing 62.6 percent of the hours during that time period (61.5 % of the day hours and 63.7 % of the night hours). Table summarizes total hours and percentage of time fished by week.

Table 1. Number and percentage of hours operated by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Sample Block Start Date	Hours Operated	Percent Hours Fished
1	20-Jan	71	42
2	27-Jan	132	79
3	3-Feb	96	57
4	10-Feb	119	71
5	17-Feb	66	39
6	24-Feb	151	90
7	3-Mar	140	83
8	10-Mar	126	75
9	17-Mar	166	99
10	24-Mar	121	72
11	31-Mar	120	71
12	7-Apr	70	41
13	14-Apr	123	73
14	21-Apr	109	65
15	28-Apr	156	93
16	5-May	85	50
17	12-May	85	50
18	19-May	113	67
19	26-May	83	49
20	2-Jun	93	55
21	9-Jun	103	61
22	16-Jun	65	38
23	23-Jun	72	43

During operation, the trap was under constant observation and video surveillance. Site visits occurred at a minimum of once per day and frequently more than once per day depending on operating conditions. The number of revolutions of the trap cone per minute was recorded at the beginning and end of each trapping period (set). Discharge information from upstream of the trapping site was obtained from the U.S. Geological Survey Gaging Station No. 12138160 (Sultan River below Power Plant; River Mile 4.5).

At the end of each set, captured fish were enumerated and sorted by species and life history stage. Throughout the sampling season, on a weekly basis, a subsample of fish were measured (fork length, mm). Prior to measurement, fish were anesthetized with tricaine methanesulfonate (MS-222).

Trap Efficiency

In order to estimate total outmigration, the capture efficiency (percentage of out-migrating fish captured) of the trap needed to be determined. Tests of capture efficiency tests were performed by releasing marked groups of Chinook (wild and hatchery) and chum salmon. Wild fish were captured at the trap, anesthetized with MS-222, and marked with Alcian blue colored dye applied

with a jet inoculator to produce a small mark near the lateral line. Hatchery Chinook were also used to increase our sample size and confidence in test results. A total of three thousand (3,000) hatchery Chinook, obtained from the Wallace River Hatchery, were released in batches of 750 fish on four separate nights during weeks 12, 14, 16, and 20. These fish were approximately 70 mm in length, slightly larger than wild Chinook (Table 10). Hatchery Chinook were marked with calcein (SE-MARK). Hatchery fish were not anesthetized prior to marking with calcein as that is not necessary.

We conducted efficiency trials at various discharges in order to determine efficiency under varied conditions. All efficiency releases were made at Reese Park, approximately 0.3 miles upstream of the trap. This distance was great enough to allow for mixing of fish across the stream channel and within the water column, but short enough to reduce the likelihood of predation that would result in the loss of fish before they have an opportunity to arrive at the trap. To further reduce predation, all releases occurred approximately 1 hour after sunset. In order to be assured that marked fish and unmarked fish have the same probability of capture, the trap fished continuously for a minimum of 72 hours after each release to allow all marked fish to migrate past the trap.

Estimating Total Migration

A modified Peterson mark-recapture approach was used to estimate total migration for the season (Volkhardt 2007).

The following 5 assumptions must be met in order to achieve an estimate:

1) The population is closed;
2) All fish (marked and unmarked) have an equal opportunity of capture;
3) Marking does not affect catchability;
4) Marked fish mix at random with unmarked fish; and
5) All marks are detected and reported.

Peterson's equation is slightly biased. Therefore, we used Seber's adjustment (Seber 1982) to Peterson's equation because it assumes that the second sampling is done without replacement. Because we did not sample all hours during the season, we've modified Seber's equation to adjust for our sampling effort. Our modified Seber's estimator is as follows:

$$U_{2013} = \left(\frac{u_{2013} + 1}{p_{2013}}\right)\left(\frac{M_{2013} + 1}{m_{2013} + 1}\right)$$

Where

U_{2013} = Estimated number of fish migrating past the trap during 2013 including hours not fished

u_{2013} = Number of fish captured at the trap during the 2013 season

p_{2013} = Percent of hours fished during the 2013 season

M_{2013} = Number of fish marked and released during 2013 efficiency trials

m_{2013} = Number of marked fish captured during 2013 efficiency trials

An approximate variance estimate of U_{2013} is as follows:

$$\widehat{Var}(U_{2013}) = \frac{(u_{2013}+1)(M_{2013}+1)(u_{2013}-m_{2013})(M_{2013}-m_{2013})}{{p_{2013}}^2(m_{2013}+1)^2(m_{2013}+2)}$$

and an approximate 95% confidence interval is

$$U_{2013} \pm 1.96\sqrt{\widehat{Var}(U_{2013})}$$

Chinook egg-to-migrant survival

Once total Chinook migration was estimated, egg-to-migrant survival was estimated. Egg-to-migrant survival is estimated by:

$$S_{2013} = \left(\frac{E_{2012}}{U_{2013}}\right)$$

Where

S_{2013} = Chinook egg-to-migrant survival in 2013

U_{2013} = Estimate of 2013 Chinook migration

E_{2012} = Number of Chinook eggs deposited in gravel in 2012

The number of Chinook eggs deposited in gravel in 2012 figure is calculated using Chinook spawner data from 2012 surveys and average Chinook fecundity from Wallace River Hatchery data.

We are unable to calculate egg-to-migrant survival for chum or coho salmon because typically the river is too turbid to get accurate fish counts during their respective spawning seasons.

3. Results and Discussion

Catch

A total of 16,489 fish and 2 salamanders were captured during the 2013 sampling year (Table 2). Chinook salmon (0+) were the dominant species encountered, accounting for 56 percent of the catch. Although scales were not collected, all Chinook were age 0+ based on size and identification keys. This is reinforced by scale sample data from adult Chinook that indicate that virtually all Sultan River Chinook migrate as sub-yearlings (0+).

Table 2. Total fish captured by species and lifestage, Sultan River smolt trap, 2013.

Species	Total
Chinook (0+)	9,314
Chum	3,739
Coho (0+)	2,180
Coho (1+)	677
Dace	266
Rainbow Trout	140
Lamprey	108
Sculpin	49
Cutthroat Trout	13
Three spine Stickleback	2
Northwest Salamander	2
Brook Trout	1

Trap Efficiency

In order to estimate total migration, groups of wild Chinook and chum, as well as 3,000 hatchery Chinook were used to assess capture efficiency throughout the season. Table 3 summarizes results of efficiency trials by species.

Table 3. Summary of mark-recapture tests of trap capture efficiency of wild Chinook, hatchery Chinook, and chum salmon, Sultan River smolt trap, 2013.

Fish Used	Total Marked and Released	Total Recaptured	% Trap Efficiency
Wild Chinook	1,274	30	2.4
Hatchery Chinook	3,000	112	3.7
Chum	740	11	1.5
All Species Combined	5,014	153	3.1

Estimating Total Migration

A modified Peterson mark-recapture approach was used to estimate total migration of Chinook, chum, and yearling coho salmon. This method accounts for hours not fished during the season. We did not stratify mark and recapture rates into discrete time periods, but rather used a mark-recapture rate for the entire season. Table 4 presents total migration by species using wild Chinook only, wild and hatchery Chinook combined, chum only, or all species combined efficiency rates.

Table 4. Total migration of Chinook, chum, and yearling coho salmon using wild Chinook only, wild and hatchery Chinook combined, chum only, or all species combined efficiency rates, Sultan River smolt trap, 2013.

Fish used for efficiency test	Chinook Migration	Chum Migration	Yearling coho Migration
Wild Chinook (2.4%)	610,567	na	na
Wild and Hatchery Chinook (3.3%)	443,789	na	na
Chum (1.5 %)	na	368,053	na
All Species Combined (3.1%)	na	194,099	35,187

Tables 5, 6, and 7 summarize migration for Chinook, chum, and yearling coho salmon using various efficiencies.

Table 5. Chinook migration estimate, 95% confidence level, and migration variance using wild Chinook only (2.4%) efficiency and wild and hatchery Chinook combined (3.3 %) efficiency, Sultan River smolt trap, 2013.

Fish Used for Efficiency Test	Chinook Migration Estimate	95 % Confidence Level High	Low	Migration Variance
Wild Chinook (2.4%)	610,567	819,182	401,952	11,328,681,879
Wild and Hatchery Chinook (3.3%)	443,798	514,513	373,083	1,301,706,165

Table 6. Chum salmon migration estimate, 95% confidence level, and migration variance using chum salmon only (1.5 %) efficiency and all fish combined (3.1%) efficiency, Sultan River smolt trap, 2013.

Fish Used for Efficiency Test	Chum Migration Estimate	95 % Confidence Level High	Low	Migration Variance
Chum (1.5 %)	368,053	566,184	169,923	10,218,604,466
All Fish Combined (3.1%)	194,099	223,558	164,641	225,896,498

Table 7. Yearling coho salmon migration estimate, 95% confidence level, and migration variance using all fish combined (3.1%) efficiency, Sultan River smolt trap, 2013.

Fish Used for Efficiency Test	Yearling Coho Migration Estimate	95 % Confidence Level High	Low	Migration Variance
All Species Combined (3.1%)	35,187	39,982	30,392	5,983,959

The Peterson mark-recapture approach is based on 5 assumptions. These assumptions must be met, or accommodated, in order to ensure an unbiased abundance estimate. We determined that we satisfied all 5 assumptions.

1. The population is closed with no immigration or emigration.

We satisfied this assumption because all fish that passed the trap were migrating from only the Sultan River. Because we were far enough upstream (0.2 miles) from the mouth, we do not believe any fish that passed the trap were emigrating from the Skykomish River.

2. All fish (marked and unmarked) have an equal opportunity of capture.

In order to be assured that marked fish and unmarked fish have the same probability of capture, we fished continuously for a minimum of 72 hours after each release. All efficiency releases were at a site 0.3 miles upstream of the trap. This distance was great enough to allow for mixing of fish across the stream channel and within the water column, but short enough to reduce the likelihood of predation that would result in the loss of fish before they have an opportunity to arrive at the trap. Also, in order to avoid predation, all releases occurred approximately 1 hour after sunset.

3. Marking does not affect catchability.

After marking with calcein, fish were held in aerated totes for a minimum of one hour prior to release. The fish showed no unusual behavior or stress as a result of marking.

4. The fish do not lose their marks.

Calcein satisfied this assumption.

5. All recovered marks are detected and reported.

Marks were easily detected using a handheld SE-MARK detector light. All recovered marks were recorded immediately.

After two seasons of operation, we have not collected sufficient data to stratify mark and recapture rates into discrete time periods. Therefore, we pooled all mark-recapture data and used one trap efficiency rate for the entire season. As we collect more data in future years we will be able to determine efficiency as a function of environmental variables such as flow and turbidity and will be able to apply different efficiency rates depending on these variables.

Migration Timing

Chinook were captured during each week of the season. The first chum was captured in Week 5 and the last chum in Week 19. The first yearling coho was caught in Week 1 and the last in Week 21. Table 8 presents catches of all salmon and trout by week.

Table 8. Chinook, chum, coho (1+), coho (0+) salmon and rainbow and cutthroat trout caught by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Sample Block Start Date	Chinook (0+)	Chum	Coho (1+)	Coho (0+)	Rainbow	Cutthroat
1	20-Jan	3		1			
2	27-Jan	34		9		1	
3	3-Feb	59		5		2	2
4	10-Feb	117		7			1
5	17-Feb	15	1	3		2	
6	24-Feb	299	5	5	15	1	
7	3-Mar	211	70	6	48	1	
8	10-Mar	465	204	14	106	5	
9	17-Mar	431	448	25	153	2	
10	24-Mar	369	1678	17	69	3	2
11	31-Mar	697	847	11	157	1	
12	7-Apr	185	187	9	161	3	
13	14-Apr	468	132	32	212	4	
14	21-Apr	315	50	32	150	11	
15	28-Apr	1588	89	169	173	10	4
16	5-May	3010	26	181	274	41	2
17	12-May	292		82	44	13	1
18	19-May	232	1	29	46	12	1
19	26-May	194	1	31	161	6	
20	2-Jun	120		3	173	9	
21	9-Jun	132		6	143	8	
22	16-Jun	38			51	5	
23	23-Jun	40			44		
Totals		9314	3739	677	2180	140	13

Outmigration of Chinook and yearling coho both peaked in Week 16. Chum migration peaked in Week 10. Figure 2 below shows migration timing of Chinook, yearling coho, and chum salmon.

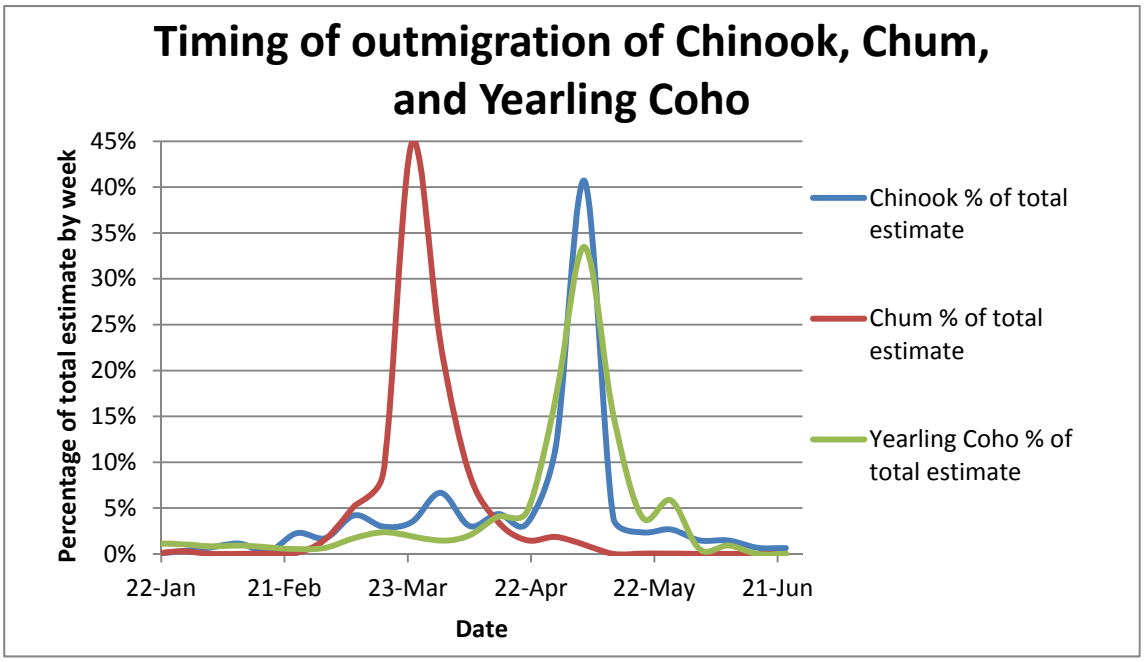

Figure 2. Timing of outmigration for Chinook (0+), chum, and yearling coho (1+) salmon, Sultan River smolt trap, 2013.

Chinook Egg-to-Migrant Survival

During fall 2012, river conditions and visibility were generally good during Chinook spawner surveys. During these surveys, a total of 390 Chinook redds were estimated. Assuming an outmigrant estimate of 443,789 fish (based on 3.3% efficiency), we calculated an Egg-to-Migrant survival of 25.2% (Table 9).

Table 9. Number of Chinook (0+) eggs deposited in 2012 to migrant survival in 2013, Sultan River smolt trap, 2013. The number of Chinook eggs is calculated using Wallace River Hatchery data of 4,510 eggs/female.

Chinook redds in 2012	Number of Chinook Eggs in 2012	Chinook Migration in 2013	Egg-to-migrant Survival Rate
390	1,758,900	443,789	25.2%

During fall 2011, river conditions and visibility were poor, resulting in limited Chinook surveys. Based on these limited surveys, we felt that Chinook escapement was low in the Sultan River and we estimated a total of 53 Chinook redds for the season. This low escapement was consistent with that observed elsewhere in the Snohomish Basin during WDFW surveys. The 53 redds in the Sultan River would have resulted in 239,030 Chinook eggs at an assumed fecundity of 4,510 eggs per female. Using 2012 smolt trap data, we calculated a 19.2% egg-to-migrant survival for the 2011 brood year, compared with 25.2 % for the 2012 brood year. Trapping during the next four years (2013 to 2016) will further inform the degree of variation in egg-to-migrant survival.

No floods occurred in 2011 or 2012 that would have resulted in scouring of Chinook redds.

We are unable to estimate egg-to-migrant survival for chum or coho salmon because we typically have poor river visibility that does not allow us to get accurate counts during their respective spawning seasons.

Fish Size

Chinook (0+)

Chinook lengths averaged 43 mm or less through Week 19 of the season. Beginning in Week 20, and continuing through the end of the season, Chinook lengths increased, averaging 59.3 mm during the last week of the season (Table 10, Figure 3).

Table 10. Mean fork length (mm), standard deviation (s.d.), minimum and maximum length, number sampled, number captured, and percent sampled of Chinook (0+) salmon by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Mean	s.d.	Minimum	Maximum	Number Sampled	Number Captured	Percent Sampled
1	41.5	0.71	41	42	2	3	66.7
2	41.3	1.85	37	43	11	34	32.4
3	42.0	1.33	39	44	22	59	37.3
4	40.5	2.16	38	45	11	117	9.4
5	42.3	1.04	41	44	8	15	53.3
6	41.3	1.98	35	46	76	299	25.4
7	41.2	1.88	39	45	108	211	51.2
8	41.6	1.81	38	46	100	465	21.5
9	41.7	1.74	38	48	109	431	25.3
10	41.8	1.38	39	45	76	369	20.6
11	41.1	1.55	37	45	138	697	19.8
12	41.3	1.44	39	44	12	185	6.5
13	41.4	1.81	38	45	46	468	9.8
14	40.9	1.79	37	46	41	315	13
15	42.1	2.15	37	49	289	1588	18.2
16	41.2	1.61	37	50	526	3010	17.5
17	41.6	1.43	37	44	58	292	19.9
18	42.3	3.66	37	55	55	232	23.7
19	42.8	1.32	40	57	55	194	28.4
20	43.9	4.61	39	57	28	120	23.3
21	47.2	7.80	38	66	23	132	17.4
22	47.6	8.63	40	69	9	38	23.7
23	59.3	12.14	42	79	16	40	40
Totals	43.0	3.05	35	79	1819	9314	20

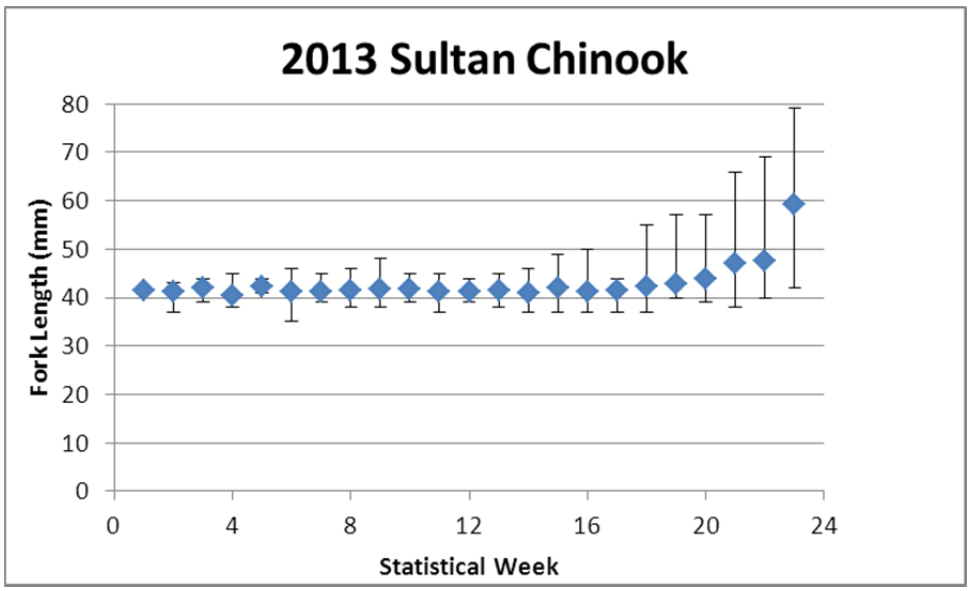

Figure 3. Range (mean, minimum, and maximum) of Chinook (0+) salmon fork lengths (mm), by statistical week, Sultan River smolt trap, 2013.

Chum

Chum salmon lengths showed little variation. The average length for the season was 39.9 mm and standard deviation was 1.46 (Table 11, Figure 4).

Table 11. Mean fork length (mm), standard deviation (s.d.), minimum and maximum length, number sampled, number captured, and percent sampled of chum salmon by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Mean	s.d.	Minimum	Maximum	Number Sampled	Number Captured	Percent Sampled
6	38.0	1.41	37	39	2	5	40
7	40.0		40	40	1	70	1
8	39.8	1.62	38	43	63	204	31
9	39.8	1.49	36	44	79	448	18
10	40.1	1.38	37	44	337	1678	20
11	39.8	1.36	35	44	158	847	19
12	39.9	1.20	38	42	10	187	5
13	39.7	2.33	36	44	11	132	8
14	39.2	0.84	38	40	5	50	10
15	38.9	1.51	35	41	25	89	28
16	39.8	2.08	36	44	16	26	62
Totals	39.2	1.46	35	44	707	3739	19

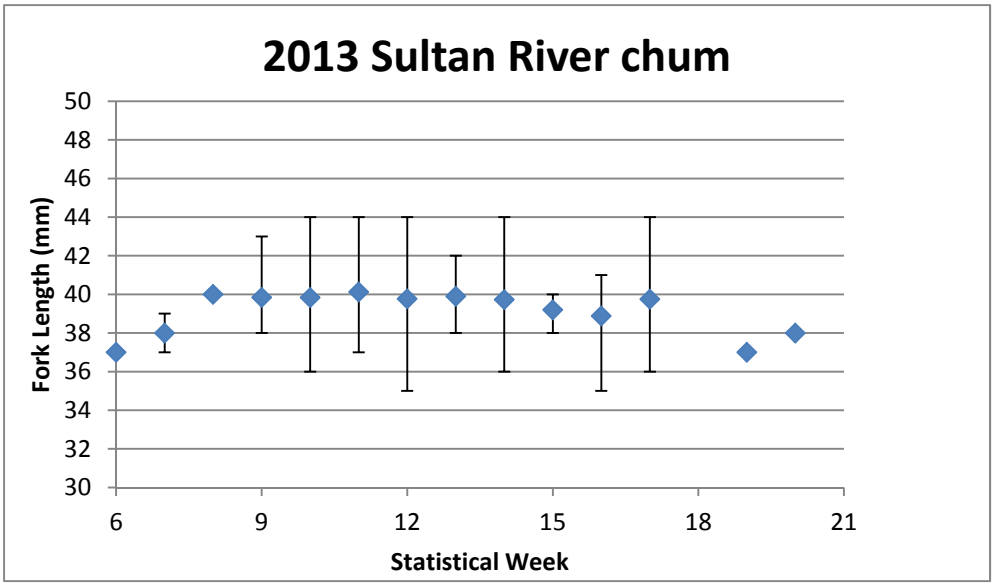

Figure 4. Range (mean, minimum, and maximum) of chum salmon fork lengths (mm) by statistical week, Sultan River smolt trap, 2013.

Yearling coho (1+)

Yearling coho averaged 93.2 mm for the season. During weeks 1-14 they averaged 81.4 mm. Beginning in Week 15, lengths increased, averaging 99.7 mm in Week 15 through the end of the season (Table 12, Figure 5).

Table 12. Mean fork length (mm), standard deviation (s.d.), minimum and maximum length, number sampled, number captured, and percent sampled of yearling coho (1+) salmon by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Mean	s.d.	Minimum	Maximum	Number Sampled	Number Captured	Percent Sampled
1	78.0		78	78	1	1	100
2	77.2	11.67	61	87	5	9	56
3	91.8	16.96	76	111	5	5	100
4	84.0	19.10	69	116	5	7	71
5	84.5	6.36	80	89	2	3	67
6	70.0	14.14	60	80	2	5	40
7	85.0	17.58	65	98	3	6	50
8	86.3	13.57	70	102	4	14	29
9	79.8	1.26	78	81	4	25	16
10	78.2	1.60	76	80	6	15	40
11	78.7	2.42	75	81	6	11	55
12	78.5	0.71	78	79	2	9	22
13	86.0	10.71	74	100	4	34	12
14	89.7	17.85	69	125	9	32	28
15	104.0	10.37	88	120	21	169	12
16	104.3	10.74	87	123	17	181	9
17	98.9	7.50	89	114	23	82	28
18	93.2	2.77	89	96	5	29	17
19	95.9	4.02	90	101	8	31	26
20	106.5	12.02	98	115	2	3	67
21	106.5	17.68	94	119	2	6	33
Season Total	93.2	14.45	58	125	136	677	20

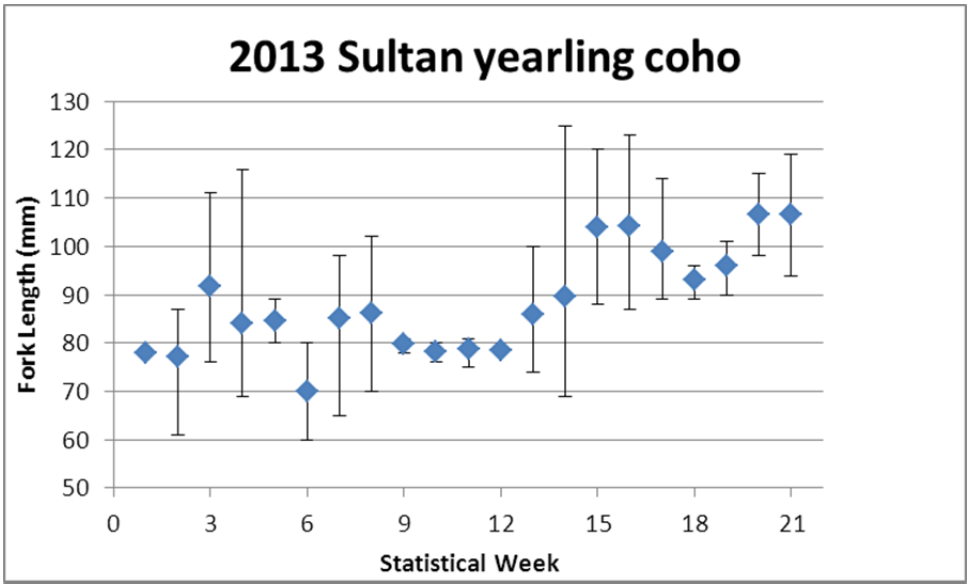

Figure 5. Range (mean, minimum, and maximum) of yearling (1+) coho salmon fork lengths (mm) by statistical week, Sultan River smolt trap, 2013.

Sub-yearling (0+) coho

Sub-yearling coho lengths showed little variation. Average length was less than 39 mm throughout the season except during the final week when the average length was 41.6 mm (Table 13, Figure 6).

Table 13. Mean fork length (mm), standard deviation (s.d.), minimum and maximum length, number sampled, number captured, and percent sampled of sub-yearling (0+) coho salmon by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Mean	s.d.	Minimum	Maximum	Number Sampled	Number Captured	Percent Sampled
8	34.7	1.49	33	38	10	106	9
9	36.1	2.31	33	41	20	153	13
10	38.2	3.06	35	42	6	69	9
11	38.1	1.33	35	42	57	157	36
12	38.2	1.27	36	41	20	161	12
13	37.9	1.16	35	41	39	212	18
14	38.1	1.62	35	40	9	122	7
15	38.3	1.56	36	42	20	173	12
16	37.9	2.09	36	44	50	274	18
17	37.5	1.77	35	41	8	44	18
18	36.6	1.96	33	41	27	46	59
19	38.3	3.43	33	48	70	161	43
20	37.7	4.46	34	50	19	173	11
21	38.5	3.87	35	55	63	143	44
22	37.4	2.81	34	44	18	51	35
23	41.6	4.03	35	48	16	44	36
Totals	38.0	2.86	33	55	452	2,089	22

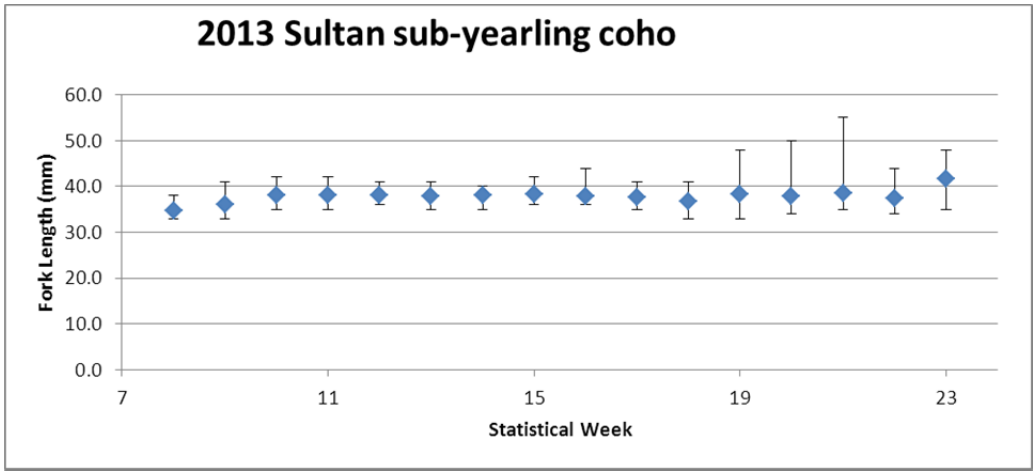

Figure 6. Range (mean, minimum, and maximum) of sub-yearling (0+) coho salmon fork lengths (mm) by statistical week, Sultan River smolt trap, 2013.

Rainbow Trout

Rainbow trout varied greatly in length and showed no pattern of increasing lengths as the season progressed (Table 13, Figure 7).

Table 13. Mean fork length (mm), standard deviation (s.d.), minimum and maximum length, number sampled, number captured, and percent sampled of rainbow trout by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Mean	s.d.	Minimum	Maximum	Number Sampled	Number Captured	Percent Sampled
2	92.0		92	92	1	1	100
3	90.5	4.95	87	94	2	2	100
5	110.5	38.89	83	138	2	2	100
6	89.0		89	89	1	1	100
7	220.0		220	220	1	1	100
8	139.0	76.37	85	193	2	5	40
9	92.5	13.44	83	102	2	2	100
10	88.3	19.55	68	107	3	3	100
11	171.0		171	171	1	1	100
12	107.0	2.83	105	109	2	3	67
13	106.3	27.98	74	141	4	4	100
14	104.8	33.98	69	164	9	11	82
15	112.6	47.03	71	206	8	10	80
16	101.0	34.88	70	187	28	41	68
17	144.5	61.06	76	217	11	13	95
18	122.5	45.96	90	155	2	12	17
19	126.0	48.66	70	158	3	6	50
20	78.0		78	78	1	9	11
21	103.5	40.02	63	178	8	8	100
22	138.3	41.43	91	168	3	5	60
Season Total	112.6	42.32		220	94	140	67

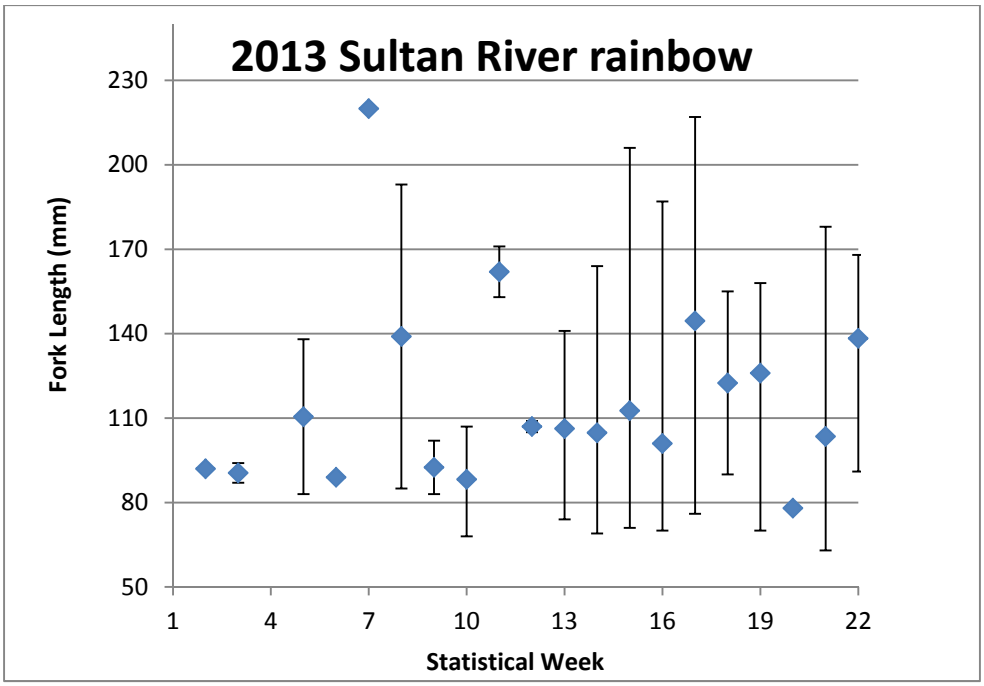

Figure 7. Range (mean, minimum, and maximum) of rainbow trout fork lengths (mm) by statistical week, Sultan River smolt trap, 2013.

Cutthroat Trout

We caught 13 cutthroat trout and measured 9 of these. Table 15 summarizes cutthroat trout fork lengths.

Table 14. Mean fork length (mm), standard deviation (s.d.), minimum and maximum length, number sampled, number captured, and percent sampled of cutthroat trout by statistical week, Sultan River smolt trap, 2013.

Statistical Week	Mean	s.d.	Minimum	Maximum	Number Sampled	Number Captured	Percent Sampled
3	125.5	2.12	124	127	2	2	100
4	127		127	127	1	1	100
10	146	19.8	132	160	2	2	100
15	137.5	28.99	117	158	2	4	50
16	101		101	101	1	2	50
17	132		132	132	1	1	100
18	121		121	121	1	1	100
Season Total	130.9	18.54	101	160	9	13	69

Catch Per Unit Effort for 2012 and 2013

The smolt trap has been in the same location during the first two years of operation and will continue to be operated in the same location in future years. Catch per unit effort (CPUE in hours fished) was greater for all salmonids in 2013 compared to 2012 (Figure 8). Trap efficiency was similar between years and is likely not related to the observed difference in catch. During fall 2011, the Sultan River was turbid from mid-September through mid-December. This time period corresponds with the Chinook, coho, and chum spawning seasons and prevented normal spawner surveys. However, based on limited surveys, the number of all fall spawning adults was observed to be low. Cordone and Kelley (1961) indicated that migrating salmonids are known to avoid waters with high silt loads, or cease migration, when such loads are unavoidable. This could explain the dramatically lower smolt trap catch in 2012 compared with 2013. Turbidity in the Sultan River was relatively low throughout the 2012 spawning season.

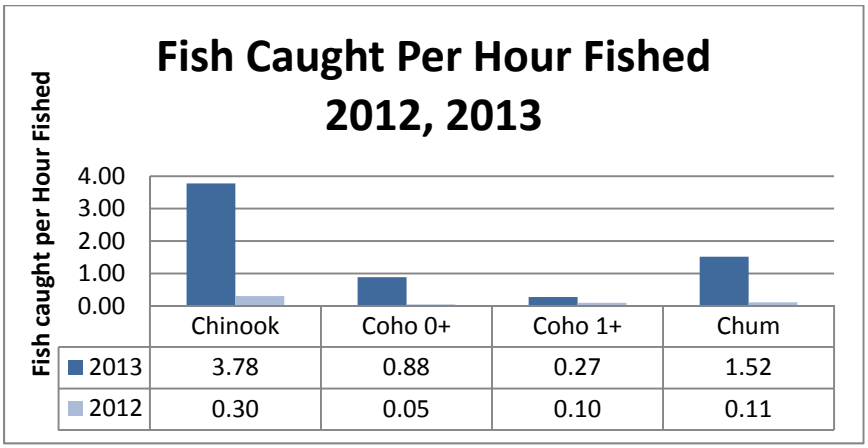

Figure 8. Chinook (0+), sub-yearling coho (0+), yearling coho (1+), and chum salmon captured per hour fished during 2012 and 2013, Sultan River smolt trap.

4. Summary

This report presents the results of the second year of operation of the rotary screw trap located on the Sultan River. In 2013, the trap was operated from January 22 to June 27 and fished 62% of the hours during that time period. Chinook, yearling coho, and chum salmon production estimates were made using a modified Peterson mark-recapture approach. An estimated 443,789 Chinook, 194,099 chum, and 35,187 yearling coho migrated during the trapping period. Chinook egg-to-migrant survival was estimated at 25.2%. This value was calculated using Chinook spawner data from 2012 (390 redds) and the juvenile production estimate of 443,789 in 2013. No flooding occurred in 2012 that would have resulted in scouring of Chinook redds.

5. References

Cordone, A.J. and D.W. Kelley. 1961. The influences of inorganic sediment on the aquatic life of streams. Calif. Fish and Game 47(2):189-228.

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Volkhardt, G.C., S.L. Johnson, B. Miller, T.E. Nickelson, and D. E. Seiler. 2007. Rotary screw traps and inclined plane traps. Pages 235-266 in D.H. Johnson, B.M. Shrier, J.S. O'Neal, J.A.

Knutzen, X. Augerot, T.A. O'Neil, and T.N. Pearsons. Salmonid field protocols handbook: techniques for assessing status and trends in salmon and trout populations. American Fisheries Society, Bethesda, Maryland.

APPENDIX E

Consultation Documentation

Presler, Dawn

From: Presler, Dawn
Sent: Monday, April 21, 2014 1:45 PM
To: 'brock.applegate@dfw.wa.gov' (brock.applegate@dfw.wa.gov); 'Maynard, Chris (ECY)' (cmay461@ecy.wa.gov); 'Loren Everest - USFS' (leverest@fs.fed.us); 'Tim_Romanski@fws.gov' (Tim_Romanski@fws.gov); 'Steven Fransen' (steven.m.fransen@noaa.gov); Anne Savery; 'Leonetti, Frank' (frank.leonetti@snoco.org); Mick Matheson; 'Jim Miller' (JMiller@ci.everett.wa.us); Tom O'Keefe
Cc: Binkley, Keith
Subject: JHP (FERC No. 2157) - draft FHMP Annual report for your 30-day review and comment
Attachments: DRAFT 2013 FHMP Annual Report to ARC.pdf

Dear ARC Members:
Attached is the draft Fisheries and Habitat Monitoring Plan Annual Report for 2013 for a 30-day review and comment period. If you have comments on the attached draft report, please email them to me (with cc: to Keith) by May 21, 2014. Thanks.

Dawn Presler
Sr. Environmental Coordinator
Generation Resources
(425) 783-1709
****
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