



Energizing Life in Our Communities

June 27, 2024

VIA ELECTRONIC FILING

Debbie-Anne A. Reese, Acting Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

**Re: Jackson Hydroelectric Project, FERC No. 2157
Water Quality Monitoring Plan – 2023 Annual Report
License Article 401 (b)**

Dear Acting Secretary Reese:

Enclosed is Public Utility District No. 1 of Snohomish County's Water Quality Monitoring Plan Annual Report for 2023 pursuant to License Article 401 (b) for the Jackson Hydroelectric Project. The draft report was provided to the Aquatic Resources Committee for a 30-day review and comment period; Snohomish County and Washington State Department of Ecology submitted comments for consideration. Consultation documentation and how comments were addressed are included in the report's Appendix F.

If you have any questions on the Water Quality Monitoring Plan Annual Report for 2023, please do not hesitate to contact me.

Sincerely,

/s/ Keith Binkley

Keith Binkley
Manager, Natural Resources
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Attached: Water Quality Monitoring Plan Annual Report for 2023

cc: Aquatic Resources Committee
Scott Bohling – Ecology

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



License Article 401: Water Quality Monitoring Plan – 2023 Annual Report



Everett, WA

June 2024

Final – The document may be cited as:

Public Utility District No. 1 of Snohomish County (Snohomish PUD). 2023. Water Quality Monitoring Plan 2023 Annual Report, License Article 401, for the Henry M. Jackson Hydroelectric Project, FERC No. 2157. June 2024.

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List of Acronyms and Abbreviations

7-DAD Max	seven-day average of the daily maximum
ARC	Aquatic Resource Committee
Ecology	Washington Department of Ecology
FERC	Federal Energy Regulatory Commission
Project	Henry M. Jackson Hydroelectric Project, FERC No. 2157
RM	river mile
Snohomish PUD	Public Utility District No. 1 of Snohomish County
USGS	U.S. Geological Survey
WQMP	Water Quality Monitoring Plan

1. INTRODUCTION

Public Utility District No. 1 of Snohomish County (Snohomish PUD) received a license on September 2, 2011 (License), from the Federal Energy Regulatory Commission (FERC) for the Henry M. Jackson Hydroelectric Project (Project). The FERC approved the Water Quality Monitoring Plan (WQMP) on March 30, 2012, pursuant to License Article 401(a). Snohomish PUD is to file a report with the FERC by June 30 of each year detailing the monitoring efforts of the previous calendar year, pursuant to License Article 401(b).

This WQMP Annual Report covers activities conducted in calendar year 2023. Monthly measurements of reservoir water quality are presented in Appendix A. Appendices B, C, and D present the data from continuous monitoring of water temperature in the river and tributary systems. Appendix B shows graphical data, Appendix C shows tabular data, and Appendix D shows seven-day average of the daily maximum water temperature in tabular format. A 2023 water temperature technical memo provided to Ecology is included in Appendix E. This WQMP Annual Report is being provided to the Aquatic Resources Committee (ARC) [consisting of the City of Everett, City of Sultan, Snohomish County, Washington Department of Ecology (Ecology), Washington Department of Fish and Wildlife, 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. Comments were received from Snohomish County and Washington State Department of Ecology for consideration; consultation documentation and responses to comments are included in Appendix F.

The annual report fulfills monitoring and reporting requirements as stipulated in Ecology's 401 Water Quality Certification Order (Order No. 7918, October 18, 2010). As described in the 401 Certification Order (Section 9.0, Monitoring and Reporting Requirements), the report includes summaries of the water quality data, and includes sample dates, times, locations, and results. Compliance with state water quality standards is discussed as well. The report will be submitted to the hydropower certification manager at Ecology's Water Quality Program Northwest Regional Office and FERC.

The WQMP requires Snohomish PUD to collect water quality data in and around Spada Lake Reservoir, the Sultan River between river mile (RM) 15.8 and RM 0.2, and the Skykomish River at RM 14.1 and RM 13.2 (Table 1-1). The following sections of this report are organized and structured as water flows, beginning in the upper portion of the Sultan watershed.

Table 1-1. Parameters to be monitored, standards, locations, and sampling frequency.

Parameter	Unit	Associated Standard	South Fork Sultan River	Spada Lake Reservoir	Sultan River										Skykomish River	Frequency
			Upriver from bridge	Near log boom	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2	
Water temperature	°C	16 °C – 7 DAD Max for river locations. No standard for reservoir samples. Data used for stratification assessment.	•	•	•	•	•	•	•	•	•	•	•	•	•	Year-round in stream reaches at all locations except RM 15.5, 14.3, and 11.3 which are monitored from April 1-October 31 only. Lake profile is monitored monthly between May 1 and October 31.
Dissolved oxygen	mg/L	9.5 mg/L (core summer salmonid habitat) for river locations. No standard for reservoir sampling. Data used for stratification assessment.	•	•					•			•				May 1 to October 31. Monthly in stream reaches. Monthly for lake profile.
Turbidity	NTU	Criteria in WAC 173-201A-200: 5 NTU over background when background is 50 NTU or less, or a 10% increase when background is more than 50 NTU. For river locations, the South Fork location will be used as background.	•	•					•			•				May 1 to October 31. Monthly in stream reaches. Monthly for lake profile.
pH	pH units	Criteria in WAC 173-201A-200: 6.5 to 8.5pH units, with human-caused variation within the above range of less than 0.5 units.	•	•					•			•				May 1 to October 31. Monthly in stream reaches. Monthly for lake profile.
Secchi transparency	meters	None. For purposes of this monitoring, Secchi depth will be used to assess lake conditions, including photic zone depth.		•												May 1 to October 31. Monthly.
Flow discharge	cfs	None.	•		•				•	•	•	•				Year-round. Daily.
Reservoir elevation	Feet	None.		•												Year-round. Daily.

2. RESERVOIR MONITORING

2.1. *Climatic Conditions*

2.1.1. Rainfall Data

During 2023, a total of 123.9 inches of rain was recorded at the Culmback Dam Weather Station. The rainfall measured during 2023 was less than the historical annual average of 161.8 inches. Monthly rainfall averaged 10.3 inches and ranged between a low of 1.5 inches in July and a high of 27.0 inches in December (Table 2-1). During 2023, the highest recorded daily rainfall (4.9 inches) occurred on December 6, 2023.

Table 2-1. Monthly rainfall, Culmback Dam Weather Station, 2023.

Month	Rainfall (inches)
January	11.1
February	18.2
March	10.0
April	15.8
May	2.4
June	3.0
July	1.5
August	2.0
September	8.9
October	5.7
November	18.3
December	27.0

2.1.2. Snow Survey Measurements

Beginning in 1986, Snohomish PUD has conducted annual surveys of the snowpack, typically during late March. Since inception, the annual mean snow and water content depth at Stickney Ridge (elevation 3,600 feet) are 100.3 and 42.4 inches, respectively. During the 2023 survey (March 21, 2023), there were 112.8 inches of snow at the Stickney Ridge station (Figure 2-1) which was 112 percent of historical mean. In terms of water content, the 48.6 inches recorded during the 2023 survey equated to 114 percent of the historic mean.

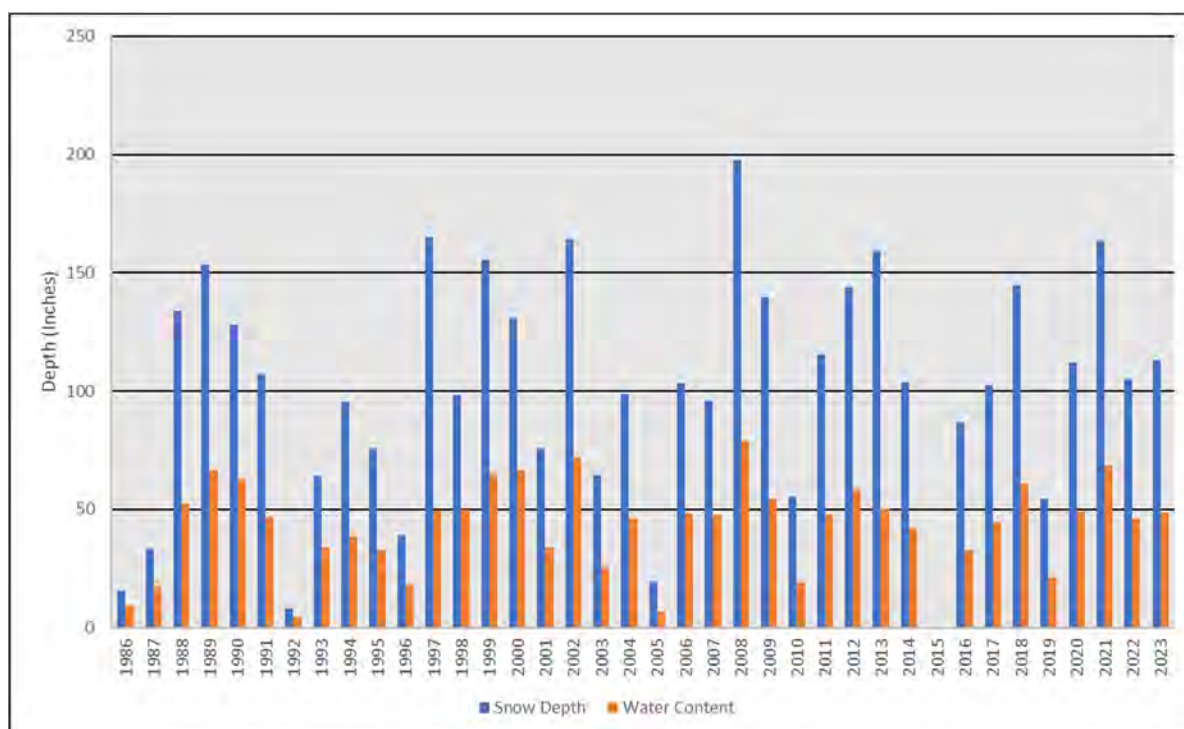


Figure 2-1. Snow survey data, Stickney Ridge, Sultan Watershed, 1986-2023.

2.1.3. Reservoir Inflow

Three tributaries feed into Spada Lake Reservoir: the South Fork Sultan River, Williamson Creek, and the mainstem Sultan River, including Elk Creek. Historically, the U.S. Geological Survey (USGS) has operated gages at several locations within the basin. Currently, the South Fork Sultan River is the only tributary that is actively gaged. At this location, the USGS operates Station No. 12137290, South Fork Sultan River near Sultan, WA, which provides real-time information for Project operations. Hydrologic modeling indicates that the South Fork Sultan River, on average, accounts for between 14 and 22 percent of total inflow into the reservoir, depending on seasonal conditions. The 2023 hydrograph for this station is presented in Figure 2-2. Instantaneous flow values ranged from 4.6 to 3,580 cfs. Mean daily flow during 2023 averaged 74.7 cfs and ranged between a low of 4.7 cfs and a high flow of 2,380 cfs. The average mean annual flow, based on the USGS Water Year, for this station is 132.3 cfs (Period of Record 1992-2023).

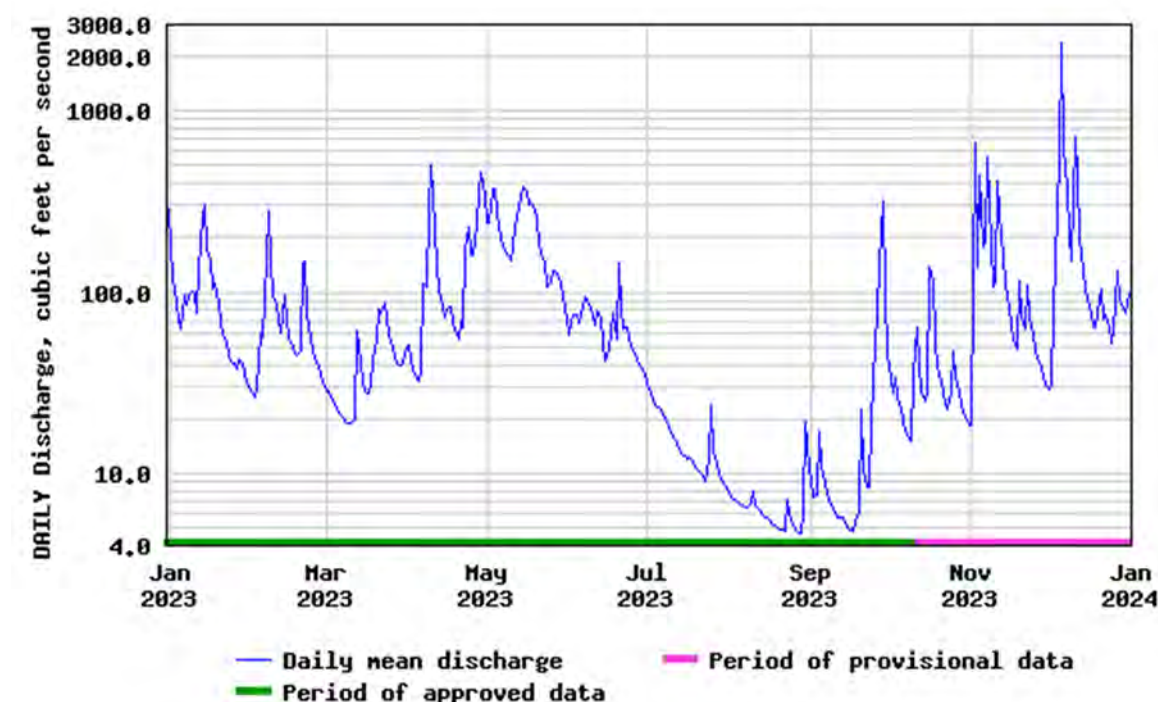


Figure 2-2. Hydrograph for the South Fork Sultan River, USGS Station No. 12137290, 2023 calendar year.

2.2. Reservoir Operations

2.2.1 Project Outflow

In the absence of reservoir spill, the vast majority of Project outflow occurs through the power tunnel, as indexed by daily plant generation. In 2023, the Project did not experience spill. Daily plant generation during 2023 is depicted in Figure 2-3. A total of 299,965 megawatt hours were produced during 2023 equating to 71.9 percent of the historic annual average of 417,299 megawatt hours.

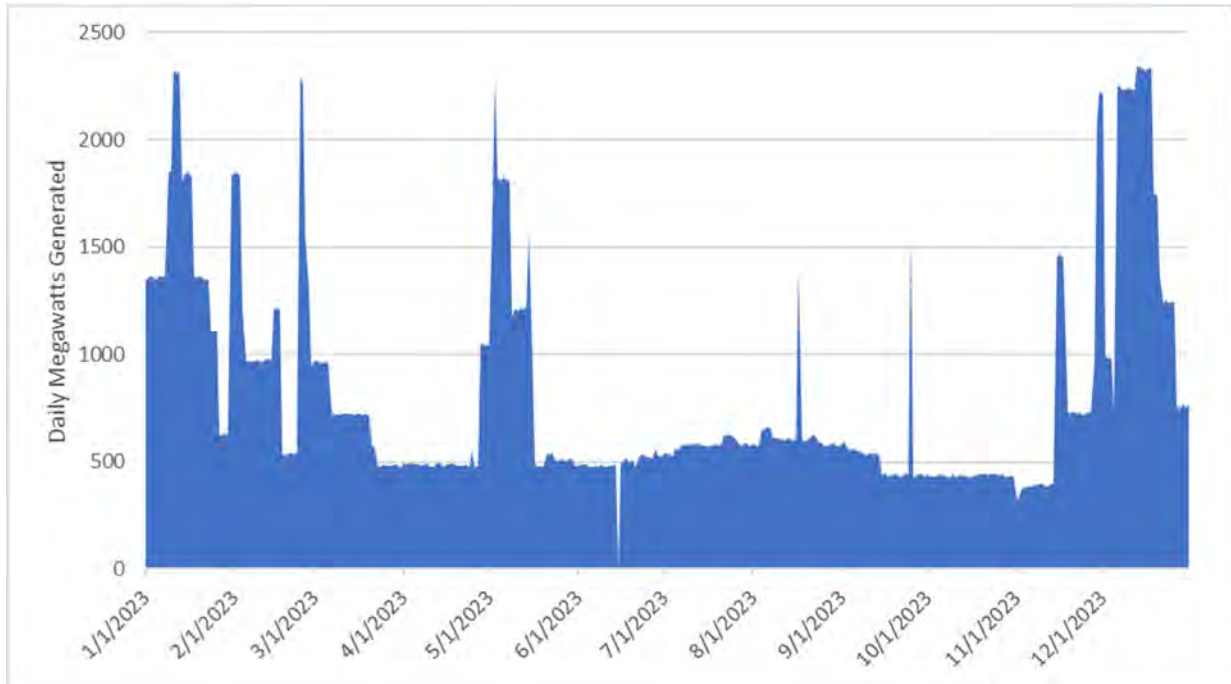


Figure 2-3. Daily plant generation, Jackson Hydroelectric Project, 2023.

2.2.2. Reservoir Elevation

Water surface elevation in Spada Lake Reservoir is partitioned into five states, which define how the Project is to be operated through the year. Generally, States 1 and 2 require full generation to withdraw 1,300 cfs for spill/flood control. State 3 is a discretionary zone, which allows Snohomish PUD to operate in a range defined by the maximum of states 1 and 2 or minimum defined by State 4. State 4 requires minimum generation to maintain the instream flows for fish and habitat protection and water supply for the City of Everett. State 5 lies below reservoir elevation 1,380 feet msl, during which the Project does not operate. During 2023, Spada Lake Reservoir was drafted and filled in accordance with the rule curves established for the Project (Figure 2-4).

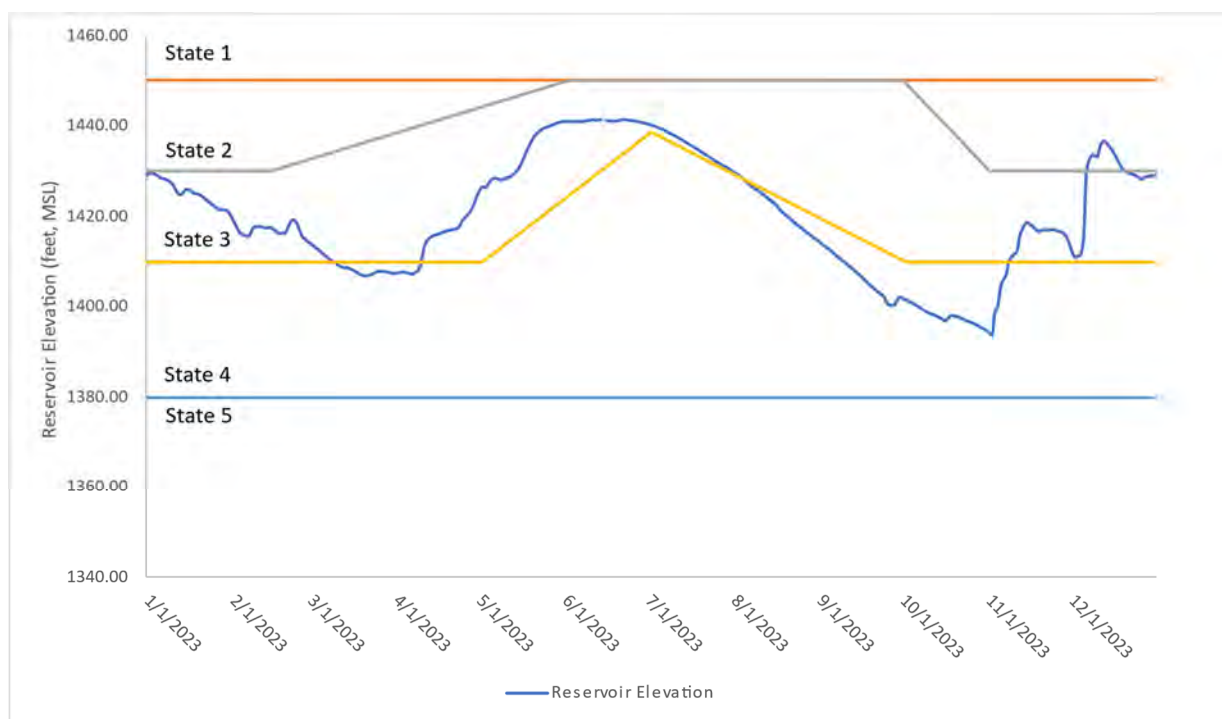


Figure 2-4. Daily water surface elevation, Spada Lake Reservoir, 2023.

2.3. Water Quality

Monthly sampling of water quality in Spada Lake Reservoir occurred on the following dates during 2023: April 27, May 10, June 27, July 25, August 22, September 12, and October 30. Sampling was conducted cooperatively with the City of Everett and included profile measurements of conventional parameters including temperature, pH, dissolved oxygen, and turbidity. Vertical profile data are used to assess stratification within the reservoir and do not have associated State water quality standards. Additional sampling included measurements of nutrients, phytoplankton, and zooplankton; however, summary Phyto data are not available yet.

2.3.1. Temperature

Spada Lake Reservoir temperatures ranged from 4.1 to 21.2 °C depending on month and depth (Appendix A). No associated temperature standard exists for the reservoir; however, the temperature data are used to assess stratification. Temperature stratification was first evident during the June sampling session. April had the coolest water temperatures, while July and August had the warmest water temperatures. The thermocline was strongest in September; however, July and August also had a resistance to mixing. The strongest point in the thermocline dropped from 26 feet in June to 39 feet in September. The timing and scale of seasonal stratification in 2023 was consistent with previous years' sampling efforts.

2.3.2. pH

The associated standard for pH is between 6.5 and 8.5 pH units. The highest measured pH was 7.35 in June at a depth of 29 feet. The lowest pH of 6.37 was measured in October at a depth of 42 feet and was likely due to increased bacterial degradation of organic matter. These ranges are typical of those recorded and since License implementation. No action is proposed to address the exceedance because it is a result of naturally occurring conditions.

2.3.3. Dissolved Oxygen

The reservoir does not have an associated standard for dissolved oxygen; however, the data are used to assess stratification. Dissolved oxygen ranged from a low of 8.2 mg/L in September to a high of 12.4 mg/L in May. By saturation values, the maximum of 105 percent in May, June, and July, likely due to increasing primary production. The minimum of 64 percent of saturation at depth in September was likely due to limited photosynthetic oxygen production and bacterial degradation of organic matter. The timing and scale of seasonal stratification in 2023 was consistent with previous years' sampling efforts.

2.3.4. Turbidity

In each month sampled, the surface was less turbid than at depth. Turbidity values at the surface and at depth decreased from May to June, held steady from July to September and increased from October. May had the highest turbidity value recorded (12.4 NTU) at a depth of 150.8 feet, whereas June had the lowest overall turbidity (0.4 NTU) at depths between 26.1 and 29.4 feet. Characterization of monthly turbidity values across the vertical profile were consistent with previous years' sampling efforts where throughout most of the season, the cut-off points between higher and lower turbidity values can be traced to the thermal structure and seasonal inflow patterns of the reservoir and not directly tied to an anthropogenic perturbation.

2.3.5. Secchi Transparency

No associated standard exists for this sampling; however, the purpose is to use Secchi depth to assess lake conditions, including photic zone depth. Secchi transparency ranged from a high of 22 feet in June to a low of 4 feet in April (Table 2-2).

Table 2-2. Secchi transparency, Spada Lake Reservoir, 2023.

Date	Result (feet)
4/20/2023	4
5/10/2023	5
6/29/2023	22
7/25/2023	17
8/22/2023	15
9/12/2023	14
10/30/2023	6

2.3.6. Nutrients

Total phosphorus concentrations were between 5.5 and 7.7 µg/L for most of the summer, both at the surface and at depth. Total nitrogen varied from 89 to 226 µg/L during the summer with a high in June. Nitrate showed more variation over time and depth, with values ranging between 0.0 and 126.4 µg/L from April to July. Silica concentrations were relatively stable throughout the water column, ranging from 1,311 and 1,606 µg/L. Nutrients are not required to be sampled as part of the Water Quality Monitoring Plan; however, the City of Everett monitors these parameters in the reservoir as part of their municipal water supply monitoring and are included in this report for additional perspective.

2.3.7. Phytoplankton

No data available at this time.

2.3.8. Zooplankton

No data available at this time.

3. RIVER MONITORING

3.1. Background

Maintaining suitable water temperatures in the Sultan River is an important aspect of the Project operation. Water temperature influences fish behavior, especially anadromous fish during the freshwater phase of their life cycle. The Sultan River produces Chinook, coho, chum, and pink salmon, and steelhead trout, plus resident fish species.

The Project's water storage and conveyance system is complex with discharge into the Sultan River occurring at three facilities – Culmback Dam, Diversion Dam, and Powerhouse (Figure 3-1). At Culmback Dam, a 10-inch cone valve is used to variably release an annual water budget of 23,831 acre-feet into Reach 3 of the Sultan River, immediately downstream of the dam. Further downstream, the additional water necessary to meet instream flow requirements (at the Diversion Dam) is routed through the Francis turbine units at the Powerhouse, then the Lake Chaplain pipeline to a former City Water diversion tunnel connected to another water line discharging into the river at the Diversion Dam at RM 9.8. Except for infrequent spill at Culmback Dam, these releases, plus tributary flows to the river, provide the instream flow for fish species throughout 11 river miles upstream from the Powerhouse. Pelton turbines, which discharge directly to the river at RM 4.5, provide additional water when needed to meet minimum instream flow requirements below the Powerhouse.

Water temperatures in Reach 3, immediately downstream of Culmback Dam, are seasonally influenced by releases through a 24-inch cone valve blended in concert with water discharged through the 10-inch cone valve. The releases are described in detail in the annual reporting for the Water Temperature Conditioning Plan for Reach 3 (Snohomish PUD 2010). Downstream, water temperatures at the Diversion Dam are influenced by flow volume and the depth of release at Culmback Dam (whether through the selective withdrawal intake structure, fixed elevation 12" cone valve, deep water valves located in the valve chamber, or by spill), by tributary flows, and by meteorological conditions. Moveable panels at the Spada Lake Reservoir intake structure control the level and, hence, the temperature at which water is withdrawn from the reservoir and delivered to the powerhouse when conditions allow. When isothermal conditions exist in the reservoir, no change in water temperature can be achieved by moving the panels on the intake structure. The degree of temperature control possible by panel manipulation varies seasonally with the degree of temperature stratification in the reservoir.

The replacement of the cold-water valves was scheduled to occur during summer 2023 based on receiving approval from the FERC's Portland Regional Office of Dam Safety and Inspections. From a risk management standpoint, summer was chosen as the preferred season for this project. With active work occurring in the spillway, the risk of spill had to be mitigated and summer provides the most assurance to guard against a spill event. With the cold-water valves unavailable during the scheduled maintenance work, the only way to manage water temperatures being delivered into Reach 3, downstream of Culmback Dam, was to adjust panel configurations and selectively introduce water at various depths along the intake structure. Across the summer, Snohomish PUD made prudent decisions based on real-time information to provide biologically relevant and appropriate water temperatures downstream of Culmback Dam to the maximum

extent possible using all reasonable tools and options available. Panel position settings during 2023 are presented in Table 3-1.

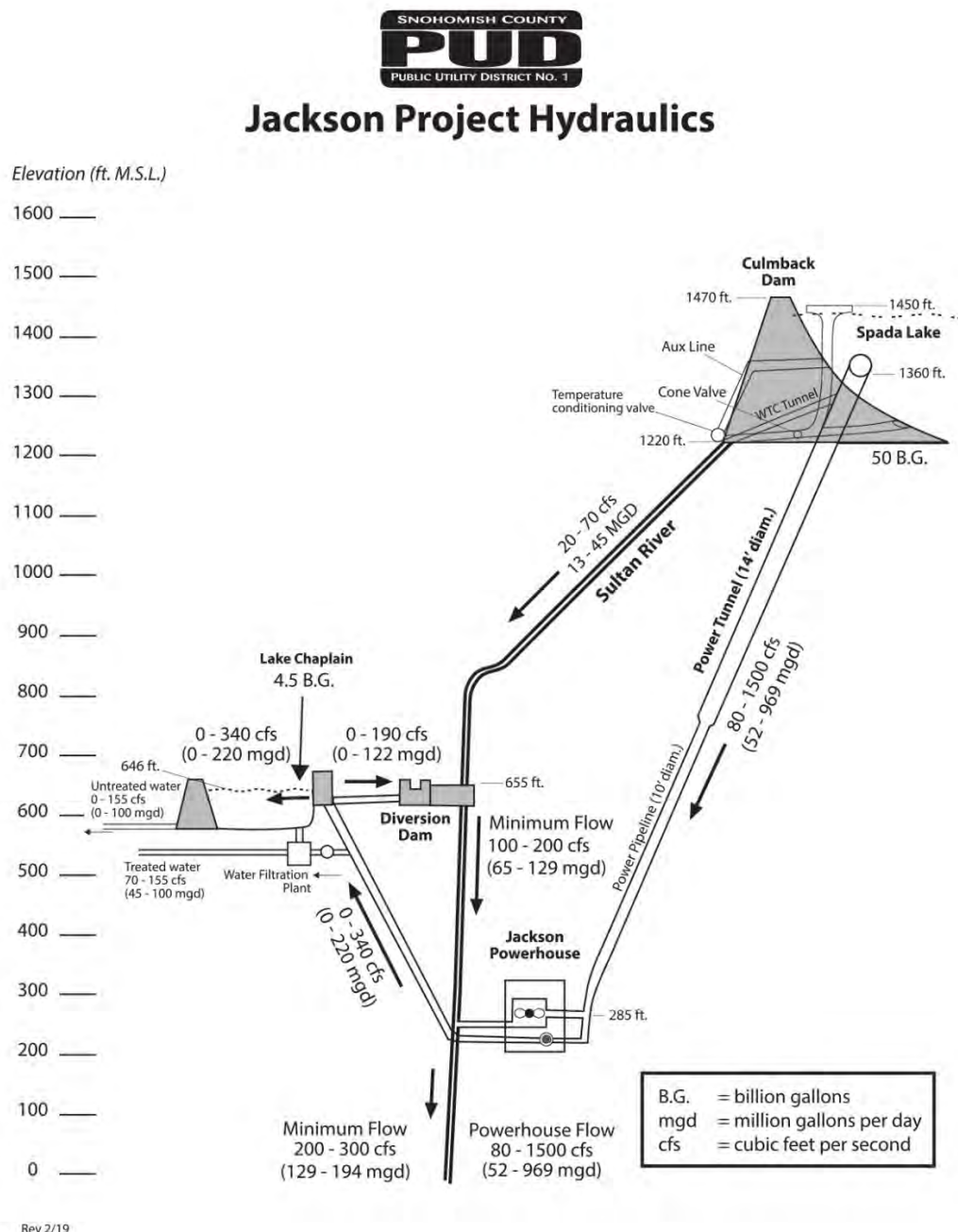


Figure 3-1. Schematic of water conveyance system, Jackson Hydroelectric Project.

Table 3-1. Settings for selective withdrawal panels, Spada Lake Reservoir, 2023.

Dates	Panel Setting	Upper Opening (elevation in feet msl)	Lower Opening (elevation in feet msl)
6/2/2023	D	1402.5	1385
6/5/2023	E	1380	1360
6/8/2023	Modified C/D	1420	1397.5
6/12/2023	D	1405	1385
6/14/2023	Modified C	1420	1387.5
6/27/2023	D	1405	1387.5
7/14/2023	E	1377.5	1360
9/13/2023	E	1375	1360
9/14/2023	E	1377.5	1360

3.2. Continuous Temperature Monitoring

Snohomish PUD monitored water temperature at 12 locations within the Project area during 2023 (Figure 3-2). The RM 15.5, 14.3, and 11.3 locations were monitored from April 1 through October 31. All other sites were monitored throughout the year. These locations, in order from upstream to downstream, include:

- South Fork Sultan River, upstream of Culmback Dam, near RM 18.2;
- Sultan River, within the bypass reach immediately downstream of Culmback Dam, at RM 15.8;
- Sultan River, within the bypass reach at the base of the Sultan River Canyon Trail, at RM 15.5;
- Sultan River, within the bypass reach, near RM 14.3;
- Sultan River, within the bypass reach, 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;
- 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 and 11.3, are part of the Water Temperature Conditioning Plan monitoring sites for Reach 3; the remaining 10 stations are those required for monitoring under the WQMP.

In general, water temperatures in the Sultan Basin during 2023 were warmer than 2022. The associated temperature water quality standard for all river monitoring locations is 16 degrees Celsius for the seven-day average of the daily maximum temperature (7-DAD Max). The 7-DAD Max was exceeded on multiple days for 9 out of the 10 river monitoring locations. This is due in part to naturally occurring conditions through longitudinal warming in Reach 3 and due to a valve replacement project that occurred in the summer of 2023 that impacted the ability to deliver cold water to the river (see Appendix E for 2023 Water Temperature Technical Memo for

more detail). The valve replacement project was completed in September 2023. No further action is proposed with respect to corrective measures.

Figures depicting water temperatures during 2023 are presented in Appendix B. A tabulation of all mean daily temperature data for 2023 is presented in Appendix C. The 7-DAD Max is presented in Appendix D, with exceedances in State water quality standards highlighted in red. Data gaps are attributed to inaccessibility due to inclement weather conditions, malfunctioning equipment, or equipment lost due to vandalism.

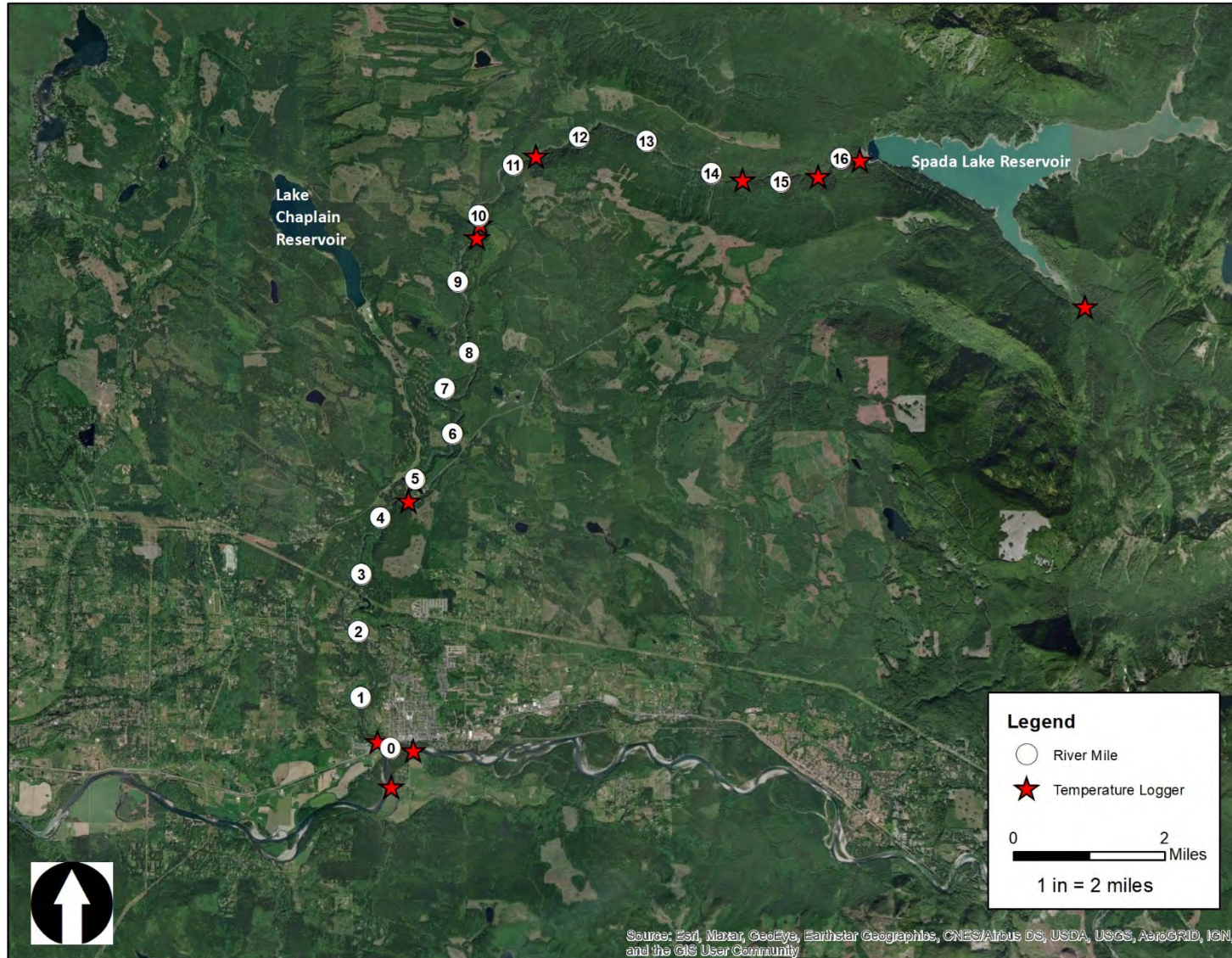


Figure 3-2. Locations of water temperature monitoring, Jackson Hydroelectric Project.

3.3. *Synoptic Measurements of Water Quality*

Synoptic measurements of water quality were collected during late spring, summer, and early fall 2023 at the South Fork Sultan River (tributary to Spada Lake Reservoir) and at two locations in the Sultan River downstream of Culmbach Dam (Table 3-2). State water quality standards for pH (6.5-8.5 pH units) were exceeded on multiple occasions for the South Fork and downstream of Powerhouse (RM 4.4) locations and exceeded once for the site upstream of the Diversion Dam (RM 9.8). The observed slightly acidic conditions are typical of western Cascade streams and consistent with the 2009 CH2M Hill Water Quality Final Technical Report. As these noted exceedances are not a result of Project actions, no operational changes are proposed.

Table 3-2. Synoptic monthly measurements of water quality, Sultan River, 2023.

Location	Date	Temp °C	pH Units	Turb NTU	LDO mg/l
South Fork Sultan River (SF)					
	4/27/2023	3.60	*6.12	0.61	12.39
	5/10/2023	5.66	*6.04	0.41	10.92
	6/27/2023	10.60	*6.27	0.41	10.57
	7/25/2023	12.59	*6.23	0.35	10.24
	8/22/2023	13.17	*6.38	0.37	9.88
	9/12/2023	12.48	*6.13	0.41	10.30
	10/30/2023	4.10	*5.88	0.37	12.02
Sultan River upstream of Diversion Dam (RM 9.8)					
	4/27/2023	6.98	*6.30	3.30	11.94
	5/10/2023	10.94	6.79	4.50	10.01
	6/27/2023	14.66	7.09	0.92	9.92
	7/25/2023	14.49	6.87	2.31	10.29
	8/22/2023	15.47	6.72	0.68	9.80
	9/12/2023	15.3	6.66	0.96	9.96
	10/30/2023	7.33	6.70	3.50	11.5
Sultan River downstream of Powerhouse (RM 4.4)					
	4/27/2023	6.79	*6.39	2.81	11.75
	5/10/2023	8.32	6.66	3.10	10.85
	6/27/2023	11.82	6.64	1.06	10.84
	7/25/2023	11.29	*6.22	1.19	11.29
	8/22/2023	14.34	*6.20	1.13	10.15
	9/12/2023	16.20	*6.40	1.10	10.60
	10/30/2023	9.45	6.60	2.20	11.26

* Exceedance of WAC 173-201A(1)(g)

4. DATA QUALITY AND COMPLIANCE

Monitoring of water quality during 2023 adhered to the protocols and procedures outlined in the WQMP. All survey locations and parameters of measurement were consistent with those outlined in the WQMP. All data were reviewed and accepted to accurately represent conditions at the time of sampling.

Downstream of Culmback Dam, Sultan River water temperature exceeded the Washington State water temperature criteria on 81 days during summer 2023. These exceedances occurred at all nine sample locations on the Sultan River; however, the majority of the exceedance days were located at the lower end of each operational reach and occurred during late June through mid-September. No operational changes have been proposed because the exceedances were attributed to either natural occurring conditions or a result of the one-time valve replacement project.

At the water temperature station upstream of the Sultan on the Skykomish River, water temperature exceeded the state criteria on 90 days during summer 2023 (Appendix D). Downstream, the Sultan River cooled the Skykomish River which resulted in the Skykomish River downstream of the Sultan to exceed the State standard on 80 days. The 2023 Reach 3 Water Temperature Technical Memo that outlines and describes temperature exceedances has been included in Appendix E.

Missing water temperature data are attributed to malfunctioning or missing equipment. Project operations were conducted in accordance with License conditions throughout the sampling period.

No exceedances for dissolved oxygen were recorded in 2023. Exceedances for pH were observed during the monthly riverine sampling, however these are attributed to natural occurring conditions and not a result of project operations. No action is proposed to address these exceedances.

5. 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.

FERC. 2011. Order Issuing New License, Project No. 2157-188. 136 FERC ¶ 62,188. September 2, 2011.

Snohomish PUD. 2010. Water Temperature Conditioning Plan for Reach 3. Henry M. Jackson Hydroelectric Project (FERC No. 2157). 2010.

APPENDIX A

Monthly Reservoir Water Quality Sampling

Date	Depth	Depth	Elevation	Temperature	Conductivity	pH	Dissolved Oxygen	Chlorophyll	Turbidity
M/D/Y	feet	meters	feet	degrees C	µmhos/cm		mg/L	RFU	NTU
5/10/2023	1.6	0.5	1426.7	10.9	22	7.3	11.6	no data	3.2
5/10/2023	3.3	1.0	1425.0	10.54	22	7.3	11.7	no data	3.3
5/10/2023	6.6	2.0	1421.7	10.45	22	7.3	11.7	no data	3.2
5/10/2023	9.8	3.0	1418.5	10.41	22	7.3	11.7	no data	3.2
5/10/2023	13.1	4.0	1415.2	10.35	22	7.3	11.7	no data	3.2
5/10/2023	16.5	5.0	1411.8	10.27	22	7.3	11.7	no data	3.3
5/10/2023	19.7	6.0	1408.6	10	22	7.3	11.8	no data	3.3
5/10/2023	23.1	7.0	1405.2	8.51	24	7.2	12.1	no data	3.1
5/10/2023	26.2	8.0	1402.1	7.39	22	7.1	12.2	no data	3.2
5/10/2023	29.5	9.0	1398.8	6.97	22	7.0	12.3	no data	3.1
5/10/2023	32.9	10.0	1395.4	6.76	22	6.9	12.4	no data	3.0
5/10/2023	36.3	11.0	1392.0	6.48	22	6.8	12.3	no data	2.9
5/10/2023	39.4	12.0	1388.9	6.22	21	6.7	12.3	no data	2.7
5/10/2023	42.9	13.0	1385.4	6.05	22	6.7	12.3	no data	2.9
5/10/2023	45.8	14.0	1382.5	5.9	22	6.7	12.4	no data	2.7
5/10/2023	49.2	15.0	1379.1	5.73	22	6.7	12.4	no data	2.7
5/10/2023	55.7	17.0	1372.6	5.36	23	6.7	12.4	no data	3.4
5/10/2023	62.2	19.0	1366.1	5.06	24	6.7	12.4	no data	4.1
5/10/2023	68.9	21.0	1359.4	4.94	24	6.7	12.4	no data	4.2
5/10/2023	75.4	23.0	1352.9	4.7	24	6.7	12.4	no data	4.5
5/10/2023	82.0	25.0	1346.3	4.59	24	6.7	12.4	no data	4.4
5/10/2023	88.3	27.0	1340.0	4.43	24	6.7	12.4	no data	4.5
5/10/2023	95.1	29.0	1333.2	4.23	24	6.7	12.4	no data	5.0
5/10/2023	101.9	31.0	1326.4	4.17	24	6.7	12.3	no data	5.0
5/10/2023	111.5	34.0	1316.8	4.12	25	6.6	12.3	no data	6.4
5/10/2023	121.3	37.0	1307.0	4.12	25	6.6	12.2	no data	7.2
5/10/2023	131.6	40.0	1296.7	4.11	25	6.6	12.1	no data	8.1
5/10/2023	141.1	43.0	1287.2	4.1	25	6.5	11.9	no data	10.9
5/10/2023	150.8	46.0	1277.5	4.11	25	6.5	11.8	no data	12.4
5/10/2023	148.3	45.0	1280.0	4.1	25	6.4	11.6	no data	11.7

Date	Depth	Depth	Elevation	Temperature	Conductivity	pH	Dissolved Oxygen	Chlorophyll	Turbidity
M/D/Y	feet	meters	feet	degrees C	µmhos/cm		mg/L	RFU	NTU
6/29/2023	1.7	0.5	1438.9	18.6	21	7.2	9.3	no data	0.6
6/29/2023	3.3	1.0	1437.3	18.5	21	7.2	9.3	no data	0.6
6/29/2023	3.3	1.0	1437.3	18.5	21	7.2	9.3	no data	0.6
6/29/2023	6.7	2.0	1433.9	18.2	21	7.2	9.3	no data	0.6
6/29/2023	9.7	3.0	1430.9	18.2	21	7.2	9.3	no data	0.6
6/29/2023	13.1	4.0	1427.5	18.1	21	7.2	9.3	no data	0.6
6/29/2023	16.2	5.0	1424.4	17.9	21	7.2	9.3	no data	0.6
6/29/2023	19.7	6.0	1420.9	16.9	21	7.2	9.5	no data	0.5
6/29/2023	23.1	7.0	1417.5	15.1	21	7.3	10.1	no data	0.5
6/29/2023	26.1	8.0	1414.5	14.2	21	7.3	10.7	no data	0.4
6/29/2023	29.4	9.0	1411.2	13.2	20	7.4	11.0	no data	0.4
6/29/2023	32.8	10.0	1407.8	12.4	20	7.3	11.0	no data	0.5
6/29/2023	36.2	11.0	1404.4	10.9	20	7.2	11.2	no data	0.6
6/29/2023	39.3	12.0	1401.3	9.7	20	7.1	11.3	no data	0.6
6/29/2023	42.7	13.0	1397.9	8.3	20	7.0	11.4	no data	0.6
6/29/2023	46.0	14.0	1394.6	7.6	21	6.9	11.4	no data	0.6
6/29/2023	49.2	15.0	1391.4	6.8	22	6.9	11.3	no data	0.8
6/29/2023	56.1	17.0	1384.5	5.9	22	6.8	11.4	no data	1.0
6/29/2023	62.3	19.0	1378.3	5.5	23	6.8	11.4	no data	1.4
6/29/2023	68.7	21.0	1371.9	5.4	23	6.8	11.4	no data	1.5
6/29/2023	75.5	23.0	1365.1	5.3	23	6.8	11.4	no data	1.5
6/29/2023	81.9	25.0	1358.7	5.2	23	6.7	11.3	no data	1.8
6/29/2023	88.6	27.0	1352.0	5.0	23	6.7	11.4	no data	1.9
6/29/2023	95.1	29.0	1345.5	5.0	24	6.7	11.4	no data	1.8
6/29/2023	101.7	31.0	1338.9	4.8	24	6.7	11.4	no data	2.0
6/29/2023	111.7	34.0	1328.9	4.7	24	6.6	11.4	no data	2.1
6/29/2023	121.4	37.0	1319.2	4.6	24	6.6	11.4	no data	2.6
6/29/2023	131.4	40.0	1309.2	4.5	24	6.6	11.2	no data	3.2
6/29/2023	141.1	43.0	1299.5	4.4	25	6.5	11.1	no data	4.3
6/29/2023	150.8	46.0	1289.8	4.3	25	6.5	11.0	no data	4.8
6/29/2023	160.9	49.0	1279.7	4.3	25	6.5	10.8	no data	6.4

Date	Depth	Depth	Elevation	Temperature	Conductivity	pH	Dissolved Oxygen	Chlorophyll	Turbidity
M/D/Y	feet	meters	feet	degrees C	µmhos/cm		mg/L	RFU	NTU
7/25/2023	1.8	0.5	1430.3	21.2	23	7.2	8.6	no data	1.5
7/25/2023	3.4	1.0	1428.8	21.3	23	7.2	8.5	no data	1.5
7/25/2023	6.5	2.0	1425.6	21.2	23	7.2	8.6	no data	1.5
7/25/2023	9.7	3.0	1422.4	21.2	23	7.2	8.5	no data	1.5
7/25/2023	13.1	4.0	1419.0	21.2	23	7.2	8.6	no data	1.6
7/25/2023	16.4	5.0	1415.7	21.2	23	7.2	8.5	no data	1.7
7/25/2023	19.8	6.0	1412.3	20.6	24	7.2	9.0	no data	1.6
7/25/2023	23.1	7.0	1409.0	18.6	23	7.2	9.6	no data	1.1
7/25/2023	26.2	8.0	1405.9	17.4	22	7.1	10.1	no data	1.3
7/25/2023	29.5	9.0	1402.6	16.3	22	7.1	10.3	no data	1.2
7/25/2023	32.8	10.0	1399.3	15.0	21	7.1	10.5	no data	1.2
7/25/2023	36.1	11.0	1396.0	13.5	21	7.0	10.6	no data	1.1
7/25/2023	39.4	12.0	1392.7	12.1	21	6.9	10.6	no data	1.1
7/25/2023	42.8	13.0	1389.3	10.5	21	6.8	10.6	no data	1.2
7/25/2023	45.9	14.0	1386.2	8.4	22	6.7	10.6	no data	0.9
7/25/2023	49.2	15.0	1382.9	6.9	22	6.6	10.6	no data	1.0
7/25/2023	55.8	17.0	1376.3	6.1	23	6.6	10.7	no data	1.1
7/25/2023	62.4	19.0	1369.7	5.9	23	6.6	10.7	no data	1.3
7/25/2023	68.9	21.0	1363.2	5.7	23	6.6	10.8	no data	1.4
7/25/2023	75.5	23.0	1356.6	5.5	23	6.7	10.8	no data	1.2
7/25/2023	81.8	25.0	1350.3	5.4	23	6.7	11.0	no data	1.4
7/25/2023	88.4	27.0	1343.7	5.4	23	6.6	11.0	no data	1.3
7/25/2023	95.1	29.0	1337.0	5.2	23	6.6	11.1	no data	1.2
7/25/2023	101.7	31.0	1330.4	5.1	23	6.6	11.2	no data	1.3
7/25/2023	111.6	34.0	1320.5	4.9	24	6.6	11.1	no data	1.5
7/25/2023	121.4	37.0	1310.7	4.7	24	6.6	11.1	no data	2.0
7/25/2023	131.2	40.0	1300.9	4.6	25	6.6	11.0	no data	2.3
7/25/2023	141.2	43.0	1290.9	4.5	25	6.5	10.8	no data	2.9
7/25/2023	151.0	46.0	1281.1	4.4	25	6.5	10.7	no data	3.4
7/25/2023	160.7	49.0	1271.4	4.3	25	6.5	10.5	no data	4.0

Date	Depth	Depth	Elevation	Temperature	Conductivity	pH	Dissolved Oxygen	Chlorophyll	Turbidity
M/D/Y	feet	meters	feet	degrees C	µmhos/cm		mg/L	RFU	NTU
8/22/2023	1.6	0.5	1417.2	21.1	25	7.2	8.5	no data	1.0
8/22/2023	3.3	1.0	1415.5	21.1	25	7.2	8.5	no data	1.1
8/22/2023	6.7	2.0	1412.1	21.1	25	7.2	8.5	no data	1.0
8/22/2023	9.9	3.0	1408.9	21.1	25	7.2	8.5	no data	1.0
8/22/2023	12.9	4.0	1405.9	21.1	25	7.2	8.6	no data	1.1
8/22/2023	16.4	5.0	1402.4	21.1	25	7.2	8.5	no data	1.1
8/22/2023	19.7	6.0	1399.1	21.1	25	7.2	8.5	no data	1.1
8/22/2023	23.0	7.0	1395.8	20.9	25	7.1	8.6	no data	1.0
8/22/2023	26.3	8.0	1392.5	20.3	25	7.0	8.7	no data	1.2
8/22/2023	29.3	9.0	1389.5	19.8	25	6.9	8.8	no data	1.1
8/22/2023	32.8	10.0	1386.0	17.1	24	6.8	9.2	no data	1.1
8/22/2023	36.1	11.0	1382.7	14.3	22	6.7	9.4	no data	1.0
8/22/2023	39.5	12.0	1379.3	12.5	22	6.6	9.5	no data	1.1
8/22/2023	42.7	13.0	1376.1	11.0	22	6.6	9.6	no data	1.1
8/22/2023	45.8	14.0	1373.0	9.2	22	6.6	9.8	no data	1.1
8/22/2023	49.2	15.0	1369.6	7.4	23	6.6	9.9	no data	1.1
8/22/2023	55.8	17.0	1363.0	6.4	24	6.6	10.0	no data	1.2
8/22/2023	62.4	19.0	1356.4	6.0	24	6.6	10.2	no data	1.2
8/22/2023	69.0	21.0	1349.8	5.7	24	6.6	10.3	no data	1.1
8/22/2023	75.5	23.0	1343.3	5.6	24	6.6	10.4	no data	1.3
8/22/2023	82.0	25.0	1336.8	5.5	24	6.6	10.3	no data	1.2
8/22/2023	88.7	27.0	1330.1	5.4	24	6.7	10.5	no data	1.2
8/22/2023	95.3	29.0	1323.5	5.3	24	6.7	10.8	no data	1.1
8/22/2023	101.7	31.0	1317.1	5.1	24	6.7	10.8	no data	1.1
8/22/2023	111.6	34.0	1307.2	4.9	24	6.7	10.8	no data	1.2
8/22/2023	121.3	37.0	1297.5	4.7	25	6.7	10.7	no data	1.6
8/22/2023	131.4	40.0	1287.4	4.6	25	6.6	10.6	no data	1.8
8/22/2023	141.1	43.0	1277.7	4.5	25	6.6	10.5	no data	2.2
8/22/2023	150.9	46.0	1267.9	4.4	25	6.6	10.1	no data	2.9

Date	Depth	Depth	Elevation	Temperature	Conductivity	pH	Dissolved Oxygen	Chlorophyll	Turbidity
M/D/Y	feet	meters	feet	degrees C	µmhos/cm		mg/L	RFU	NTU
9/12/2023	1.6	0.5	1406.8	19.2	26	7.1	8.8	no data	1.1
9/12/2023	3.3	1.0	1405.1	19.2	26	7.11	8.8	no data	1.1
9/12/2023	6.6	2.0	1401.8	19.2	26	7.11	8.8	no data	1.1
9/12/2023	9.7	3.0	1398.7	19.2	26	7.11	8.8	no data	1.0
9/12/2023	13.1	4.0	1395.3	19.2	26	7.11	8.8	no data	1.1
9/12/2023	16.4	5.0	1392.0	19.1	26	7.11	8.8	no data	1.1
9/12/2023	19.8	6.0	1388.6	19.1	26	7.12	8.8	no data	1.1
9/12/2023	23.0	7.0	1385.4	18.8	27	6.91	8.6	no data	1.2
9/12/2023	26.2	8.0	1382.2	18.4	27	6.87	8.6	no data	1.1
9/12/2023	29.5	9.0	1378.9	17.8	26	6.66	8.4	no data	1.1
9/12/2023	32.7	10.0	1375.7	17.1	26	6.54	8.2	no data	1.4
9/12/2023	36.1	11.0	1372.3	12.8	23	6.42	8.8	no data	1.2
9/12/2023	39.4	12.0	1369.0	9.3	23	6.44	9.1	no data	1.8
9/12/2023	42.9	13.0	1365.5	7.1	24	6.45	9.4	no data	1.6
9/12/2023	45.9	14.0	1362.5	6.5	24	6.47	9.6	no data	1.3
9/12/2023	49.2	15.0	1359.2	6.1	24	6.51	9.9	no data	1.1
9/12/2023	55.8	17.0	1352.6	5.8	24	6.54	10.1	no data	1.3
9/12/2023	62.4	19.0	1346.0	5.6	24	6.55	10.2	no data	1.1
9/12/2023	68.2	21.0	1340.2	5.5	24	6.57	10.2	no data	1.1
9/12/2023	75.5	23.0	1332.9	5.4	24	6.58	10.4	no data	1.3
9/12/2023	82.1	25.0	1326.3	5.3	24	6.62	10.6	no data	1.3
9/12/2023	88.6	27.0	1319.8	5.1	24	6.61	10.6	no data	1.3
9/12/2023	95.2	29.0	1313.2	4.9	24	6.6	10.6	no data	1.5
9/12/2023	101.6	31.0	1306.8	4.8	25	6.59	10.5	no data	1.8
9/12/2023	111.6	34.0	1296.8	4.6	25	6.55	10.3	no data	2.0
9/12/2023	121.5	37.0	1286.9	4.5	25	6.52	10.0	no data	2.2
9/12/2023	131.2	40.0	1277.2	4.5	26	6.48	9.7	no data	2.3
9/12/2023	141.1	43.0	1267.3	4.5	26	6.46	8.3	no data	7.3

Date	Depth	Depth	Elevation	Temperature	Conductivity	pH	Dissolved Oxygen	Chlorophyll	Turbidity
M/D/Y	feet	meters	feet	degrees C	µmhos/cm		mg/L	RFU	NTU
10/30/2023	1.6	0.5	1393.3	10.5	28	6.8	9.6	no data	3.3
10/30/2023	3.2	1.0	1391.7	10.5	28	6.82	9.6	no data	3.3
10/30/2023	6.6	2.0	1388.3	10.5	28	6.81	9.6	no data	3.3
10/30/2023	9.9	3.0	1385.0	10.5	28	6.81	9.6	no data	3.3
10/30/2023	13.2	4.0	1381.7	10.5	28	6.81	9.6	no data	3.2
10/30/2023	16.4	5.0	1378.5	10.5	28	6.82	9.6	no data	3.3
10/30/2023	19.7	6.0	1375.2	10.5	28	6.8	9.6	no data	3.2
10/30/2023	23.0	7.0	1371.9	10.5	28	6.82	9.6	no data	3.4
10/30/2023	26.2	8.0	1368.7	10.5	28	6.81	9.6	no data	3.3
10/30/2023	29.6	9.0	1365.3	10.4	28	6.8	9.6	no data	3.2
10/30/2023	32.8	10.0	1362.1	10.3	28	6.76	9.5	no data	3.3
10/30/2023	36.1	11.0	1358.8	9.3	26	6.59	9.2	no data	3.9
10/30/2023	39.3	12.0	1355.6	8.3	25	6.4	8.7	no data	3.9
10/30/2023	42.7	13.0	1352.2	7.5	24	6.37	8.7	no data	3.5
10/30/2023	46.0	14.0	1348.9	6.6	24	6.38	9.0	no data	2.8
10/30/2023	49.3	15.0	1345.6	6.1	24	6.39	9.2	no data	2.5
10/30/2023	55.7	17.0	1339.2	5.8	24	6.42	9.4	no data	2.4
10/30/2023	62.2	19.0	1332.7	5.7	24	6.46	9.7	no data	2.0
10/30/2023	68.9	21.0	1326.0	5.6	24	6.46	9.7	no data	1.8
10/30/2023	75.5	23.0	1319.4	5.4	24	6.48	9.8	no data	1.8
10/30/2023	82.1	25.0	1312.8	5.2	24	6.49	9.9	no data	2.3
10/30/2023	88.6	27.0	1306.3	5.1	25	6.47	9.9	no data	2.7
10/30/2023	95.1	29.0	1299.8	5.0	25	6.46	9.7	no data	2.8
10/30/2023	101.6	31.0	1293.3	4.9	25	6.46	9.6	no data	3.1
10/30/2023	111.6	34.0	1283.3	4.8	25	6.43	9.4	no data	3.3
10/30/2023	114.4	35.0	1280.5	4.7	26	6.39	8.9	no data	4.4

APPENDIX B

Mean Daily Water Temperature Monitoring – Figures

Figure B-1. Mean Daily Water Temperature in the South Fork Sultan (RM 18.2), and the mainstem Sultan River immediately downstream of Culmback Dam (RM 15.8) during 2023

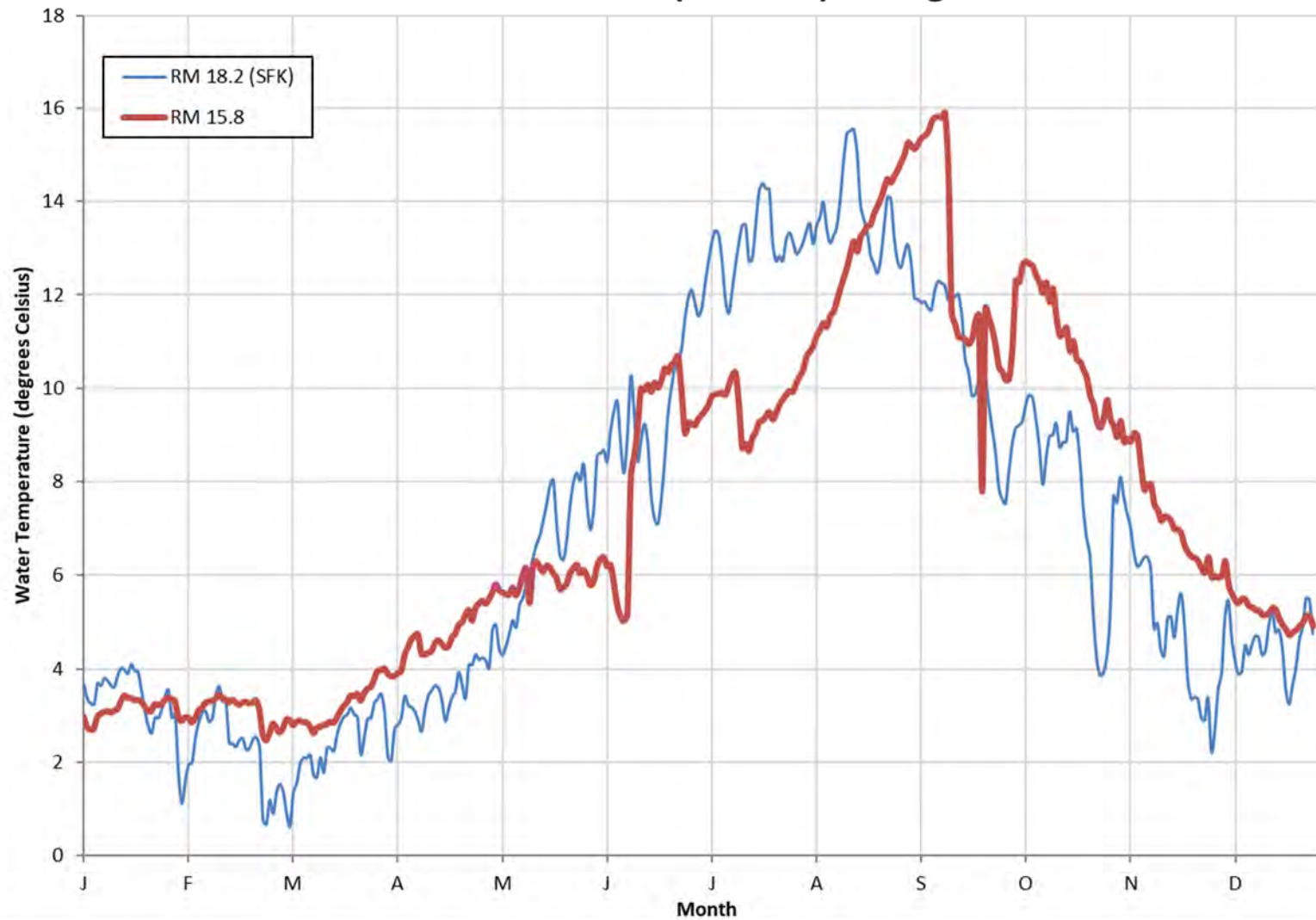
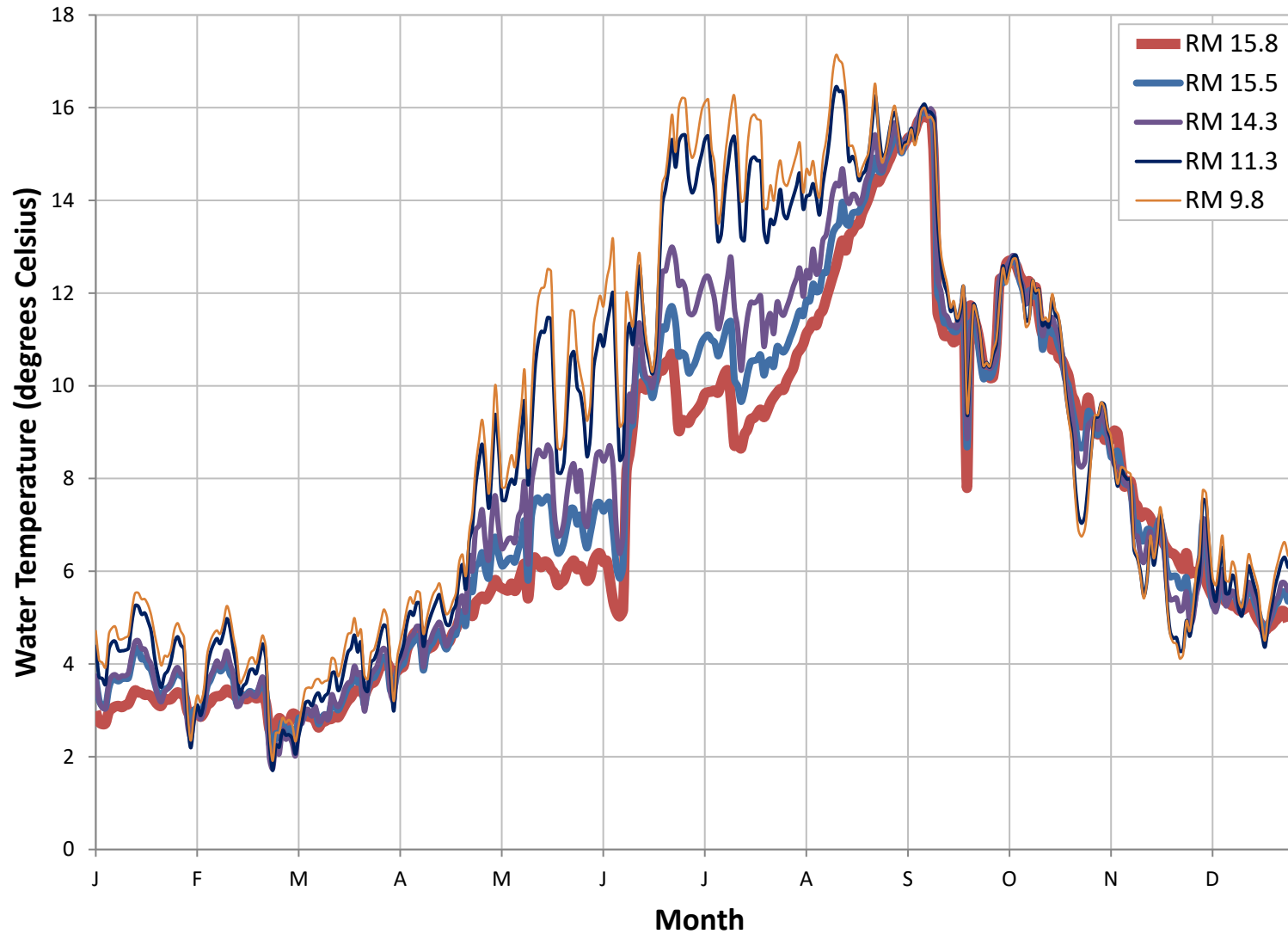
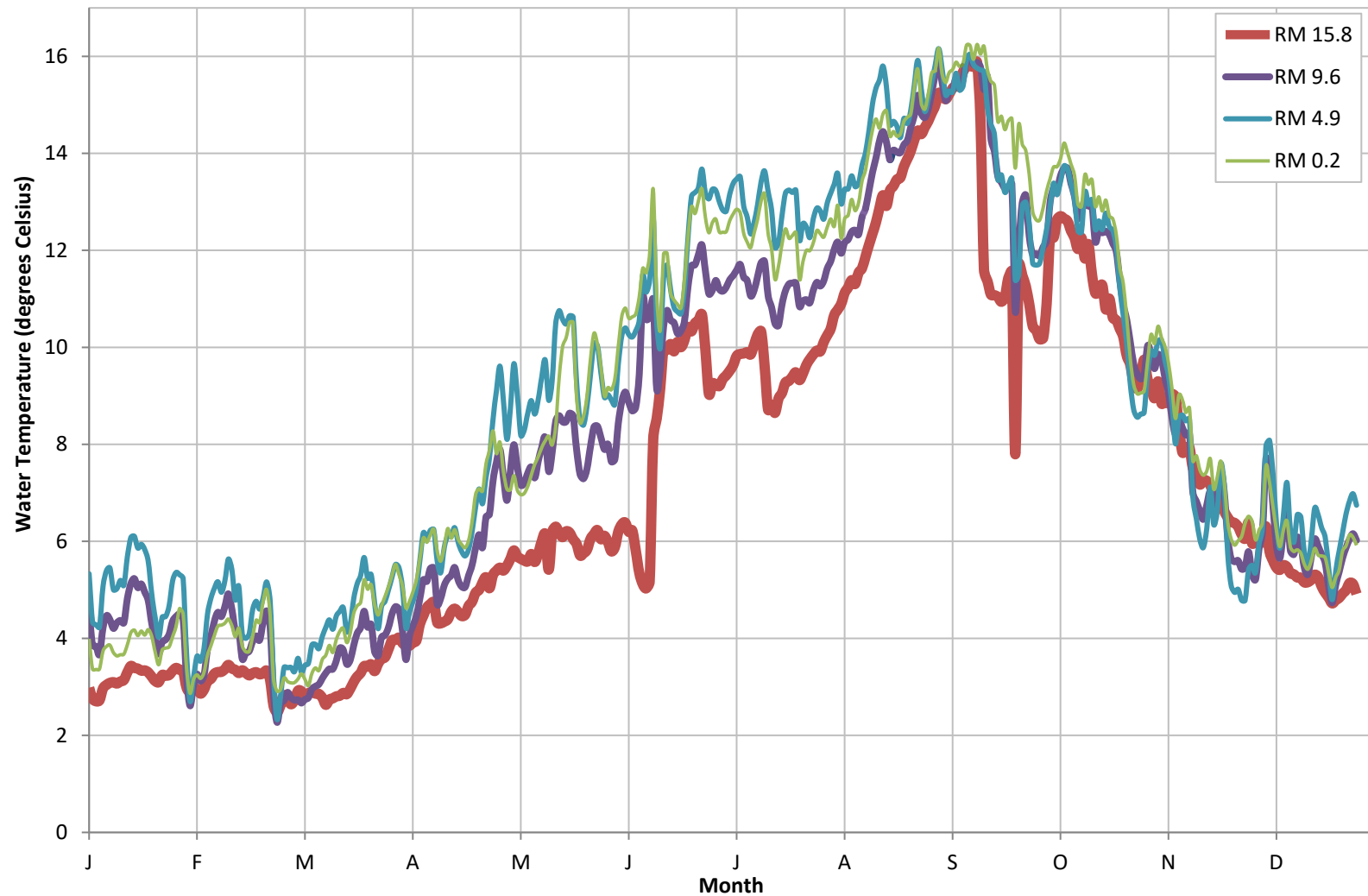


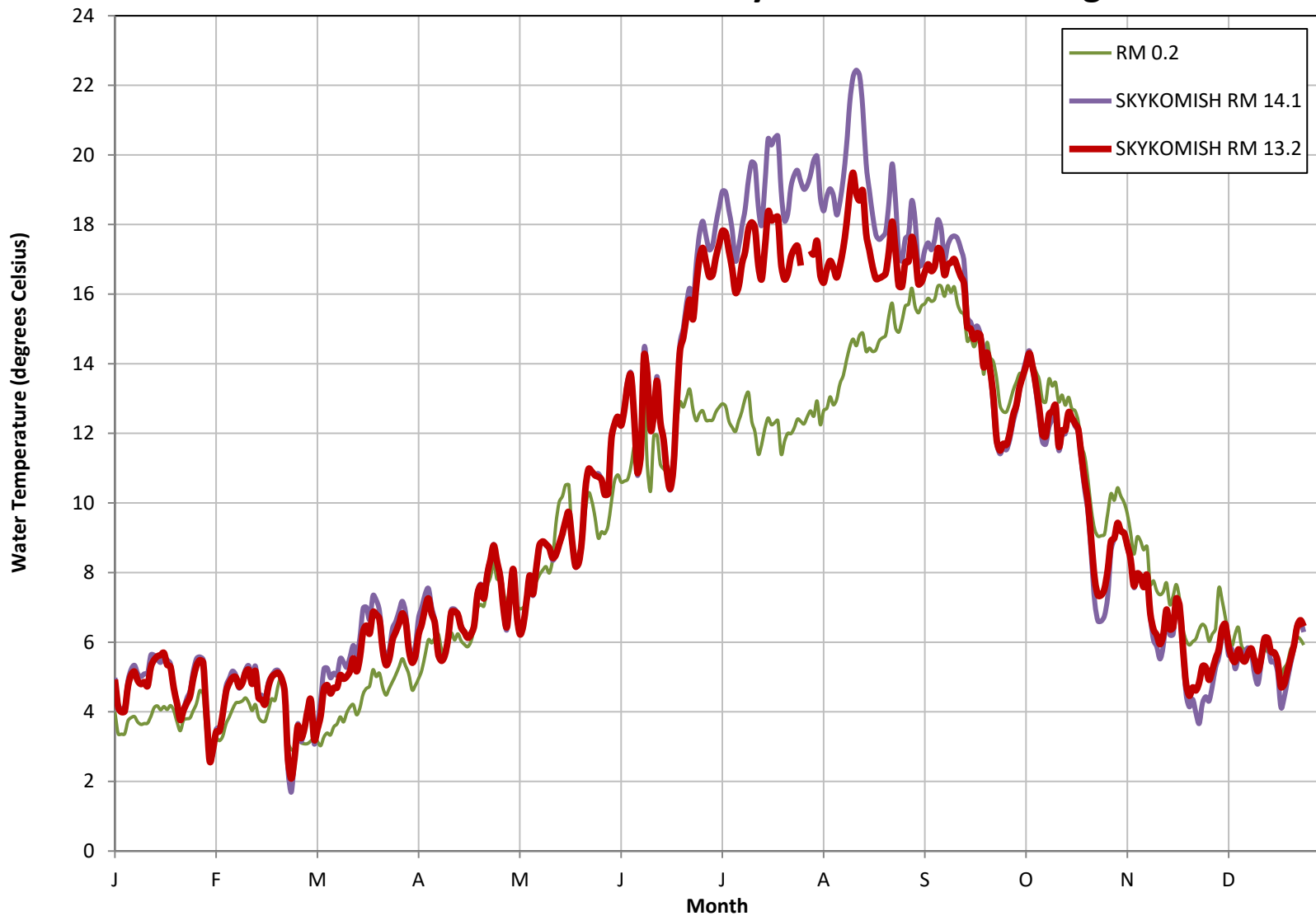
Figure B-2. Longitudinal Depiction of Mean Daily Water Temperature in the Bypass Reach (Reach 3) of the Sultan River during 2023



**Figure B-3. Longitudinal Depiction of Mean Daily Water Temperature,
Sultan River downstream of Culmback Dam during 2023**



**Figure B-4. Mean Daily Water Temperature
near confluence of Sultan and Skykomish rivers during 2023**



APPENDIX C

Mean Daily Water Temperature Data in Tabular Format

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
1/1	3.7	3.0	3.7	3.7	4.4	4.7	4.5	5.3	4.4	4.0	5.0	4.9
1/2	3.4	2.8	3.2	3.2	3.7	4.1	3.9	4.3	3.6	3.4	4.2	4.1
1/3	3.3	2.7	3.1	3.1	3.7	4.0	3.8	4.3	3.5	3.4	4.1	4.0
1/4	3.3	2.7	3.1	3.0	3.6	3.9	3.7	4.2	3.4	3.4	4.1	4.0
1/5	3.7	3.0	3.5	3.6	4.3	4.6	4.2	5.1	3.8	3.7	4.9	4.7
1/6	3.6	3.0	3.7	3.7	4.5	4.8	4.5	5.4	4.0	3.8	5.2	5.1
1/7	3.8	3.1	3.7	3.8	4.5	4.8	4.4	5.4	4.0	3.9	5.3	5.2
1/8	3.7	3.1	3.6	3.7	4.3	4.5	4.2	5.0	3.7	3.7	5.1	4.9
1/9	3.6	3.1	3.7	3.7	4.3	4.5	4.3	5.0	3.6	3.6	5.0	4.8
1/10	3.6	3.1	3.7	3.7	4.3	4.6	4.4	5.2	3.6	3.7	5.1	4.9
1/11	3.9	3.1	3.7	3.8	4.3	4.6	4.3	5.1	3.6	3.7	5.1	4.7
1/12	4.0	3.3	4.0	4.2	4.9	5.2	4.8	5.7	3.7	3.9	5.6	5.3
1/13	4.0	3.4	4.3	4.5	5.3	5.5	5.1	6.1	4.1	4.1	5.6	5.5
1/14	3.9	3.4	4.3	4.5	5.2	5.5	5.2	6.1	4.2	4.2	5.5	5.6
1/15	4.1	3.4	4.1	4.3	5.1	5.4	5.0	5.9	4.0	4.1	5.4	5.6
1/16	4.0	3.3	4.1	4.3	5.1	5.4	5.1	5.9	4.2	4.2	5.6	5.7
1/17	3.9	3.3	3.9	4.1	4.9	5.3	5.0	5.8	4.1	4.1	5.5	5.4
1/18	3.5	3.3	3.9	4.0	4.7	5.0	4.8	5.6	4.4	4.2	5.4	5.3
1/19	3.1	3.2	3.6	3.6	4.1	4.6	4.3	4.9	4.2	4.0	4.7	4.7
1/20	2.8	3.1	3.4	3.3	3.7	4.3	4.0	4.4	3.8	3.7	4.3	4.2
1/21	2.6	3.1	3.3	3.2	3.5	4.0	3.7	4.0	3.6	3.5	3.8	3.8
1/22	3.0	3.2	3.4	3.4	3.8	4.2	3.9	4.4	3.8	3.8	4.1	4.0
1/23	3.0	3.2	3.5	3.5	3.9	4.2	4.0	4.5	3.8	3.8	4.4	4.3
1/24	3.1	3.2	3.6	3.6	4.1	4.3	4.1	4.7	3.7	3.8	4.6	4.5
1/25	3.4	3.3	3.7	3.8	4.4	4.7	4.4	5.2	3.7	4.0	5.2	5.0
1/26	3.5	3.4	3.8	3.9	4.6	4.9	4.5	5.4	4.1	4.2	5.5	5.3
1/27	3.0	3.4	3.7	3.8	4.4	4.7	4.5	5.3	4.6	4.6	5.6	5.5
1/28	3.0	3.3	3.7	3.7	4.3	4.6	4.4	5.2	4.5	4.5	5.5	5.4
1/29	1.7	3.0	2.9	2.7	2.9	3.0	3.2	3.7	3.5	3.4	3.9	4.0
1/30	1.1	2.9	2.7	2.4	2.2	2.3	2.6	2.7	3.0	2.9	2.6	2.6
1/31	1.6	3.0	3.0	2.8	2.8	2.9	3.0	3.2	3.1	3.2	2.8	2.9

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
2/1	2.0	3.0	3.0	3.0	3.1	3.3	3.3	3.6	3.2	3.2	3.5	3.4
2/2	2.0	2.9	2.9	2.8	2.9	3.2	3.1	3.5	3.1	3.2	3.6	3.4
2/3	2.5	2.9	3.1	3.1	3.2	3.4	3.2	3.8	3.1	3.3	4.0	3.9
2/4	2.9	3.1	3.5	3.5	3.9	4.2	3.8	4.5	3.4	3.7	4.7	4.6
2/5	3.1	3.2	3.7	3.7	4.2	4.5	4.0	4.8	3.6	3.9	5.0	4.8
2/6	3.1	3.3	3.8	3.9	4.4	4.7	4.4	5.0	3.9	4.1	5.2	5.0
2/7	2.9	3.3	4.0	4.1	4.6	4.7	4.5	5.2	4.3	4.3	5.1	5.0
2/8	2.9	3.3	3.9	3.9	4.4	4.7	4.5	5.0	4.3	4.3	4.7	4.7
2/9	3.4	3.4	3.9	4.1	4.7	4.9	4.7	5.2	4.1	4.3	4.9	4.8
2/10	3.6	3.5	4.1	4.3	5.0	5.3	4.9	5.6	4.1	4.4	5.2	5.1
2/11	3.3	3.4	3.8	4.0	4.8	5.0	4.6	5.4	4.0	4.3	5.3	5.2
2/12	3.3	3.4	3.7	3.8	4.3	4.6	4.2	4.8	3.8	4.0	5.0	4.8
2/13	2.4	3.3	3.2	3.1	3.9	4.2	4.1	5.1	4.0	4.2	5.3	5.2
2/14	2.4	3.3	3.3	3.1	3.4	3.6	3.6	4.1	3.7	3.8	4.5	4.4
2/15	2.3	3.3	3.3	3.3	3.5	3.7	3.7	4.0	3.6	3.7	4.5	4.3
2/16	2.5	3.2	3.3	3.3	3.6	3.9	3.7	4.1	3.6	3.7	4.4	4.2
2/17	2.5	3.3	3.4	3.4	3.9	4.1	3.9	4.6	3.9	4.1	4.9	4.7
2/18	2.3	3.3	3.4	3.3	3.9	4.1	4.1	4.8	4.3	4.4	5.0	5.0
2/19	2.3	3.3	3.4	3.3	3.8	4.0	4.0	4.6	4.3	4.3	5.2	5.1
2/20	2.5	3.3	3.5	3.6	4.1	4.3	4.3	4.8	4.8	4.8	5.2	5.1
2/21	2.5	3.3	3.7	3.7	4.4	4.6	4.6	5.2	5.0	5.0	4.9	5.0
2/22	2.3	3.1	3.4	3.4	4.1	4.3	4.2	4.8	4.6	4.5	4.5	4.6
2/23	0.8	2.6	2.3	2.0	2.4	2.6	2.8	3.2	3.3	3.2	2.3	2.6
2/24	0.7	2.5	2.1	1.7	1.7	1.9	2.3	2.3	2.9	2.9	1.7	2.1
2/25	1.2	2.6	2.5	2.3	2.2	2.5	2.7	2.8	2.9	3.0	2.6	2.7
2/26	0.9	2.8	2.4	2.1	2.2	2.5	2.7	3.4	3.1	3.2	3.7	3.6
2/27	1.3	2.7	2.7	2.6	2.6	2.8	2.9	3.4	3.1	3.1	3.1	3.2
2/28	1.5	2.6	2.5	2.4	2.5	2.7	2.8	3.4	3.0	3.1	3.5	3.5

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
3/1	1.4	2.7	2.6	2.4	2.5	2.8	2.7	3.3	2.8	3.1	4.1	4.0
3/2	0.9	2.9	2.6	2.3	2.4	2.7	2.7	3.6	3.0	3.2	4.3	4.3
3/3	0.6	2.9	2.5	2.0	2.1	2.3	2.7	3.3	3.1	3.3	3.1	3.2
3/4	1.4	2.8	2.8	2.7	2.5	2.7	2.7	3.4	2.9	3.2	3.6	3.5
3/5	1.6	2.9	2.8	2.7	2.8	3.1	2.8	3.5	2.8	3.0	4.4	3.9
3/6	2.0	2.9	3.0	3.0	3.2	3.4	3.0	3.9	3.0	3.3	5.2	4.7
3/7	2.1	2.9	3.0	3.0	3.2	3.5	3.0	3.9	3.2	3.4	5.3	4.8
3/8	2.1	2.9	2.9	2.9	3.1	3.5	3.1	3.8	3.2	3.3	5.0	4.5
3/9	2.2	2.8	3.0	3.1	3.3	3.6	3.2	4.0	3.3	3.6	5.1	4.7
3/10	1.7	2.6	2.7	2.8	3.4	3.7	3.3	4.2	3.4	3.7	5.1	4.7
3/11	1.7	2.7	2.8	2.8	3.2	3.6	3.4	4.4	3.6	3.9	5.5	5.1
3/12	2.1	2.8	2.9	2.9	3.3	3.6	3.4	4.2	3.5	3.7	5.4	5.0
3/13	1.8	2.8	2.8	2.8	3.4	3.7	3.5	4.5	3.9	4.0	5.3	5.0
3/14	2.3	2.8	3.2	3.3	3.8	4.1	3.8	4.6	4.0	4.1	5.6	5.2
3/15	2.3	2.9	3.1	3.2	3.8	4.1	3.8	4.6	4.0	4.2	5.9	5.5
3/16	2.2	2.8	3.0	3.1	3.4	3.7	3.5	4.1	3.7	3.9	5.6	5.2
3/17	2.6	3.0	3.1	3.2	3.6	3.9	3.6	4.3	3.8	4.1	6.1	5.6
3/18	2.8	3.1	3.3	3.5	3.9	4.3	3.9	4.8	4.1	4.5	7.0	6.3
3/19	3.0	3.2	3.5	3.6	4.3	4.6	4.1	5.1	4.3	4.7	7.0	6.5
3/20	3.0	3.3	3.6	3.6	4.4	4.7	4.2	5.3	4.6	4.7	6.6	6.3
3/21	3.2	3.4	3.8	4.0	4.6	5.0	4.6	5.7	5.0	5.2	7.3	6.9
3/22	3.0	3.4	3.6	3.8	4.3	4.6	4.2	5.2	4.7	5.0	7.2	6.8
3/23	3.0	3.5	3.7	3.8	4.5	4.7	4.3	5.3	4.8	5.1	6.9	6.7
3/24	2.2	3.3	3.1	3.0	3.5	3.8	3.7	4.7	4.4	4.7	6.0	5.8
3/25	2.5	3.5	3.5	3.4	3.4	3.7	3.6	4.2	4.1	4.5	5.5	5.3
3/26	2.9	3.6	3.7	3.7	4.0	4.2	4.0	4.7	4.4	4.7	5.8	5.5
3/27	2.9	3.6	3.7	3.9	4.1	4.3	4.1	4.8	4.5	4.9	6.4	6.1
3/28	3.3	3.8	3.9	4.0	4.3	4.6	4.2	5.0	4.7	5.1	6.6	6.3
3/29	3.4	4.0	4.1	4.3	4.6	4.9	4.5	5.3	4.9	5.3	6.9	6.5
3/30	3.5	4.0	4.2	4.3	4.8	5.2	4.7	5.5	5.1	5.5	7.2	6.8
3/31	3.1	4.0	4.1	4.2	4.8	5.0	4.6	5.5	5.0	5.3	6.9	6.6

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
4/1	2.1	3.9	3.4	3.4	3.9	4.1	4.2	5.0	4.8	5.1	5.9	5.8
4/2	2.0	3.8	3.4	3.2	3.0	3.2	3.6	4.2	4.2	4.6	5.6	5.4
4/3	2.7	3.8	3.8	3.9	4.0	4.1	4.0	4.5	4.5	4.8	5.9	5.6
4/4	2.8	3.9	3.9	4.1	4.2	4.5	4.3	4.8	4.6	5.0	6.7	6.2
4/5	3.0	4.0	4.0	4.2	4.4	4.8	4.5	5.0	4.9	5.2	7.0	6.5
4/6	3.4	4.3	4.3	4.4	4.9	5.2	4.8	5.6	5.3	5.6	7.4	7.0
4/7	3.2	4.5	4.4	4.6	5.1	5.4	5.2	6.2	5.8	6.1	7.5	7.3
4/8	3.2	4.6	4.5	4.6	5.1	5.3	5.2	6.0	5.7	6.0	7.0	6.8
4/9	3.1	4.7	4.6	4.8	5.3	5.6	5.4	6.2	5.9	6.1	6.6	6.5
4/10	2.9	4.7	4.5	4.8	5.3	5.5	5.5	6.2	6.1	6.2	5.6	5.6
4/11	2.7	4.3	3.9	3.9	4.4	4.7	4.7	5.6	5.5	5.8	5.4	5.5
4/12	3.1	4.3	4.2	4.4	4.7	4.9	4.8	5.4	5.3	5.6	5.7	5.6
4/13	3.4	4.3	4.4	4.5	5.0	5.3	5.1	5.9	5.6	5.9	6.1	6.1
4/14	3.5	4.4	4.5	4.7	5.2	5.5	5.2	6.1	5.8	6.3	6.9	6.9
4/15	3.6	4.5	4.7	4.8	5.4	5.6	5.3	6.1	5.7	6.1	6.9	6.9
4/16	3.6	4.6	4.7	4.9	5.5	5.7	5.5	6.3	5.9	6.2	6.8	6.8
4/17	3.3	4.5	4.5	4.7	5.1	5.4	5.2	6.0	5.7	6.0	6.5	6.4
4/18	2.9	4.5	4.3	4.4	4.9	5.1	5.1	5.8	5.6	5.9	6.3	6.3
4/19	3.2	4.5	4.4	4.5	4.8	5.1	5.1	5.7	5.5	5.9	6.2	6.1
4/20	3.4	4.7	4.6	4.8	5.1	5.4	5.3	5.8	5.7	6.0	6.3	6.2
4/21	3.5	4.8	4.6	4.8	5.3	5.6	5.5	6.2	6.0	6.4	6.5	6.5
4/22	3.9	4.9	5.1	5.3	5.9	6.2	5.9	6.7	6.4	7.0	7.4	7.4
4/23	3.7	5.0	5.1	5.5	6.1	6.4	6.1	7.1	6.7	7.1	7.7	7.6
4/24	3.4	5.2	4.8	5.1	5.6	5.9	5.9	6.8	6.6	7.0	7.4	7.3
4/25	4.1	5.3	5.8	6.3	6.6	6.8	6.5	7.3	7.1	7.6	8.0	7.9
4/26	4.1	5.0	5.6	6.0	7.0	7.3	6.6	7.7	7.2	7.9	8.4	8.4
4/27	4.3	5.3	6.1	6.9	7.8	8.2	7.2	8.5	7.4	8.3	8.8	8.8
4/28	4.2	5.4	6.2	7.0	8.4	8.8	7.6	9.1	7.1	7.8	8.3	8.3
4/29	4.2	5.5	6.4	7.3	8.7	9.3	7.9	9.6	7.2	8.0	7.8	7.9
4/30	4.2	5.4	6.0	6.6	8.2	8.6	7.3	8.9	6.9	7.4	6.9	6.9

DATE	Sultan River										Skykomish River	
	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
5/1	4.0	5.5	5.9	6.3	7.4	7.7	6.8	8.1	6.8	7.1	6.4	6.4
5/2	4.8	5.6	6.5	7.2	8.2	8.7	7.5	8.7	6.7	7.1	7.5	7.4
5/3	5.0	5.8	6.7	7.6	9.4	10.0	8.0	9.7	7.0	7.4	8.1	8.1
5/4	4.4	5.7	6.4	6.9	8.7	9.0	7.5	9.0	6.9	7.1	6.7	6.8
5/5	4.3	5.6	6.1	6.5	7.6	7.8	7.2	8.2	6.9	7.0	6.2	6.2
5/6	4.5	5.6	6.2	6.6	7.5	7.8	7.2	8.3	6.8	7.0	6.5	6.5
5/7	4.8	5.6	6.3	6.7	7.8	8.2	7.4	8.6	6.9	7.1	7.2	7.2
5/8	5.0	5.7	6.3	6.7	8.0	8.5	7.5	8.9	7.2	7.4	7.9	7.9
5/9	4.9	5.6	6.2	6.6	7.9	8.3	7.3	8.6	7.4	7.6	7.3	7.4
5/10	5.4	5.7	6.5	7.2	8.4	9.0	7.7	8.9	7.6	7.7	8.2	8.1
5/11	5.5	6.0	6.7	7.3	9.0	9.6	7.9	9.4	7.9	7.9	8.8	8.8
5/12	5.8	6.1	7.1	7.9	9.7	10.3	8.1	9.7	8.0	8.1	8.9	8.9
5/13	6.0	5.4	5.8	6.2	7.9	8.2	7.4	8.9	8.0	8.2	8.8	8.8
5/14	6.4	6.2	7.1	7.8	9.0	9.7	7.8	9.3	7.7	8.0	8.7	8.7
5/15	6.7	6.3	7.5	8.3	10.3	11.0	8.5	10.5	8.3	8.4	8.4	8.4
5/16	6.9	6.2	7.6	8.6	10.9	11.8	8.6	10.8	8.7	9.4	8.5	8.5
5/17	7.2	6.1	7.5	8.5	11.2	12.1	8.5	10.6	9.1	10.0	8.8	8.8
5/18	7.5	6.2	7.5	8.5	11.2	12.1	8.5	10.5	9.1	10.2	9.1	9.1
5/19	7.9	6.2	7.6	8.7	11.5	12.5	8.6	10.7	9.3	10.5	9.5	9.5
5/20	8.0	6.0	7.4	8.5	11.4	12.5	8.6	10.6	9.2	10.5	9.7	9.7
5/21	7.1	5.9	6.7	7.3	9.7	10.2	7.9	9.3	8.4	9.0	8.8	8.9
5/22	6.4	5.7	6.4	6.8	8.1	8.7	7.4	8.5	7.8	8.4	8.2	8.2
5/23	6.3	5.8	6.4	6.8	8.1	8.6	7.3	8.4	7.8	8.6	8.3	8.3
5/24	6.8	5.8	6.7	7.1	8.4	9.0	7.5	8.8	8.1	9.0	9.0	9.0
5/25	7.5	6.1	7.0	7.7	9.6	10.4	8.0	9.4	8.6	9.8	10.4	10.3
5/26	8.0	6.2	7.3	8.2	10.6	11.6	8.4	10.1	9.1	10.3	10.9	11.0
5/27	8.2	6.2	7.3	8.3	10.7	11.6	8.4	10.0	9.1	10.1	10.9	10.9
5/28	8.0	6.0	7.0	7.7	10.0	10.7	8.1	9.5	8.8	9.6	10.8	10.8
5/29	8.4	6.1	7.2	8.2	9.8	10.3	7.9	9.0	8.3	9.0	10.8	10.8
5/30	7.5	6.0	6.8	7.2	9.3	9.9	8.0	9.0	8.5	9.2	10.7	10.7
5/31	7.0	5.8	6.5	7.0	8.5	9.2	7.6	8.9	8.3	9.1	10.2	10.2

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
6/1	7.4	5.9	6.8	7.6	8.9	9.6	7.7	8.8	8.3	9.4	10.4	10.3
6/2	8.6	6.2	7.2	8.1	10.3	11.3	8.4	9.6	9.1	10.0	11.9	11.8
6/3	8.6	6.4	7.5	8.5	10.8	11.7	8.9	10.2	9.6	10.6	12.3	12.3
6/4	8.7	6.4	7.5	8.6	11.1	11.9	9.1	10.4	9.8	10.8	12.5	12.5
6/5	8.4	6.2	7.3	8.4	10.9	11.7	8.9	10.3	9.6	10.6	12.3	12.2
6/6	9.1	6.2	7.4	8.5	11.3	12.3	8.7	10.2	9.5	10.6	12.8	12.7
6/7	9.5	5.8	7.5	8.7	11.7	12.6	8.8	10.3	9.6	10.7	13.5	13.4
6/8	9.7	5.4	6.9	8.2	12.0	13.1	9.4	10.6	10.0	11.0	13.7	13.7
6/9	8.8	5.1	6.1	6.9	10.1	10.8	11.0	11.5	11.4	11.6	12.3	12.5
6/10	8.2	5.0	5.8	6.4	8.4	9.1	10.6	11.1	11.1	11.5	10.8	10.9
6/11	9.0	5.2	6.1	6.8	8.5	9.3	10.6	11.4	11.3	11.9	11.5	11.4
6/12	10.3	8.1	8.4	8.9	10.8	12.0	11.0	12.7	12.1	13.3	14.4	14.2
6/13	9.4	8.5	9.1	9.8	11.4	11.7	9.2	10.5	10.0	11.1	13.8	13.7
6/14	8.5	9.1	9.2	9.2	10.9	11.3	9.5	10.0	9.7	10.3	12.2	12.1
6/15	8.9	10.0	10.5	10.9	11.6	12.2	10.4	11.4	11.1	11.9	12.6	12.5
6/16	9.2	9.9	10.8	11.4	12.6	12.9	10.8	11.7	11.1	11.9	13.6	13.5
6/17	8.8	10.1	10.3	10.6	11.7	11.8	10.6	11.2	10.8	11.1	12.4	12.3
6/18	7.7	9.9	10.1	10.2	10.9	11.1	10.5	10.8	10.6	11.0	11.9	11.8
6/19	7.2	10.1	10.0	10.1	10.5	10.7	10.3	10.7	10.5	10.9	10.9	10.9
6/20	7.1	10.0	9.7	10.0	10.3	10.3	10.3	10.7	10.6	10.8	10.4	10.4
6/21	7.6	10.2	10.1	10.5	10.7	10.9	10.5	11.2	10.8	11.4	11.0	11.0
6/22	8.5	10.4	10.8	11.4	12.5	12.9	11.3	12.3	11.5	12.3	12.9	12.8
6/23	9.5	10.3	11.3	12.5	13.9	14.3	11.7	13.1	12.0	12.9	14.6	14.4
6/24	10.0	10.5	11.2	12.5	14.3	14.6	11.7	13.2	12.1	12.8	15.0	14.7
6/25	10.4	10.6	11.6	12.8	14.7	15.2	11.9	13.3	12.2	13.0	15.7	15.4
6/26	10.6	10.7	11.7	13.0	15.3	15.9	12.1	13.7	12.5	13.3	16.2	15.8
6/27	10.8	10.0	11.4	12.7	14.7	15.0	11.6	13.2	11.9	12.7	15.7	15.3
6/28	11.5	9.0	10.6	12.2	15.2	16.0	11.1	13.1	11.4	12.4	16.9	16.3
6/29	11.9	9.3	10.7	12.3	15.4	16.2	11.2	13.3	11.6	12.6	17.7	17.0
6/30	12.1	9.2	10.6	12.1	15.4	16.2	11.4	13.2	11.7	12.6	18.1	17.3

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
7/1	8.0	9.2	10.3	11.6	14.5	15.3	11.2	13.0	11.5	12.4	17.7	16.9
7/2	7.8	9.3	10.4	11.5	14.2	14.9	11.2	12.8	11.5	12.4	17.3	16.5
7/3	7.8	9.4	10.5	11.6	14.3	15.1	11.2	12.8	11.5	12.4	17.4	16.6
7/4	8.5	9.5	10.7	11.9	14.7	15.5	11.4	13.2	11.7	12.6	18.0	17.1
7/5	9.1	9.6	10.9	12.1	15.0	15.9	11.5	13.4	11.9	12.8	18.5	17.4
7/6	9.2	9.8	11.1	12.3	15.3	16.1	11.6	13.5	12.0	12.8	19.0	17.8
7/7	8.8	9.9	11.1	12.4	15.4	16.2	11.7	13.5	12.0	12.8	18.9	17.8
7/8	8.8	9.9	11.0	12.1	14.6	15.1	11.4	12.9	11.6	12.4	18.4	17.2
7/9	9.0	9.9	10.9	11.8	14.2	14.8	11.4	12.7	11.5	12.2	17.8	16.7
7/10	9.9	9.9	10.6	11.2	13.1	13.5	11.1	12.3	11.4	12.1	17.0	16.0
7/11	9.7	10.1	10.8	11.5	13.3	13.9	11.2	12.6	11.5	12.4	17.4	16.2
7/12	9.6	10.3	11.1	11.9	14.1	14.8	11.5	12.9	11.8	12.6	18.0	16.9
7/13	9.4	10.3	11.4	12.4	14.7	15.4	11.7	13.4	12.1	13.0	18.5	17.2
7/14	10.0	9.6	11.4	12.8	15.2	16.0	11.8	13.6	12.1	13.2	19.3	17.9
7/15	10.6	8.7	10.1	11.7	15.4	16.3	11.1	13.2	11.3	12.4	19.8	18.1
7/16	11.0	8.8	10.0	11.2	14.5	15.4	10.8	12.8	11.2	12.0	19.7	17.9
7/17	10.7	8.6	9.7	10.3	13.2	14.0	10.5	12.1	10.7	11.4	18.5	16.8
7/18	11.1	8.9	9.9	10.9	13.1	14.0	10.5	12.2	10.8	11.7	18.0	16.4
7/19	11.6	9.1	10.3	11.5	14.2	15.1	10.9	12.7	11.1	12.1	19.1	17.3
7/20	12.4	9.3	10.5	11.8	14.9	15.8	11.2	13.2	11.5	12.4	20.5	18.4
7/21	12.8	9.3	10.5	11.8	14.9	15.9	11.3	13.2	11.4	12.3	20.3	18.1
7/22	12.5	9.4	10.6	11.8	14.9	15.7	11.3	13.2	11.4	12.3	20.5	18.2
7/23	11.6	9.5	10.7	11.9	14.8	15.7	11.3	13.2	11.4	12.4	20.5	18.2
7/24	11.1	9.3	10.2	10.9	13.4	13.8	10.8	12.2	10.9	11.4	19.0	16.9
7/25	11.1	9.5	10.5	11.4	13.1	13.8	11.0	12.5	11.1	11.8	18.1	16.4
7/26	12.0	9.6	10.6	11.6	13.6	14.3	11.0	12.5	10.9	12.0	18.3	16.6
7/27	12.9	9.8	10.4	11.1	13.5	14.0	10.9	12.3	10.9	12.0	19.1	17.1
7/28	13.3	9.9	10.8	11.8	13.8	14.5	11.2	12.7	11.1	12.2	19.4	17.3
7/29	13.4	9.9	10.8	11.6	14.2	14.9	11.3	12.9	11.2	12.4	19.6	17.4
7/30	13.8	9.9	10.7	11.5	13.7	14.4	11.3	12.8	11.3	12.3	19.2	16.8
7/31	14.3	10.1	10.8	11.7	13.6	14.3	11.4	12.6	11.2	12.3	19.0	

DATE	Sultan River										Skykomish River	
	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
8/1	13.0	10.2	11.0	11.9	13.9	14.5	11.6	13.0	11.5	12.5	19.1	
8/2	13.1	10.4	11.2	12.1	14.1	14.8	11.8	13.2	11.6	12.6	19.4	17.2
8/3	13.4	10.7	11.4	12.3	14.3	15.0	12.0	13.4	11.8	12.5	19.9	17.1
8/4	13.5	10.8	11.6	12.5	14.6	15.2	12.2	13.6	12.3	12.9	20.0	17.5
8/5	13.1	10.9	11.5	11.9	13.8	14.2	11.9	13.0	12.0	12.3	18.8	16.5
8/6	13.5	11.1	11.8	12.5	14.1	14.7	12.2	13.3	12.2	12.7	18.4	16.3
8/7	13.6	11.2	11.8	12.3	14.1	14.5	12.2	13.3	12.3	12.7	18.8	16.7
8/8	14.0	11.4	12.2	13.0	14.4	14.9	12.4	13.5	12.5	13.1	19.0	17.0
8/9	13.4	11.3	12.0	12.4	14.1	14.3	12.4	13.3	12.4	12.8	18.8	16.8
8/10	13.1	11.5	12.1	12.5	13.7	14.1	12.3	13.4	12.5	13.0	18.3	16.5
8/11	13.3	11.6	12.4	13.1	14.3	14.9	12.7	13.8	12.8	13.4	18.7	16.8
8/12	13.5	11.9	12.5	13.3	14.8	15.3	12.9	14.0	13.0	13.7	19.3	17.3
8/13	14.0	12.1	12.9	13.7	15.3	15.9	13.2	14.5	13.3	14.1	20.2	18.0
8/14	14.8	12.3	13.3	14.2	16.1	16.7	13.6	15.0	13.7	14.5	21.5	18.9
8/15	15.5	12.6	13.4	14.4	16.4	17.1	13.9	15.3	14.0	14.7	22.2	19.5
8/16	15.5	12.9	13.5	14.3	16.3	17.0	14.3	15.5	13.8	14.5	22.4	18.9
8/17	15.5	13.1	14.0	14.7	16.3	16.9	14.5	15.8	14.1	14.8	22.3	18.7
8/18	15.1	12.9	13.5	14.1	15.8	16.3	14.2	15.4	14.1	14.9	21.3	19.0
8/19	13.9	13.2	13.5	13.9	14.8	15.2	13.9	14.6	13.8	14.4	19.8	17.8
8/20	13.6	13.3	13.7	14.1	15.0	15.2	14.1	14.7	13.9	14.5	19.0	17.3
8/21	13.4	13.5	13.7	14.1	14.8	15.0	14.0	14.6	14.0	14.4	18.3	16.8
8/22	12.8	13.5	13.8	13.9	14.4	14.5	14.0	14.3	14.0	14.4	17.7	16.4
8/23	12.7	13.7	13.9	14.0	14.6	14.7	14.2	14.7	14.2	14.7	17.6	16.5
8/24	12.5	13.9	14.1	14.4	14.7	14.9	14.3	14.6	14.2	14.7	17.6	16.5
8/25	12.8	14.1	14.4	14.6	15.0	15.1	14.5	14.9	14.5	14.8	17.8	16.6
8/26	13.4	14.3	14.6	15.1	15.6	15.8	14.8	15.4	14.8	15.4	18.6	17.2
8/27	14.1	14.5	14.9	15.4	16.3	16.5	15.2	15.9	15.1	15.7	19.7	18.1
8/28	14.1	14.4	14.6	14.9	15.5	15.4	14.8	15.3	14.9	15.0	18.7	17.2
8/29	13.2	14.5	14.6	14.6	15.0	14.8	14.7	14.9	14.7	14.9	17.2	16.2
8/30	12.7	14.7	14.8	14.9	15.0	15.0	14.9	15.1	15.0	15.2	16.9	16.2
8/31	12.6	14.8	15.0	15.1	15.4	15.3	15.2	15.5	15.2	15.7	17.6	16.9

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
9/1	12.9	15.0	15.2	15.4	15.7	15.8	15.6	15.8	15.3	15.7	17.7	16.9
9/2	13.1	15.2	15.5	15.7	15.9	16.0	15.8	16.2	15.7	16.2	18.7	17.6
9/3	12.7	15.2	15.4	15.4	15.6	15.5	15.5	15.7	15.5	15.6	18.1	17.2
9/4	11.9	15.1	15.0	15.0	15.1	15.0	15.1	15.2	15.3	15.5	16.8	16.3
9/5	11.9	15.2	15.2	15.3	15.2	15.2	15.3	15.3	15.4	15.7	16.8	16.4
9/6	11.8	15.3	15.3	15.4	15.3	15.2	15.3	15.3	15.5	15.7	17.3	16.6
9/7	11.9	15.4	15.4	15.5	15.6	15.5	15.5	15.6	15.6	15.9	17.5	16.9
9/8	11.7	15.5	15.4	15.5	15.3	15.2	15.3	15.3	15.5	15.8	17.3	16.7
9/9	11.7	15.7	15.7	15.8	15.5	15.4	15.5	15.4	15.7	15.9	17.6	16.8
9/10	12.1	15.8	15.9	16.0	16.0	15.9	15.9	15.9	16.0	16.2	18.1	17.3
9/11	12.3	15.8	15.9	16.0	16.1	16.0	16.0	16.0	16.0	16.2	17.9	17.2
9/12	12.2	15.8	15.9	15.9	15.9	15.8	15.8	15.8	15.9	15.9	17.0	16.6
9/13	12.2	15.9	15.9	16.0	15.9	15.8	15.9	15.8	15.9	16.2	17.4	16.8
9/14	11.9	14.7	15.4	15.8	15.7	15.6	15.8	15.7	16.0	16.0	17.6	16.9
9/15	11.9	11.6	12.0	12.3	13.7	14.1	15.3	15.7	15.9	16.2	17.7	17.0
9/16	12.0	11.4	11.8	12.1	12.7	12.9	15.6	14.9	15.4	15.7	17.6	16.8
9/17	12.0	11.1	11.4	11.6	12.2	12.5	14.3	14.6	15.1	15.5	17.3	16.5
9/18	11.6	11.1	11.4	11.5	12.0	12.2	14.0	14.4	15.0	15.4	16.9	16.3
9/19	10.6	11.0	11.2	11.3	11.6	11.7	13.5	13.5	14.5	14.7	15.3	15.1
9/20	10.4	10.9	11.2	11.3	11.7	11.8	13.4	13.6	14.5	14.8	15.2	15.0
9/21	9.9	11.0	11.2	11.3	11.4	11.5	13.3	13.2	14.3	14.5	15.0	14.7
9/22	9.9	11.4	11.5	11.5	11.6	11.7	13.3	13.3	14.4	14.7	15.1	14.9
9/23	10.1	11.6	11.8	11.9	12.1	12.1	13.4	13.5	14.5	14.7	14.9	14.8
9/24	10.1	7.8	8.7	8.9	9.4	9.5	10.7	11.4	12.6	13.7	14.4	13.9
9/25	10.2	11.7	11.3	11.1	10.4	10.3	12.1	11.5	13.9	14.6	14.1	14.3
9/26	9.7	11.5	11.4	11.6	11.7	11.7	13.0	12.9	14.1	14.2	13.7	13.8
9/27	9.1	11.3	11.2	11.4	11.6	11.5	13.1	13.0	13.9	14.1	12.7	13.0
9/28	8.6	10.9	10.6	10.9	11.1	11.1	12.3	12.5	13.0	13.6	11.7	11.8
9/29	7.9	10.4	10.2	10.4	10.4	10.4	11.9	11.7	12.3	12.8	11.4	11.5
9/30	7.6	10.3	10.3	10.5	10.5	10.5	11.9	11.7	12.5	12.6	11.6	11.7

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
10/1	7.6	10.2	10.2	10.4	10.4	10.4	11.9	11.7	12.6	12.6	11.5	11.7
10/2	8.2	10.2	10.3	10.5	10.7	10.8	12.1	12.1	12.8	12.9	11.8	12.0
10/3	8.8	10.9	10.7	10.7	10.9	11.0	12.2	12.4	12.9	13.2	12.3	12.5
10/4	9.1	12.3	12.2	12.3	11.9	11.9	13.0	12.9	13.3	13.5	12.7	12.8
10/5	9.2	12.3	12.2	12.4	12.6	12.5	13.3	13.4	13.6	13.7	13.2	13.3
10/6	9.3	12.6	12.5	12.5	12.3	12.2	13.2	13.1	13.5	13.7	13.7	13.6
10/7	9.7	12.7	12.6	12.7	12.5	12.5	13.5	13.4	13.7	13.9	14.1	14.0
10/8	9.9	12.7	12.7	12.8	12.8	12.7	13.7	13.7	13.9	14.2	14.4	14.3
10/9	9.8	12.6	12.7	12.8	12.8	12.7	13.7	13.7	13.9	14.0	13.8	13.9
10/10	9.3	12.4	12.3	12.3	12.4	12.3	13.4	13.4	13.6	13.8	13.2	13.4
10/11	8.8	12.3	12.1	12.2	12.1	11.9	13.1	13.0	13.4	13.5	12.4	12.7
10/12	7.9	12.0	11.8	11.8	11.4	11.3	12.7	12.4	12.9	13.0	11.8	12.0
10/13	8.5	12.3	12.1	12.0	11.5	11.4	12.8	12.4	12.9	12.9	11.7	11.9
10/14	9.0	11.8	11.9	12.1	12.3	12.3	13.1	13.2	13.3	13.6	12.2	12.5
10/15	9.0	12.1	12.0	12.0	12.0	12.0	12.9	12.9	13.2	13.4	12.4	12.6
10/16	9.3	11.5	11.7	12.0	12.1	12.1	12.9	13.0	13.2	13.5	12.6	12.8
10/17	8.7	11.1	10.8	11.1	11.3	11.4	12.2	12.4	12.6	12.9	11.5	11.6
10/18	8.8	11.2	11.1	11.3	11.4	11.5	12.4	12.6	12.8	13.1	12.0	12.1
10/19	8.9	11.3	11.2	11.3	11.3	11.4	12.4	12.4	12.6	12.8	12.0	12.1
10/20	9.5	10.8	11.1	11.5	11.9	12.0	12.4	12.8	12.7	13.0	12.5	12.6
10/21	9.1	11.0	11.1	11.3	11.5	11.6	12.3	12.5	12.6	12.7	12.4	12.5
10/22	9.1	10.6	10.8	11.0	11.4	11.5	12.1	12.4	12.4	12.6	12.2	12.3
10/23	8.5	10.6	10.6	10.7	10.9	10.9	12.0	12.1	12.2	12.3	12.0	12.1
10/24	7.5	10.4	10.2	10.1	9.9	9.9	11.4	11.3	11.6	11.7	11.1	11.3
10/25	6.8	10.2	10.0	9.9	9.4	9.3	10.9	10.7	11.1	11.3	10.3	10.6
10/26	6.4	9.8	9.5	9.4	8.9	8.8	10.6	10.1	10.6	10.6	9.7	10.0
10/27	5.2	9.6	9.2	8.9	7.9	7.7	10.1	9.3	10.0	9.8	8.4	8.9
10/28	4.2	9.3	8.7	8.3	7.2	6.9	9.7	8.7	9.5	9.2	7.2	7.8
10/29	3.9	9.1	8.7	8.2	7.0	6.7	9.5	8.6	9.3	9.0	6.6	7.3
10/30	3.9	9.4	8.8	8.4	7.2	6.9	9.3	8.6	9.3	9.1	6.6	7.4
10/31	4.3	9.7	9.4	9.1	7.9	7.5	9.4	8.7	9.5	9.1	6.8	7.5

	Sultan River										Skykomish River	
DATE	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
11/1	5.2	9.3	9.3	9.2	8.7	8.5	10.0	9.5	9.9	9.7	7.3	8.1
11/2	7.7	9.2	9.2	9.3	9.3	9.4	9.8	9.9	10.0	10.3	8.6	8.9
11/3	7.6	9.0	8.9	9.1	9.3	9.4	9.6	9.8	9.9	10.1	9.0	9.0
11/4	8.1	9.3	9.3	9.5	9.6	9.6	9.9	10.1	10.2	10.4	9.4	9.4
11/5	7.7	8.8	9.0	9.2	9.6	9.5	9.8	10.1	10.1	10.2	9.2	9.2
11/6	7.3	8.9	8.9	8.9	9.1	9.1	9.4	9.7	9.8	10.0	9.1	9.1
11/7	7.0	8.8	8.5	8.6	8.8	8.9	9.1	9.4	9.5	9.7	8.7	8.8
11/8	6.5	9.0	6.5	8.3	8.3	8.4	8.5	8.8	9.0	9.1	8.3	8.4
11/9	6.2	9.0	6.2	8.3	7.8	7.9	8.2	8.0	8.5	8.5	7.6	7.6
11/10	6.3	8.4	6.2	8.2	8.2	8.2	8.5	8.6	8.9	9.0	7.9	8.0
11/11	6.4	7.8	6.2	7.9	8.1	8.2	8.3	8.6	8.7	8.9	7.9	7.9
11/12	6.4	7.9	6.0	7.8	8.0	8.1	8.2	8.5	8.5	8.7	7.6	7.6
11/13	6.2	7.9	6.0	7.9	8.0	8.1	8.2	8.5	8.6	8.8	7.9	7.9
11/14	4.9	7.5	5.9	6.8	6.5	6.6	7.0	6.9	7.7	7.7	6.7	6.9
11/15	5.0	7.4	5.9	6.8	6.3	6.3	6.8	6.5	7.6	7.8	6.1	6.4
11/16	4.4	7.2	5.8	6.4	6.0	5.9	6.6	6.0	7.4	7.5	5.9	6.2
11/17	4.3	7.3	5.7	6.2	5.5	5.4	6.5	5.9	7.3	7.4	5.5	5.9
11/18	5.1	7.2	5.3	6.6	5.8	5.8	6.8	6.3	7.4	7.5	5.9	6.2
11/19	5.1	7.2	5.2	6.9	6.7	6.8	7.0	7.1	7.4	7.7	6.7	6.9
11/20	4.7	7.0	5.3	6.4	6.1	6.3	6.6	6.3	7.1	7.1	6.2	6.4
11/21	5.3	7.0	5.7	6.8	6.5	6.6	6.9	6.6	7.1	7.3	6.2	6.4
11/22	5.6	6.9	6.0	7.2	7.3	7.4	7.4	7.6	7.5	7.7	7.1	7.3
11/23	4.9	6.6	6.0	6.7	6.8	6.8	7.0	7.2	7.2	7.2	7.0	7.0
11/24	3.8	6.5	5.6	5.7	5.5	5.4	6.1	5.8	6.6	6.4	5.8	5.9
11/25	3.4	6.4	5.8	5.4	4.7	4.7	5.6	5.1	6.3	6.1	4.5	4.8
11/26	3.4	6.4	5.6	5.4	4.6	4.5	5.6	4.9	6.2	5.9	4.1	4.5
11/27	3.3	6.3	5.5	5.4	4.6	4.4	5.6	5.0	6.2	6.0	4.4	4.7
11/28	3.0	6.1	4.9	5.1	4.3	4.1	5.4	4.8	6.2	6.1	4.0	4.6
11/29	2.9	6.1	4.4	5.2	4.3	4.2	5.5	4.8	6.4	6.4	3.7	4.9
11/30	3.4	6.4	4.3	5.6	4.9	4.9	5.8	5.4	6.4	6.5	4.3	5.3

DATE	Sultan River										Skykomish River	
	RM 18.2 (SFK)	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	RM 14.1	RM 13.2
12/1	2.2	6.0	5.3	4.9	4.6	4.7	5.3	5.5	6.3	6.4	4.4	5.3
12/2	2.7	6.0	5.2	5.0	5.0	5.2	5.2	5.4	5.7	6.0	4.3	4.9
12/3	3.6	6.0	5.6	5.5	5.6	6.0	5.8	5.9	6.1	6.2	4.7	5.2
12/4	3.9	6.0	6.0	5.8	6.0	6.4	6.2	6.3	6.3	6.4	5.3	5.5
12/5	5.1	6.3	7.1	7.1	7.5	7.7	7.7	8.0	7.9	7.6	5.6	5.8
12/6	5.5	5.8	6.7	6.9	7.5	7.7	7.6	8.1	7.3	7.2	6.2	6.4
12/7	4.7	5.6	5.8	6.0	6.5	6.7	6.7	7.4	6.6	6.7	6.3	6.5
12/8	4.2	5.5	5.3	5.3	5.6	5.9	5.9	6.4	6.1	6.2	5.6	5.9
12/9	3.9	5.4	5.2	5.1	5.4	5.7	5.7	5.9	5.8	5.9	5.8	5.6
12/10	4.0	5.5	5.6	5.6	6.0	6.2	6.2	6.5	6.2	6.2	5.2	5.4
12/11	4.5	5.5	5.9	6.0	6.5	6.8	6.7	7.2	6.4	6.4	5.6	5.8
12/12	4.3	5.3	5.3	5.3	5.5	5.8	5.8	6.2	5.8	5.9	5.7	5.5
12/13	4.5	5.3	5.4	5.4	5.5	5.8	5.7	6.0	5.7	5.8	5.7	5.5
12/14	4.7	5.3	5.5	5.6	5.9	6.2	6.1	6.5	5.7	5.8	5.8	5.7
12/15	4.7	5.3	5.4	5.5	5.7	6.0	5.9	6.5	5.7	5.8	5.7	5.8
12/16	4.3	5.2	5.2	5.1	5.2	5.4	5.5	5.8	5.5	5.5	5.1	5.5
12/17	4.4	5.2	5.2	5.1	5.0	5.2	5.3	5.5	5.4	5.4	4.8	5.2
12/18	4.9	5.2	5.4	5.4	5.5	5.8	5.7	6.0	5.5	5.6	5.4	5.5
12/19	5.2	5.3	5.6	5.8	6.1	6.4	6.1	6.7	5.7	5.9	6.1	6.1
12/20	4.8	5.3	5.5	5.6	5.9	6.1	5.9	6.5	5.7	5.7	6.0	6.1
12/21	4.8	5.1	5.3	5.4	5.6	5.9	5.7	6.3	5.7	5.7	5.4	5.7
12/22	4.5	4.9	5.1	5.2	5.4	5.6	5.6	6.1	5.7	5.7	5.5	5.7
12/23	3.6	4.8	4.8	4.7	4.7	4.9	5.1	5.5	5.4	5.4	5.1	5.5
12/24	3.3	4.7	4.7	4.5	4.4	4.5	4.7	4.8	5.0	5.1	4.1	4.7
12/25	3.7	4.8	4.9	4.8	4.9	5.1	5.1	5.4	5.2	5.3	4.4	4.8
12/26	4.0	4.8	5.0	5.1	5.2	5.5	5.4	5.8	5.3	5.4	4.9	5.2
12/27	4.6	4.9	5.2	5.3	5.7	5.9	5.7	6.2	5.4	5.8	5.4	5.5
12/28	4.9	5.0	5.3	5.5	5.9	6.2	5.9	6.6	5.5	5.9	5.8	5.9
12/29	5.5	5.1	5.5	5.7	6.2	6.5	6.0	6.8	5.5	6.1	6.5	6.4
12/30	5.5	5.1	5.6	5.7	6.3	6.6	6.2	7.0	5.6	6.1	6.6	6.6
12/31	4.8	4.9	5.4	5.6	6.1	6.3	6.0	6.7	5.6	5.9	6.3	6.5

APPENDIX D

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

* Red highlight indicates exceedance of State water quality standards per WAC 173-201A-200(1)(c)

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
1/1	3.7	2.9	3.6	3.6	4.3	4.6	4.5	5.1	4.2	4.0	4.8	4.8
1/2	3.7	3.0	3.6	3.6	4.3	4.6	4.5	5.1	4.1	3.9	4.9	4.8
1/3	3.7	3.0	3.6	3.7	4.3	4.6	4.4	5.1	4.0	3.9	4.9	4.8
1/4	3.7	3.0	3.6	3.6	4.3	4.7	4.4	5.1	3.9	3.8	5.0	4.9
1/5	3.7	3.0	3.6	3.6	4.3	4.6	4.3	5.1	3.9	3.8	5.0	4.8
1/6	3.8	3.0	3.6	3.7	4.4	4.7	4.4	5.2	3.8	3.8	5.1	4.9
1/7	3.8	3.1	3.7	3.8	4.5	4.8	4.4	5.3	3.8	3.8	5.2	5.0
1/8	3.9	3.1	3.8	3.9	4.6	4.9	4.5	5.4	3.8	3.9	5.4	5.1
1/9	3.9	3.2	3.9	4.0	4.7	4.9	4.6	5.5	3.8	3.9	5.4	5.2
1/10	4.0	3.2	4.0	4.1	4.8	5.0	4.7	5.6	3.9	3.9	5.5	5.2
1/11	4.0	3.3	4.1	4.2	4.9	5.1	4.8	5.7	3.9	4.0	5.5	5.3
1/12	4.1	3.3	4.2	4.3	5.0	5.2	5.0	5.8	4.0	4.0	5.5	5.4
1/13	4.1	3.4	4.2	4.4	5.1	5.4	5.1	5.9	4.0	4.1	5.6	5.6
1/14	4.2	3.4	4.2	4.4	5.2	5.4	5.1	6.0	4.1	4.2	5.7	5.6
1/15	4.2	3.4	4.3	4.4	5.2	5.5	5.2	6.0	4.3	4.2	5.7	5.7
1/16	4.0	3.4	4.2	4.4	5.1	5.4	5.1	5.9	4.3	4.3	5.6	5.6
1/17	3.9	3.3	4.1	4.2	4.9	5.3	5.0	5.7	4.3	4.2	5.4	5.5
1/18	3.7	3.3	3.9	4.0	4.6	5.0	4.8	5.4	4.2	4.1	5.2	5.2
1/19	3.5	3.3	3.8	3.9	4.5	4.9	4.6	5.2	4.2	4.1	5.1	5.0
1/20	3.4	3.3	3.7	3.8	4.3	4.7	4.5	5.0	4.1	4.2	4.9	4.8
1/21	3.3	3.3	3.7	3.7	4.2	4.6	4.4	4.9	4.1	4.1	4.8	4.7
1/22	3.3	3.3	3.7	3.7	4.2	4.6	4.3	4.9	4.0	4.1	4.8	4.7
1/23	3.4	3.3	3.7	3.8	4.2	4.6	4.3	4.9	4.0	4.2	4.9	4.8
1/24	3.4	3.3	3.8	3.8	4.3	4.7	4.4	5.1	4.1	4.3	5.1	5.0
1/25	3.5	3.4	3.8	3.9	4.4	4.8	4.5	5.2	4.2	4.5	5.3	5.2
1/26	3.3	3.4	3.8	3.8	4.4	4.7	4.4	5.2	4.3	4.4	5.4	5.2
1/27	3.1	3.3	3.6	3.7	4.2	4.4	4.2	5.0	4.1	4.2	5.1	5.0
1/28	2.9	3.3	3.6	3.6	4.0	4.3	4.1	4.7	4.0	4.1	4.9	4.8
1/29	2.7	3.2	3.5	3.5	3.8	4.1	3.9	4.5	4.0	4.0	4.7	4.6
1/30	2.5	3.2	3.3	3.3	3.6	3.9	3.8	4.3	3.8	3.9	4.5	4.4
1/31	2.4	3.1	3.3	3.2	3.5	3.8	3.6	4.1	3.6	3.7	4.3	4.2

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
2/1	2.4	3.1	3.2	3.2	3.4	3.7	3.5	4.0	3.4	3.5	4.2	4.1
2/2	2.5	3.1	3.3	3.3	3.5	3.8	3.6	4.1	3.4	3.5	4.2	4.1
2/3	2.8	3.1	3.5	3.5	3.8	4.1	3.8	4.4	3.5	3.7	4.5	4.4
2/4	2.9	3.2	3.6	3.7	4.0	4.3	4.0	4.6	3.7	3.8	4.8	4.7
2/5	3.1	3.2	3.8	3.8	4.2	4.5	4.2	4.8	3.9	4.0	4.9	4.8
2/6	3.3	3.3	3.9	4.0	4.5	4.7	4.4	5.0	4.1	4.2	5.1	5.0
2/7	3.4	3.4	4.1	4.2	4.8	5.0	4.7	5.3	4.2	4.4	5.3	5.2
2/8	3.5	3.4	4.1	4.3	4.9	5.2	4.8	5.4	4.3	4.5	5.4	5.3
2/9	3.5	3.4	4.2	4.3	5.0	5.3	4.9	5.5	4.3	4.6	5.5	5.3
2/10	3.6	3.5	4.2	4.3	5.0	5.3	4.9	5.5	4.4	4.6	5.5	5.4
2/11	3.6	3.4	4.0	4.2	4.9	5.2	4.8	5.4	4.2	4.6	5.4	5.3
2/12	3.5	3.4	4.0	4.1	4.7	5.1	4.7	5.3	4.1	4.5	5.4	5.3
2/13	3.3	3.4	3.9	4.0	4.6	4.9	4.6	5.1	4.0	4.4	5.4	5.2
2/14	3.2	3.4	3.8	3.9	4.4	4.7	4.4	5.0	4.0	4.4	5.3	5.2
2/15	3.0	3.4	3.7	3.8	4.2	4.6	4.3	4.9	4.0	4.3	5.2	5.1
2/16	2.8	3.4	3.6	3.7	4.1	4.4	4.2	4.8	4.1	4.3	5.2	5.1
2/17	2.7	3.3	3.6	3.7	4.1	4.4	4.3	4.8	4.3	4.4	5.2	5.1
2/18	2.7	3.3	3.7	3.7	4.2	4.5	4.4	4.9	4.5	4.6	5.2	5.1
2/19	2.7	3.3	3.7	3.8	4.3	4.6	4.5	5.0	4.6	4.7	5.2	5.1
2/20	2.5	3.3	3.6	3.6	4.2	4.5	4.4	4.9	4.6	4.7	5.0	5.0
2/21	2.2	3.2	3.4	3.4	3.9	4.2	4.2	4.7	4.5	4.5	4.6	4.7
2/22	2.1	3.1	3.3	3.3	3.8	4.0	4.0	4.5	4.3	4.3	4.4	4.4
2/23	2.0	3.0	3.2	3.2	3.6	3.9	3.9	4.3	4.1	4.2	4.2	4.2
2/24	1.9	3.0	3.1	3.0	3.4	3.7	3.7	4.1	3.8	3.9	4.0	4.0
2/25	1.8	2.9	2.9	2.8	3.1	3.4	3.4	3.8	3.5	3.6	3.8	3.9
2/26	1.7	2.8	2.8	2.7	2.9	3.2	3.1	3.7	3.3	3.4	3.8	3.9
2/27	1.7	2.8	2.9	2.7	2.9	3.2	3.1	3.6	3.2	3.4	4.0	4.2
2/28	1.7	2.9	2.9	2.7	2.9	3.2	3.1	3.7	3.2	3.5	4.1	4.3

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
3/1	1.6	2.9	2.9	2.8	2.9	3.2	3.0	3.7	3.2	3.5	4.2	4.4
3/2	1.7	2.9	2.9	2.8	3.0	3.3	3.1	3.8	3.2	3.5	4.4	4.5
3/3	1.8	2.9	3.0	2.9	3.1	3.4	3.1	3.9	3.2	3.6	4.7	4.8
3/4	1.9	3.0	3.1	3.0	3.3	3.6	3.2	4.0	3.2	3.7	5.0	5.0
3/5	2.0	3.0	3.1	3.1	3.4	3.8	3.2	4.1	3.3	3.7	5.2	4.9
3/6	2.2	3.0	3.2	3.2	3.5	4.0	3.3	4.2	3.3	3.8	5.3	4.9
3/7	2.4	2.9	3.2	3.3	3.7	4.2	3.4	4.3	3.4	3.9	5.6	5.1
3/8	2.5	2.9	3.3	3.4	3.8	4.4	3.6	4.5	3.5	4.1	5.9	5.4
3/9	2.6	2.9	3.3	3.4	3.9	4.4	3.7	4.6	3.6	4.2	6.0	5.5
3/10	2.6	2.9	3.2	3.4	3.8	4.4	3.7	4.6	3.7	4.2	5.9	5.4
3/11	2.6	2.9	3.3	3.4	3.9	4.4	3.9	4.7	3.8	4.4	6.1	5.6
3/12	2.6	2.9	3.3	3.5	4.0	4.4	3.9	4.8	3.9	4.5	6.2	5.7
3/13	2.7	2.9	3.3	3.5	4.0	4.4	4.0	4.9	4.0	4.6	6.3	5.9
3/14	2.9	2.9	3.4	3.7	4.2	4.6	4.1	5.0	4.1	4.8	6.7	6.2
3/15	3.1	3.0	3.5	3.8	4.3	4.7	4.2	5.1	4.2	4.9	7.0	6.4
3/16	3.2	3.1	3.6	3.9	4.5	4.9	4.3	5.2	4.3	5.1	7.2	6.7
3/17	3.4	3.1	3.7	4.0	4.6	5.0	4.5	5.3	4.4	5.2	7.4	6.9
3/18	3.5	3.2	3.8	4.2	4.7	5.2	4.6	5.5	4.6	5.4	7.7	7.1
3/19	3.7	3.3	3.9	4.3	4.8	5.3	4.7	5.6	4.7	5.5	7.9	7.3
3/20	3.7	3.4	4.0	4.4	4.9	5.4	4.7	5.7	4.9	5.7	8.0	7.4
3/21	3.6	3.4	3.9	4.3	4.9	5.3	4.7	5.7	4.9	5.7	7.8	7.3
3/22	3.5	3.5	4.0	4.3	4.8	5.2	4.7	5.6	4.9	5.7	7.6	7.2
3/23	3.5	3.5	4.0	4.3	4.7	5.1	4.6	5.5	4.9	5.7	7.4	7.0
3/24	3.6	3.6	4.1	4.4	4.8	5.2	4.7	5.5	4.9	5.9	7.5	7.2
3/25	3.6	3.7	4.1	4.4	4.8	5.2	4.6	5.4	4.9	5.9	7.4	7.1
3/26	3.6	3.7	4.1	4.4	4.8	5.2	4.6	5.4	4.9	5.9	7.3	7.1
3/27	3.8	3.8	4.2	4.6	5.0	5.4	4.7	5.6	5.0	6.1	7.5	7.2
3/28	3.8	3.9	4.4	4.7	5.1	5.5	4.8	5.7	5.1	6.1	7.6	7.3
3/29	3.8	4.0	4.3	4.6	5.1	5.5	4.8	5.7	5.2	6.1	7.5	7.2
3/30	3.7	4.0	4.3	4.6	5.0	5.4	4.8	5.7	5.2	6.1	7.5	7.2
3/31	3.6	4.0	4.3	4.5	4.9	5.3	4.8	5.6	5.1	6.0	7.4	7.1

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
4/1	3.6	4.0	4.3	4.6	5.0	5.3	4.8	5.6	5.1	6.1	7.5	7.1
4/2	3.5	4.0	4.3	4.6	5.0	5.3	4.9	5.6	5.2	6.1	7.5	7.1
4/3	3.5	4.1	4.3	4.6	4.9	5.3	4.9	5.6	5.2	6.0	7.5	7.1
4/4	3.6	4.2	4.4	4.6	5.0	5.4	5.0	5.7	5.3	6.2	7.6	7.2
4/5	3.7	4.3	4.5	4.8	5.1	5.5	5.1	5.8	5.4	6.2	7.7	7.3
4/6	3.8	4.4	4.6	4.9	5.4	5.7	5.3	6.1	5.7	6.4	7.8	7.4
4/7	3.7	4.5	4.7	5.0	5.5	5.9	5.5	6.3	5.9	6.5	7.7	7.4
4/8	3.6	4.6	4.7	5.0	5.4	5.8	5.5	6.3	6.0	6.4	7.4	7.2
4/9	3.6	4.6	4.7	5.0	5.5	5.7	5.6	6.4	6.1	6.5	7.2	7.0
4/10	3.6	4.6	4.7	5.0	5.5	5.8	5.6	6.5	6.1	6.5	6.9	6.9
4/11	3.7	4.6	4.8	5.2	5.7	5.9	5.7	6.6	6.2	6.7	7.0	7.0
4/12	3.8	4.6	4.8	5.2	5.7	6.0	5.8	6.6	6.2	6.7	7.0	7.0
4/13	3.9	4.6	4.9	5.2	5.8	6.1	5.8	6.6	6.2	6.8	7.0	7.1
4/14	4.0	4.6	4.9	5.3	5.8	6.1	5.8	6.6	6.2	6.9	7.2	7.2
4/15	4.1	4.6	4.9	5.3	5.8	6.2	5.8	6.7	6.2	7.0	7.3	7.4
4/16	4.1	4.6	4.9	5.3	5.8	6.2	5.8	6.6	6.2	7.0	7.3	7.4
4/17	4.1	4.7	5.0	5.3	5.8	6.2	5.8	6.6	6.1	6.9	7.3	7.3
4/18	4.0	4.7	4.9	5.2	5.7	6.1	5.7	6.5	6.1	6.8	7.1	7.1
4/19	4.1	4.8	5.0	5.3	5.8	6.2	5.8	6.6	6.2	7.0	7.3	7.3
4/20	4.1	4.8	5.1	5.4	5.9	6.3	5.9	6.7	6.3	7.1	7.4	7.3
4/21	4.1	5.0	5.2	5.5	5.9	6.3	6.0	6.9	6.5	7.2	7.5	7.5
4/22	4.3	5.2	5.5	5.9	6.4	6.7	6.4	7.2	6.8	7.5	7.8	7.8
4/23	4.5	5.2	5.7	6.1	6.7	7.0	6.6	7.6	7.1	7.8	8.2	8.2
4/24	4.7	5.3	6.0	6.6	7.3	7.7	7.0	8.1	7.5	8.4	8.6	8.7
4/25	4.9	5.5	6.3	7.1	8.0	8.4	7.5	8.7	7.7	8.7	8.9	9.0
4/26	5.1	5.6	6.5	7.5	8.6	9.0	8.0	9.2	7.7	9.0	9.0	9.1
4/27	5.2	5.6	6.6	7.7	9.0	9.4	8.2	9.5	7.8	9.1	9.0	9.1
4/28	5.3	5.6	6.7	7.8	9.2	9.6	8.2	9.7	7.8	9.0	8.9	9.0
4/29	5.4	5.7	6.9	8.0	9.5	10.0	8.4	9.9	7.7	8.9	8.9	9.0
4/30	5.6	5.8	7.1	8.4	10.1	10.5	8.7	10.2	7.6	8.9	8.9	8.9

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
5/1	5.5	5.9	7.0	8.2	10.0	10.4	8.6	10.2	7.5	8.5	8.6	8.7
5/2	5.3	6.0	6.9	7.9	9.6	10.0	8.3	9.9	7.4	8.2	8.2	8.3
5/3	5.2	6.0	6.8	7.6	9.2	9.6	8.1	9.6	7.4	7.9	8.0	8.1
5/4	5.3	6.0	6.9	7.6	9.2	9.6	8.1	9.5	7.4	7.9	8.0	8.0
5/5	5.6	6.1	7.0	7.8	9.4	10.0	8.4	9.8	7.4	8.0	8.2	8.3
5/6	5.5	6.0	6.9	7.6	9.1	9.7	8.2	9.6	7.5	8.1	8.0	8.1
5/7	5.5	6.0	6.8	7.5	9.0	9.5	8.2	9.6	7.6	8.2	8.1	8.2
5/8	5.9	6.1	7.1	7.8	9.3	9.9	8.5	9.7	7.7	8.5	8.3	8.3
5/9	6.3	6.3	7.4	8.3	10.0	10.6	8.8	10.2	7.9	8.8	8.8	8.8
5/10	6.7	6.3	7.4	8.3	10.2	10.8	8.9	10.4	8.3	9.2	9.2	9.3
5/11	7.1	6.5	7.6	8.7	10.8	11.3	9.1	10.7	8.5	9.5	9.6	9.6
5/12	7.3	6.6	7.9	9.0	11.1	11.6	9.2	10.9	8.7	9.7	9.6	9.6
5/13	7.8	6.6	8.2	9.5	11.8	12.4	9.4	11.4	8.9	10.1	9.9	9.9
5/14	8.0	6.7	8.3	9.7	12.1	12.8	9.5	11.6	9.1	10.4	10.0	10.0
5/15	8.2	6.7	8.4	9.9	12.3	13.1	9.4	11.8	9.3	10.7	10.0	10.1
5/16	8.5	6.6	8.4	10.0	12.5	13.4	9.4	12.0	9.6	11.1	10.2	10.2
5/17	8.8	6.7	8.7	10.4	13.1	14.2	9.5	12.3	9.6	11.5	10.3	10.3
5/18	8.7	6.7	8.5	10.1	12.9	13.9	9.5	12.1	9.7	11.5	10.3	10.4
5/19	8.5	6.6	8.2	9.7	12.4	13.3	9.3	11.6	9.6	11.3	10.2	10.3
5/20	8.2	6.6	7.9	9.2	11.8	12.6	9.0	11.2	9.4	11.1	10.1	10.1
5/21	8.1	6.5	7.6	8.8	11.2	12.0	8.7	10.8	9.2	10.8	10.1	10.1
5/22	8.1	6.5	7.6	8.7	11.0	11.8	8.7	10.7	9.2	10.8	10.3	10.3
5/23	8.1	6.5	7.5	8.6	10.9	11.7	8.6	10.6	9.2	10.8	10.5	10.5
5/24	8.1	6.6	7.5	8.6	10.9	11.6	8.6	10.6	9.2	10.8	10.6	10.7
5/25	8.3	6.6	7.6	8.7	10.9	11.8	8.6	10.7	9.3	11.0	10.8	10.9
5/26	8.8	6.8	7.8	9.2	11.5	12.3	8.7	10.8	9.4	11.2	11.3	11.3
5/27	9.0	6.9	7.9	9.2	11.7	12.4	9.0	10.9	9.5	11.3	11.7	11.7
5/28	9.0	6.9	7.9	9.2	11.8	12.5	9.0	11.0	9.6	11.3	11.8	11.8
5/29	9.0	6.9	7.9	9.2	11.6	12.4	8.9	10.8	9.5	11.3	11.9	11.9
5/30	9.1	6.9	7.9	9.2	11.6	12.3	8.9	10.8	9.5	11.2	12.0	12.0
5/31	9.2	6.8	7.9	9.3	11.7	12.4	9.0	10.8	9.6	11.4	12.2	12.2

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
6/1	9.4	6.8	8.1	9.6	12.1	12.8	9.0	11.1	9.8	11.7	12.5	12.6
6/2	9.4	6.7	8.1	9.6	12.3	13.2	9.3	11.5	10.1	12.1	12.8	12.8
6/3	9.9	6.7	8.3	10.1	12.9	13.9	9.3	11.9	10.4	12.6	13.2	13.2
6/4	10.4	6.7	8.5	10.6	13.5	14.5	9.5	12.2	10.6	12.9	13.7	13.8
6/5	10.7	6.6	8.5	10.7	14.0	15.1	10.0	12.4	11.0	13.1	14.1	14.2
6/6	10.6	6.4	8.3	10.4	13.7	14.7	10.3	12.4	11.1	13.0	14.2	14.2
6/7	10.3	6.2	7.9	9.8	12.9	14.0	10.4	12.3	11.2	12.8	13.8	13.9
6/8	10.4	6.0	7.6	9.3	12.3	13.3	10.5	12.2	11.3	12.8	13.7	13.7
6/9	10.6	6.6	8.1	9.6	12.4	13.4	11.0	12.6	11.7	13.2	14.0	14.0
6/10	10.5	7.0	8.3	9.6	12.1	12.9	11.0	12.5	11.7	13.1	14.2	14.1
6/11	10.2	7.6	8.5	9.4	11.8	12.6	11.3	12.2	11.7	12.8	13.9	13.8
6/12	10.1	8.3	9.0	9.8	11.7	12.4	11.2	12.3	11.8	13.0	13.8	13.8
6/13	10.2	9.0	9.7	10.4	12.2	12.8	11.1	12.4	11.8	13.2	13.9	13.8
6/14	10.3	9.8	10.4	11.0	12.7	13.2	11.2	12.4	11.7	13.1	14.1	14.1
6/15	9.9	10.6	10.9	11.4	13.0	13.5	11.2	12.3	11.6	13.0	14.1	14.1
6/16	9.2	10.5	10.7	11.2	12.5	12.9	10.9	11.7	11.2	12.4	13.4	13.4
6/17	8.8	10.6	10.7	11.1	12.3	12.6	11.0	11.6	11.2	12.2	12.7	12.7
6/18	8.7	10.6	10.8	11.3	12.1	12.5	10.9	11.8	11.2	12.4	12.6	12.6
6/19	8.7	10.7	10.9	11.4	12.3	12.7	11.2	12.0	11.3	12.4	12.7	12.7
6/20	8.9	10.7	11.1	11.7	12.8	13.2	11.5	12.4	11.5	12.7	13.1	13.0
6/21	9.2	10.8	11.4	12.2	13.5	13.9	11.7	12.8	11.8	13.2	13.6	13.5
6/22	9.8	10.9	11.7	12.8	14.4	14.8	12.0	13.4	12.0	13.7	14.3	14.2
6/23	10.5	11.0	12.2	13.5	15.4	16.0	12.4	14.0	12.4	14.2	15.3	15.1
6/24	11.2	11.1	12.5	14.1	16.4	16.9	12.6	14.6	12.6	14.7	16.2	16.0
6/25	12.0	11.1	12.7	14.5	17.4	18.0	12.7	15.0	12.8	15.0	17.3	17.0
6/26	12.5	11.0	12.6	14.8	17.9	18.4	12.6	15.1	12.8	15.0	17.9	17.5
6/27	12.9	10.9	12.5	14.7	18.1	18.7	12.5	15.2	12.7	15.0	18.4	17.9
6/28	13.1	10.9	12.2	14.6	18.1	18.9	12.5	15.2	12.7	14.9	18.8	18.2
6/29	13.3	10.9	12.0	14.4	18.0	18.8	12.3	15.2	12.6	14.9	19.0	18.3
6/30	13.6	10.8	11.7	14.3	17.9	18.7	12.2	15.1	12.5	14.7	19.2	18.5

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
7/1	13.8	10.7	11.5	14.1	17.9	18.9	12.2	15.2	12.5	14.8	19.7	18.8
7/2	14.0	10.8	11.5	14.2	17.8	18.8	12.2	15.2	12.6	14.8	19.9	19.0
7/3	14.2	10.9	11.6	14.1	17.7	18.8	12.3	15.2	12.6	14.8	20.1	19.1
7/4	14.3	11.0	11.6	14.1	17.6	18.7	12.3	15.2	12.6	14.8	20.1	19.1
7/5	14.5	11.0	11.7	14.1	17.6	18.5	12.3	15.1	12.6	14.6	20.2	19.1
7/6	14.6	10.9	11.8	13.9	17.5	18.4	12.2	14.9	12.6	14.5	20.2	19.0
7/7	14.4	10.9	11.7	13.6	16.9	17.8	12.1	14.6	12.5	14.3	20.0	18.8
7/8	14.1	10.9	11.7	13.4	16.6	17.4	12.1	14.4	12.5	14.2	19.9	18.7
7/9	14.0	10.9	11.7	13.3	16.5	17.2	12.1	14.3	12.5	14.2	19.8	18.6
7/10	13.9	11.0	11.7	13.2	16.5	17.1	12.1	14.3	12.5	14.3	19.8	18.5
7/11	13.9	11.0	11.8	13.3	16.6	17.2	12.1	14.3	12.5	14.5	19.9	18.6
7/12	13.9	10.8	11.7	13.3	16.8	17.5	12.1	14.5	12.5	14.6	20.2	18.8
7/13	14.1	10.7	11.6	13.3	16.8	17.6	12.0	14.6	12.4	14.7	20.6	19.0
7/14	14.2	10.5	11.4	13.2	16.9	17.8	11.9	14.5	12.3	14.5	20.8	19.2
7/15	14.6	10.4	11.3	13.2	17.1	18.0	11.9	14.5	12.3	14.5	20.9	19.2
7/16	14.8	10.4	11.2	13.3	17.1	18.1	11.8	14.6	12.2	14.4	21.2	19.3
7/17	15.0	10.2	11.1	13.2	17.1	18.1	11.8	14.5	12.1	14.3	21.4	19.5
7/18	15.2	10.2	10.9	13.0	17.0	18.1	11.6	14.5	12.0	14.1	21.5	19.4
7/19	15.2	10.3	10.9	13.0	16.9	18.0	11.7	14.4	12.0	14.1	21.6	19.4
7/20	15.4	10.4	11.0	13.1	17.1	18.1	11.8	14.5	12.1	14.2	21.8	19.5
7/21	15.4	10.5	11.1	13.3	17.0	18.0	11.9	14.6	12.2	14.1	21.9	19.6
7/22	15.3	10.5	11.2	13.2	16.8	17.8	11.9	14.5	12.1	14.0	21.8	19.5
7/23	15.1	10.5	11.2	13.2	16.6	17.6	12.0	14.4	12.1	13.9	21.6	19.3
7/24	14.8	10.6	11.1	12.9	16.3	17.2	11.8	14.2	12.0	13.8	21.4	19.1
7/25	14.7	10.7	11.2	12.9	16.1	17.0	11.8	14.1	11.9	13.8	21.3	19.0
7/26	14.5	10.8	11.2	12.8	15.9	16.8	11.8	14.1	11.8	13.8	21.1	18.9
7/27	14.2	10.8	11.1	12.6	15.6	16.5	11.7	13.9	11.8	13.7	20.9	18.7
7/28	14.3	11.0	11.2	12.9	16.0	16.8	11.8	14.1	11.8	14.1	20.9	No data
7/29	14.5	11.2	11.4	13.1	16.3	17.0	11.9	14.3	11.9	14.3	21.1	No data
7/30	14.5	11.4	11.4	13.1	16.4	17.1	12.0	14.5	12.0	14.3	21.3	No data
7/31	14.6	11.5	11.6	13.4	16.7	17.4	12.2	14.8	12.2	14.4	21.3	No data

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
8/1	14.6	11.6	11.7	13.5	16.7	17.5	12.4	14.9	12.3	14.5	21.4	No data
8/2	14.5	11.7	11.8	13.4	16.4	17.1	12.5	14.7	12.4	14.3	21.3	No data
8/3	14.5	11.8	12.0	13.6	16.5	17.2	12.6	14.8	12.6	14.2	21.1	No data
8/4	14.5	11.9	12.1	13.5	16.3	17.0	12.7	14.7	12.7	14.1	21.0	No data
8/5	14.6	12.0	12.3	13.7	16.3	17.0	12.8	14.7	12.8	14.1	20.9	18.4
8/6	14.5	12.1	12.3	13.5	15.9	16.6	12.8	14.5	12.9	13.9	20.7	18.2
8/7	14.3	12.1	12.4	13.4	15.5	16.2	12.8	14.3	12.9	13.9	20.3	17.9
8/8	14.2	12.2	12.5	13.5	15.5	16.0	12.9	14.3	13.0	13.9	20.1	17.9
8/9	14.4	12.4	12.8	13.9	15.9	16.5	13.1	14.6	13.1	14.4	20.2	18.0
8/10	14.5	12.5	13.0	14.1	16.2	16.7	13.3	14.9	13.2	14.7	20.6	18.4
8/11	14.7	12.7	13.3	14.6	16.6	17.2	13.6	15.2	13.5	15.1	21.1	18.8
8/12	15.0	12.8	13.5	14.8	17.0	17.6	13.9	15.5	13.7	15.4	21.6	19.2
8/13	15.4	13.1	13.7	15.3	17.6	18.3	14.2	16.0	13.9	15.9	22.2	19.7
8/14	15.8	13.3	13.9	15.7	18.2	18.9	14.5	16.4	14.2	16.3	22.8	20.2
8/15	16.1	13.5	14.0	15.6	18.3	19.1	14.7	16.6	14.4	16.4	23.1	20.4
8/16	16.1	13.8	14.1	15.7	18.3	18.9	14.8	16.6	14.5	16.5	23.1	20.4
8/17	16.0	13.9	14.2	15.6	18.1	18.7	14.9	16.6	14.6	16.4	22.7	20.2
8/18	15.7	14.1	14.1	15.5	17.7	18.3	14.8	16.4	14.7	16.2	22.1	19.8
8/19	15.2	14.2	14.1	15.3	17.2	17.7	14.7	16.2	14.6	16.0	21.4	19.2
8/20	14.7	14.2	14.1	15.1	16.8	17.2	14.7	16.0	14.7	15.9	20.6	18.7
8/21	14.3	14.3	14.2	15.1	16.5	16.9	14.7	15.8	14.6	15.9	20.0	18.3
8/22	13.9	14.5	14.4	15.2	16.4	16.7	14.8	15.7	14.7	15.9	19.5	18.0
8/23	13.9	14.5	14.6	15.4	16.5	16.8	14.9	15.9	14.8	16.1	19.4	18.0
8/24	14.0	14.7	14.8	15.7	16.7	17.0	15.2	16.0	15.0	16.3	19.6	18.2
8/25	14.1	14.7	14.9	15.7	16.6	16.9	15.3	16.1	15.1	16.3	19.7	18.3
8/26	14.1	14.9	15.1	15.7	16.5	16.8	15.4	16.1	15.1	16.3	19.5	18.1
8/27	14.1	15.0	15.2	15.8	16.6	16.8	15.5	16.1	15.2	16.3	19.5	18.1
8/28	14.1	15.1	15.2	15.8	16.5	16.7	15.6	16.1	15.4	16.3	19.3	18.0
8/29	14.1	15.2	15.3	15.9	16.5	16.8	15.8	16.3	15.5	16.5	19.4	18.1
8/30	14.0	15.3	15.4	15.9	16.5	16.7	16.0	16.3	15.6	16.6	19.4	18.2
8/31	13.7	15.4	15.4	15.7	16.2	16.3	15.9	16.3	15.6	16.3	19.2	18.0

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
9/1	13.3	15.4	15.4	15.7	16.2	16.3	16.0	16.2	15.6	16.4	18.7	17.7
9/2	13.2	15.5	15.5	15.9	16.3	16.4	16.1	16.3	15.7	16.7	18.8	17.9
9/3	13.1	15.6	15.6	16.0	16.4	16.5	16.3	16.3	15.8	16.8	18.9	18.0
9/4	13.0	15.7	15.6	16.0	16.4	16.6	16.4	16.3	15.8	16.9	18.8	18.0
9/5	12.9	15.7	15.7	16.0	16.4	16.5	16.4	16.2	15.8	16.9	18.8	18.0
9/6	12.7	15.8	15.7	16.1	16.3	16.4	16.3	16.1	15.8	16.9	18.6	17.9
9/7	12.7	15.9	15.8	16.2	16.4	16.6	16.5	16.1	15.9	17.2	18.5	17.9
9/8	12.7	16.0	15.9	16.4	16.6	16.8	16.7	16.3	16.0	17.4	18.7	18.1
9/9	12.7	16.1	16.0	16.5	16.6	16.8	16.8	16.4	16.1	17.3	18.7	18.0
9/10	12.8	16.1	16.1	16.6	16.7	16.9	16.8	16.4	16.1	17.4	18.7	18.1
9/11	12.8	16.2	16.2	16.7	16.7	16.9	16.8	16.5	16.2	17.4	18.8	18.1
9/12	12.7	15.6	15.7	16.2	16.6	16.8	16.7	16.5	16.3	17.5	18.9	18.2
9/13	12.8	15.0	15.1	15.7	16.2	16.4	16.5	16.5	16.3	17.4	18.8	18.1
9/14	12.7	14.3	14.5	15.0	15.6	15.8	16.2	16.3	16.1	17.2	18.6	17.9
9/15	12.6	13.6	13.9	14.3	15.0	15.3	15.9	16.0	16.1	17.1	18.5	17.8
9/16	12.3	12.9	13.2	13.7	14.4	14.7	15.6	15.7	15.9	16.9	18.3	17.6
9/17	12.1	12.2	12.5	13.0	13.7	14.0	15.2	15.4	15.7	16.6	17.8	17.2
9/18	12.1	11.5	11.8	12.3	13.1	13.4	14.8	15.0	15.4	16.3	17.4	16.9
9/19	12.0	11.5	11.7	12.1	12.6	12.9	14.5	14.7	14.9	16.1	17.0	16.6
9/20	11.9	11.5	11.7	12.0	12.4	12.7	14.2	14.4	14.5	15.8	16.6	16.2
9/21	11.8	11.5	11.7	12.0	12.3	12.5	13.9	14.1	14.1	15.6	16.1	15.8
9/22	11.6	11.7	11.8	12.0	12.2	12.4	13.8	13.8	13.8	15.5	15.7	15.4
9/23	11.6	11.7	11.8	12.0	12.2	12.3	13.7	13.7	13.6	15.3	15.4	15.2
9/24	11.5	11.8	11.8	12.0	12.1	12.2	13.6	13.6	13.3	15.2	15.0	15.0
9/25	11.0	11.7	11.7	11.9	12.0	12.1	13.4	13.4	13.1	14.9	14.5	14.5
9/26	10.4	11.6	11.5	11.7	11.8	11.9	13.2	13.2	13.1	14.6	13.9	13.9
9/27	9.9	11.4	11.3	11.5	11.6	11.7	13.0	13.0	13.1	14.4	13.5	13.5
9/28	9.4	11.2	11.1	11.4	11.5	11.6	12.9	12.8	13.1	14.2	13.1	13.3
9/29	9.0	10.9	10.9	11.2	11.3	11.5	12.8	12.8	13.0	13.9	12.8	13.0
9/30	8.9	11.0	10.9	11.2	11.2	11.4	12.7	12.7	13.0	13.7	12.7	12.8

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
10/1	8.8	11.1	11.1	11.4	11.3	11.5	12.7	12.7	13.1	13.7	12.7	12.8
10/2	8.9	11.3	11.3	11.6	11.6	11.8	12.8	12.8	13.2	13.7	12.9	13.0
10/3	9.2	11.7	11.7	12.0	11.9	12.0	13.0	13.0	13.4	13.9	13.3	13.3
10/4	9.4	12.0	12.1	12.3	12.2	12.3	13.2	13.3	13.6	14.1	13.7	13.7
10/5	9.8	12.4	12.5	12.6	12.5	12.6	13.4	13.6	13.7	14.3	14.1	14.0
10/6	9.9	12.7	12.8	12.9	12.8	12.9	13.6	13.8	13.9	14.5	14.4	14.3
10/7	10.0	12.8	12.9	13.1	13.0	13.1	13.8	13.9	14.0	14.5	14.5	14.4
10/8	9.9	12.8	12.8	13.0	13.0	13.0	13.8	13.9	14.0	14.5	14.4	14.4
10/9	9.7	12.7	12.7	12.9	12.8	12.8	13.7	13.8	13.9	14.4	14.3	14.2
10/10	9.6	12.6	12.6	12.8	12.7	12.7	13.7	13.7	13.8	14.3	14.0	14.0
10/11	9.4	12.5	12.5	12.7	12.6	12.6	13.6	13.6	13.7	14.2	13.6	13.7
10/12	9.3	12.5	12.4	12.5	12.4	12.5	13.4	13.4	13.6	14.0	13.2	13.4
10/13	9.2	12.4	12.4	12.4	12.3	12.4	13.3	13.3	13.5	13.9	13.0	13.2
10/14	9.1	12.2	12.1	12.3	12.2	12.3	13.1	13.2	13.3	13.8	12.8	13.0
10/15	9.1	12.1	12.0	12.1	12.1	12.2	13.0	13.2	13.3	13.7	12.8	12.9
10/16	9.3	12.0	12.0	12.1	12.1	12.3	13.0	13.2	13.3	13.7	12.8	13.0
10/17	9.4	11.8	11.8	12.0	12.1	12.3	12.9	13.2	13.2	13.7	12.8	12.9
10/18	9.4	11.7	11.7	11.9	12.0	12.2	12.8	13.0	13.1	13.5	12.8	12.9
10/19	9.4	11.4	11.5	11.7	11.9	12.1	12.7	12.9	13.0	13.4	12.7	12.8
10/20	9.3	11.2	11.3	11.5	11.7	11.9	12.5	12.8	12.8	13.2	12.7	12.7
10/21	9.1	11.1	11.2	11.3	11.5	11.7	12.4	12.6	12.7	13.0	12.6	12.7
10/22	8.8	11.0	11.0	11.1	11.2	11.3	12.2	12.3	12.4	12.8	12.3	12.4
10/23	8.5	10.7	10.7	10.8	10.8	10.9	11.9	11.9	12.1	12.4	11.9	12.0
10/24	7.8	10.5	10.5	10.4	10.3	10.3	11.6	11.5	11.7	12.0	11.4	11.5
10/25	7.2	10.3	10.1	10.0	9.7	9.7	11.2	11.0	11.3	11.6	10.7	10.9
10/26	6.4	10.0	9.8	9.6	9.1	9.0	10.9	10.5	10.9	11.2	10.0	10.3
10/27	5.8	9.9	9.5	9.3	8.6	8.5	10.5	10.0	10.5	10.7	9.3	9.7
10/28	5.4	9.8	9.5	9.2	8.3	8.2	10.3	9.7	10.2	10.4	8.7	9.1
10/29	5.2	9.7	9.4	9.1	8.2	8.2	10.2	9.6	10.1	10.2	8.3	8.8
10/30	5.4	9.6	9.3	9.1	8.3	8.2	10.1	9.5	10.0	10.1	8.1	8.6
10/31	5.7	9.5	9.3	9.1	8.5	8.4	9.9	9.6	10.0	10.1	8.2	8.6

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
11/1	6.3	9.6	9.4	9.3	8.8	8.8	10.0	9.8	10.1	10.2	8.4	8.8
11/2	6.8	9.5	9.4	9.5	9.2	9.2	10.0	9.9	10.2	10.3	8.7	8.9
11/3	7.3	9.4	9.4	9.5	9.4	9.4	10.0	10.0	10.2	10.4	8.9	9.1
11/4	7.6	9.3	9.2	9.4	9.5	9.5	9.9	10.1	10.2	10.4	9.1	9.2
11/5	7.7	9.2	9.1	9.2	9.4	9.5	9.6	9.9	10.0	10.2	9.2	9.2
11/6	7.5	9.2	9.0	9.1	9.2	9.2	9.4	9.7	9.8	10.0	9.0	9.1
11/7	7.3	9.1	8.9	9.0	9.0	9.1	9.3	9.5	9.6	9.9	8.9	8.9
11/8	7.0	8.9	8.7	8.7	8.8	8.8	9.0	9.3	9.4	9.6	8.6	8.7
11/9	6.8	8.8	8.5	8.5	8.5	8.6	8.8	9.0	9.2	9.4	8.4	8.5
11/10	6.7	8.7	8.4	8.3	8.3	8.5	8.6	8.9	9.0	9.2	8.3	8.3
11/11	6.4	8.5	8.2	8.1	8.1	8.2	8.4	8.6	8.8	9.0	8.0	8.1
11/12	6.2	8.2	8.1	8.0	7.8	8.0	8.2	8.3	8.6	8.8	7.7	7.8
11/13	6.0	7.9	7.8	7.7	8.2	7.7	8.0	8.0	8.4	8.6	7.5	7.6
11/14	5.7	7.8	7.6	7.4	7.3	7.3	7.7	7.6	8.2	8.4	7.2	7.3
11/15	5.5	7.7	7.4	7.3	6.7	7.0	7.5	7.4	8.0	8.2	7.0	7.2
11/16	5.4	7.6	7.3	7.1	6.5	6.8	7.3	7.2	7.9	8.0	6.8	7.0
11/17	5.2	7.4	7.1	6.9	5.6	6.6	7.1	6.9	7.7	7.8	6.6	6.8
11/18	5.2	7.3	7.1	6.9	6.4	6.5	7.0	6.9	7.6	7.7	6.5	6.8
11/19	5.3	7.2	7.1	6.9	6.9	6.7	7.1	7.0	7.5	7.7	6.7	6.9
11/20	5.4	7.2	7.1	6.9	6.5	6.8	7.1	7.1	7.5	7.7	6.8	7.0
11/21	5.3	7.0	7.0	6.9	7.1	6.9	7.1	7.2	7.4	7.5	6.9	7.0
11/22	5.0	6.9	6.8	6.7	7.5	6.6	6.9	6.9	7.2	7.3	6.6	6.8
11/23	4.7	6.7	6.6	6.5	7.1	6.3	6.7	6.6	7.0	7.1	6.3	6.4
11/24	4.5	6.7	6.5	6.3	6.3	6.0	6.6	6.4	6.9	7.0	6.1	6.2
11/25	4.2	6.5	6.3	6.0	4.9	5.6	6.3	6.1	6.8	6.8	5.7	6.0
11/26	3.8	6.4	6.1	5.8	4.7	5.2	6.0	5.7	6.6	6.6	5.2	5.6
11/27	3.5	6.3	6.0	5.6	4.7	4.9	5.9	5.5	6.5	6.5	4.9	5.4
11/28	3.4	6.2	5.9	5.5	4.5	4.8	5.8	5.3	6.4	6.5	4.6	5.2
11/29	3.4	6.2	5.9	5.5	4.6	4.9	5.7	5.4	6.5	6.4	4.5	5.2
11/30	3.4	6.1	5.8	5.5	5.3	5.1	5.8	5.6	6.5	6.5	4.6	5.3

	RM 18.2	RM 15.8	RM 15.5	RM 14.3	RM 11.3	RM 9.8	RM 9.6	RM 4.9	RM 4.4	RM 0.2	Skykomish	Skykomish
	(SFK) 7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	7 Day	Above	Below
DATE	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	Avg Max	7 Day Avg Max	7 Day Avg Max
12/1	3.5	6.1	5.9	5.7	5.0	5.4	5.9	5.8	6.6	6.5	4.7	5.4
12/2	3.8	6.2	6.1	6.0	5.5	6.0	6.3	6.3	6.6	6.7	5.0	5.6
12/3	4.1	6.1	6.3	6.2	5.8	6.4	6.6	6.7	6.6	6.9	5.3	5.8
12/4	4.4	6.1	6.3	6.3	6.7	6.7	6.8	7.0	6.5	6.9	5.6	6.0
12/5	4.6	6.0	6.3	6.3	7.8	6.9	6.8	7.2	6.5	6.9	5.8	6.1
12/6	4.7	5.9	6.3	6.3	7.6	6.9	6.8	7.2	6.4	6.8	5.9	6.1
12/7	4.8	5.9	6.3	6.4	7.3	7.0	6.9	7.3	6.4	6.9	6.1	6.2
12/8	4.8	5.8	6.2	6.3	5.8	7.0	6.9	7.4	6.4	6.8	6.1	6.1
12/9	4.7	5.6	6.0	6.1	5.4	6.8	6.7	7.2	6.3	6.6	6.1	6.1
12/10	4.6	5.5	5.8	5.9	6.6	6.5	6.5	7.0	6.3	6.3	6.0	5.9
12/11	4.5	5.4	5.7	5.8	6.6	6.4	6.3	6.8	6.2	6.2	5.9	5.8
12/12	4.6	5.4	5.7	5.8	6.3	6.4	6.3	6.8	6.1	6.1	5.9	5.8
12/13	4.7	5.4	5.7	5.8	5.9	6.4	6.3	6.8	6.0	6.1	5.9	5.8
12/14	4.7	5.3	5.6	5.7	6.1	6.2	6.2	6.7	5.9	6.0	5.7	5.8
12/15	4.8	5.3	5.5	5.6	5.9	6.1	6.0	6.5	5.7	5.9	5.8	5.7
12/16	5.0	5.3	5.6	5.6	5.5	6.1	6.0	6.5	5.7	5.8	5.8	5.8
12/17	5.0	5.3	5.6	5.7	5.4	6.2	6.0	6.6	5.7	5.8	5.9	5.9
12/18	5.0	5.3	5.5	5.6	5.9	6.1	6.0	6.5	5.7	5.8	5.8	5.9
12/19	5.0	5.3	5.5	5.6	6.3	6.1	5.9	6.4	5.7	5.8	5.8	5.9
12/20	4.9	5.2	5.4	5.5	6.3	6.0	5.8	6.4	5.7	5.8	5.8	5.9
12/21	4.7	5.2	5.4	5.4	5.8	5.9	5.7	6.3	5.6	5.7	5.7	5.8
12/22	4.5	5.1	5.3	5.3	5.6	5.8	5.7	6.2	5.6	5.7	5.5	5.7
12/23	4.4	5.0	5.2	5.2	5.0	5.7	5.6	6.0	5.5	5.6	5.4	5.6
12/24	4.3	5.0	5.1	5.2	4.7	5.6	5.5	5.9	5.5	5.7	5.3	5.5
12/25	4.3	4.9	5.1	5.2	5.3	5.7	5.5	6.0	5.5	5.7	5.3	5.5
12/26	4.5	5.0	5.2	5.3	5.3	5.8	5.6	6.1	5.5	5.8	5.5	5.7
12/27	4.7	5.0	5.3	5.4	5.9	6.0	5.8	6.3	5.5	5.9	5.7	5.8
12/28	5.0	5.0	5.4	5.6	6.1	6.2	5.9	6.6	5.6	6.0	6.0	6.1
12/29	5.0	5.0	5.4	5.6	6.5	6.3	6.0	6.6	5.6	6.0	6.1	6.2
12/30	5.0	5.0	5.4	5.6	6.4	6.3	6.0	6.7	5.6	6.0	6.1	6.2
12/31	5.0	5.0	5.4	5.6	6.3	6.3	5.9	6.6	5.5	6.0	6.1	6.2

APPENDIX E

2023 Water Temperature Technical Memo to Ecology



TECHNICAL MEMORANDUM

TO: WA State Department of Ecology
FROM: Keith Binkley, Manager – Natural Resources, Generation
DATE: December 26, 2023
RE: JHP (FERC No. 2157) – License Article 401: Water temperature monitoring

Water temperature criteria exceedances within the Sultan River during summer 2023

The rationale for this technical memo in advance of the Water Quality Monitoring Plan (WQMP) Annual Report is to document conditions related to exceedances of the Washington Department of Ecology (Ecology) water temperature criteria established for the Sultan River during June, July, August, and September 2023. The request for this document came as a recommendation from Scott Bohling, Ecology's representative on the Aquatic Resource Committee (ARC), during a consultation call on July 25, 2023.

License Compliance Orders

Public Utility District No. 1 of Snohomish County (Snohomish PUD) received a license on September 2, 2011 (License), from the Federal Energy Regulatory Commission (FERC) for the Henry M. Jackson Hydroelectric Project (Project). The FERC approved the WQMP on March 30, 2012, pursuant to License Article 401(a). Snohomish PUD is to file a report with the FERC by June 30 of each year detailing the monitoring efforts of the previous calendar year, pursuant to License Article 401(b).

As described in the 401 Certification Order (Section 9.0, Monitoring and Reporting Requirements), the report includes summaries of the water quality data, and includes sample dates, times, locations, and results. Compliance with Washington State water quality standards is discussed as well. The report will be submitted to the hydropower certification manager at Ecology's Water Quality Program Northwest Regional Office and FERC. This technical memo will also be included as an Appendix to the 2023 WQMP Annual Report upon completion in June 2024.

Background

Construction activity in valve chamber

Located within the valve chamber (inside the base of Culmback Dam) at an elevation of 1,250' Mean Sea Level (MSL), the 10" cone valve, the 48" Howell-Bunger valve, and the 60kW hydro unit provide variable flow volumes to the tail pond at the downstream extent of Culmback Dam (Figure 1). Replacement of these cold-water valves was scheduled to occur during summer 2023 based on receiving approval from the FERC's Portland Regional Office of Dam Safety. From a risk management standpoint, summer was chosen as the preferred season for this project. With active work occurring in the spillway, the risk of spill had to be mitigated and summer provides the most assurance to guard against a spill event.

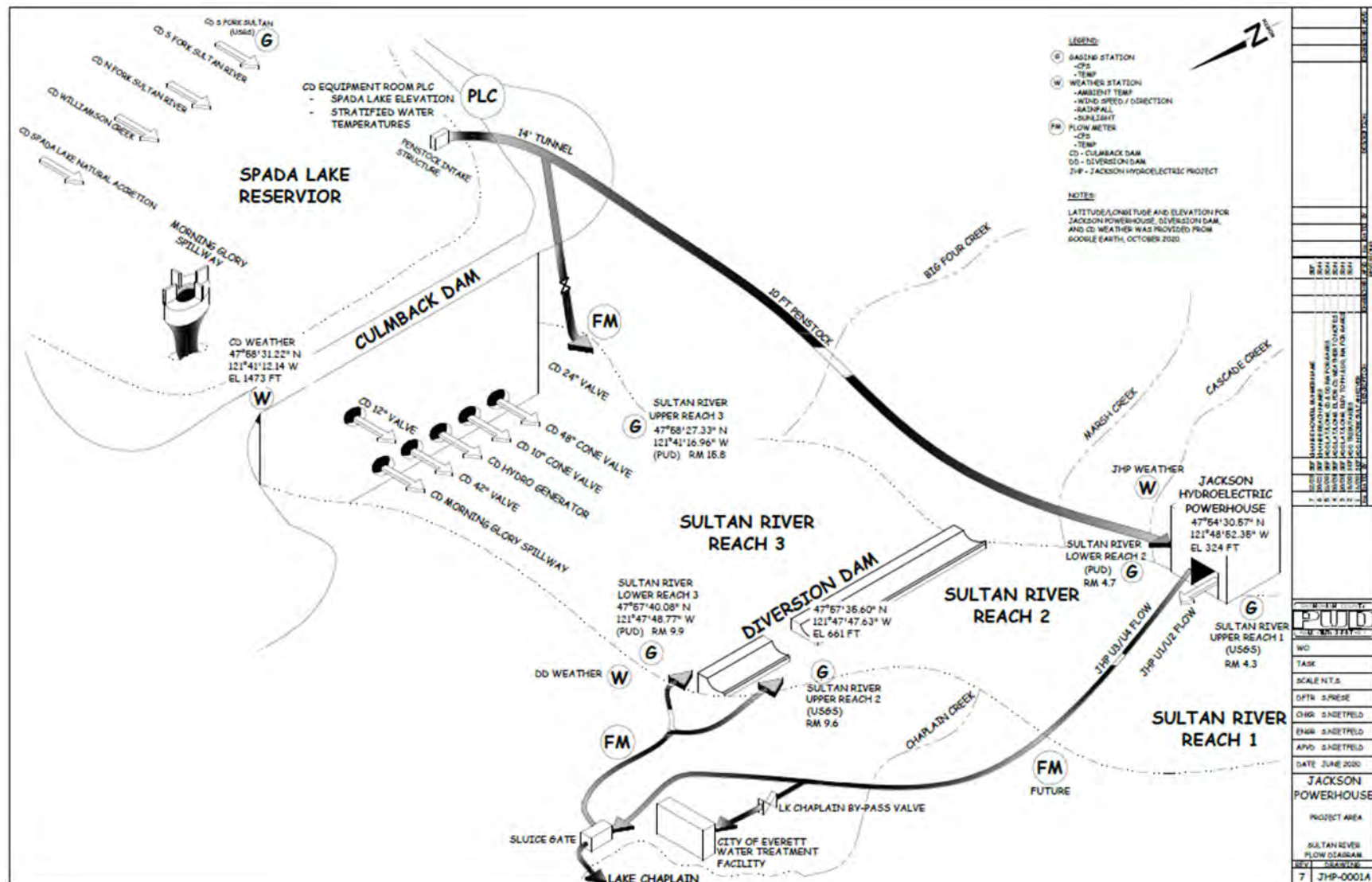


Figure 1. Map of Spada Lake Reservoir, Culmback Dam, and outlet works with Sultan River Reaches and Project Facilities identified.

From a thermal regulation and compliance perspective, project implications would preclude the use of these three valves during construction and thus limit the availability of the coldest water source for delivery to the 6.4-mile bypass reach between Culmback Dam at River Mile (RM) 16.1 and the Diversion Dam at RM 9.7 (Reach 3). The original timeline for project completion and a return to normal service was scheduled for the first week of August. However, due to unanticipated circumstances and resultant project delays, use of the cold-water valves was not restored until September 14, 2023.

Background on Reach 3 Water Temperature Control

Water temperatures in Reach 3 are managed seasonally when Spada Lake Reservoir is stratified (typically April – October) to provide optimal thermal conditions for various fish species and associated life stages (egg incubation, fry emergence, spawning, etc.) downstream of Culmback Dam. Outside of operational constraints, providing these optimal water temperatures is accomplished by manipulating intake panel configurations (Figure 2) and the blending of relatively warm epilimnetic waters with the cool, hypolimnetic waters using the 24” plunger valve combined with the 10” cone valve, respectively. Extreme summer heat can rapidly increase river temperatures within Reach 3 which can be perpetuated downstream although the magnitude is mitigated by the relatively greater minimum instream flow requirements in the downstream reaches. To limit thermal stress on salmonids, consistent with the intent to comply with Washington State water temperature criteria, panels at the intake structure are systematically adjusted down in elevation (generally starting with Setting C and ending with Setting E) to provide cooler water in response to seasonal trends and longitudinal river warming. Setting E - the lowest panel configuration - has an opening between reservoir elevation 1,380’ – 1,360’ MSL and thus cannot provide the same degree of cold water to the tail pond as the 10” cone valve located at elevation 1,250’ MSL.

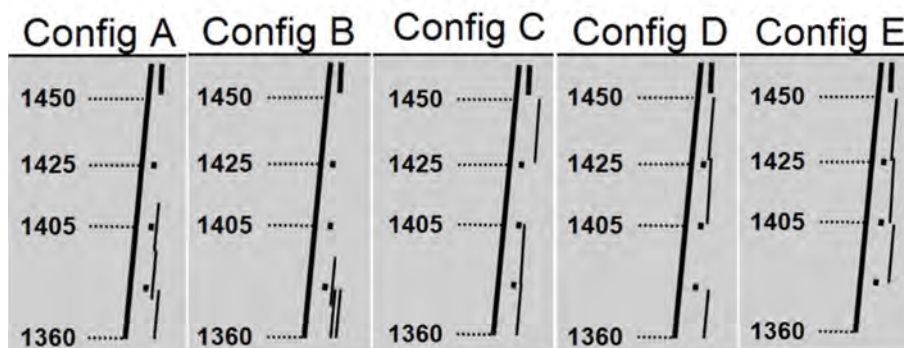


Figure 2. Intake Panel Configurations A through E at the Spada Lake Reservoir intake structure.

During summer 2023, with the cold-water valves unavailable due to them being replaced, the only way to manage water temperatures being delivered into Reach 3, downstream of Culmback Dam, was to adjust panel configurations and selectively introduce water at various depths along the intake structure. Across summer, Snohomish PUD made prudent decisions based on real-time information to provide biologically relevant and appropriate water temperatures downstream of Culmback Dam to the maximum extent possible using all reasonable tools and options available (Figure 3). As these proactive measures were implemented, it resulted in an accelerated depletion of volume of cool water available for conveyance via the intake compared to a typical year.

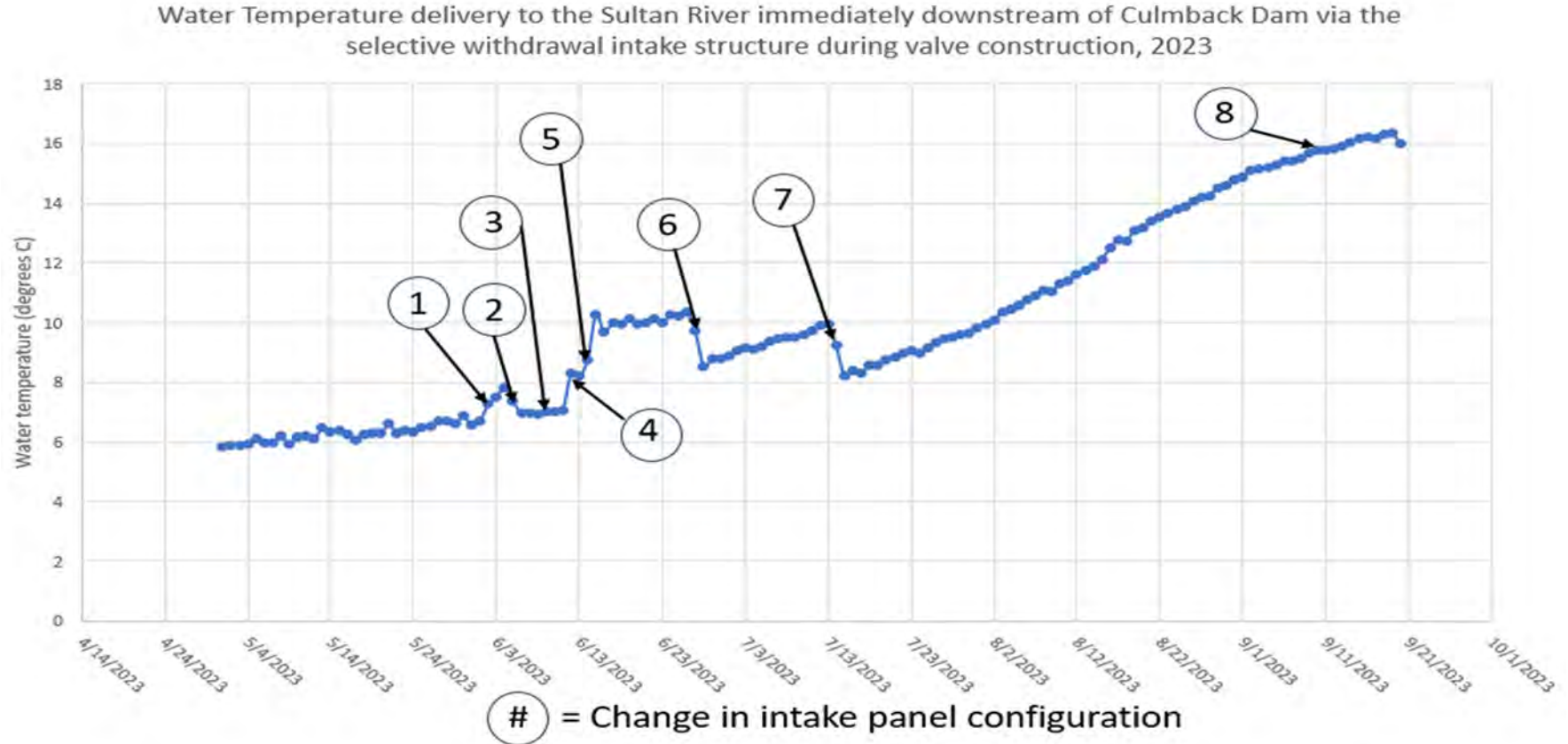


Figure 3. Mean daily water temperature from the 24" WTC valve delivered downstream of Culmback Dam and showing chronological adjustments to intake panel configuration during summer 2023.

1. June 2: From Setting E to D in effort to conserve cold water. Opening between elevation 1,385' – 1,402.5'.
2. June 5: From Setting D to E as water temperature downstream approaching 12°C. Opening between elevation 1,360' – 1,380'.
3. June 8: From Setting E to Modified C/D to conserve cold water. Opening between elevation 1,397.5' and 1,420'.
4. June 12: From Setting Modified C/D to D as water temperature downstream approaching 12°C. Opening between elevation 1,385' – 1,405'.
5. June 14: From Setting D to Modified C to conserve cold water. Opening between 1,387.5' – 1,420'.
6. June 27: From Setting Modified C to D as water temperature downstream approaching 16°C. Opening between 1,387.5' – 1,405'.
7. July 14: From Setting D to E as water temperature downstream approaching 16°C. Opening between 1,360' – 1,377.5'.
8. September 13: Setting E to E able to lower upper panel another few feet to provide maximum cooling as release temperature approaches 16°C. Opening between 1,360' – 1,375'.

Water Temperature Monitoring and Typical Actions Employed

Snohomish PUD monitors water temperature at 5 stations within Reach 3 downstream of Culmback Dam. The compliance measurement point at RM 9.8 provides real-time temperature data via Snohomish PUD's SCADA system. This hard-wired data feed makes it possible to manage water temperature on a daily basis as conditions change. Additional real-time river temperature data located in the tail pond of Culmback Dam provides the input for determining longitudinal river warming in the 6.4-mile reach. During extreme "heat-dome" type conditions where longitudinal warming is greatest, swapping all the Reach 3 release flow to the 10" cone valve delivers the minimum flow volume at the lowest temperature possible (4 to 6 degrees Celsius (°C)). The action of relying solely on the 10" valve in providing the minimum flow to meet downstream water temperature targets is necessary during short-term heat excursions in most years. In some cases, even when releasing entirely from the 10" valve, complying with the state water temperature standard of 16°C (7DADMax) cannot be accomplished because the rate of longitudinal river warming is too great.

Local and Regional Conditions during Summer 2023

The Sultan and Skykomish rivers have the same beneficial use described as Core Summer Salmonid Habitat with a water temperature criterion of 16°C (7DADMax). During 2023, inflows into Spada Lake Reservoir were significantly less than the 31-year historic median values, and the water temperature associated with the low inflows was greater than the median values (Figures 4 and 5). At the South Fork Sultan River stream gage (USGS Gaging Station #12137290), the magnitude of difference between the observed mean daily water temperatures compared to the historic median values were as high as 3°C in June and July (Figure 6).

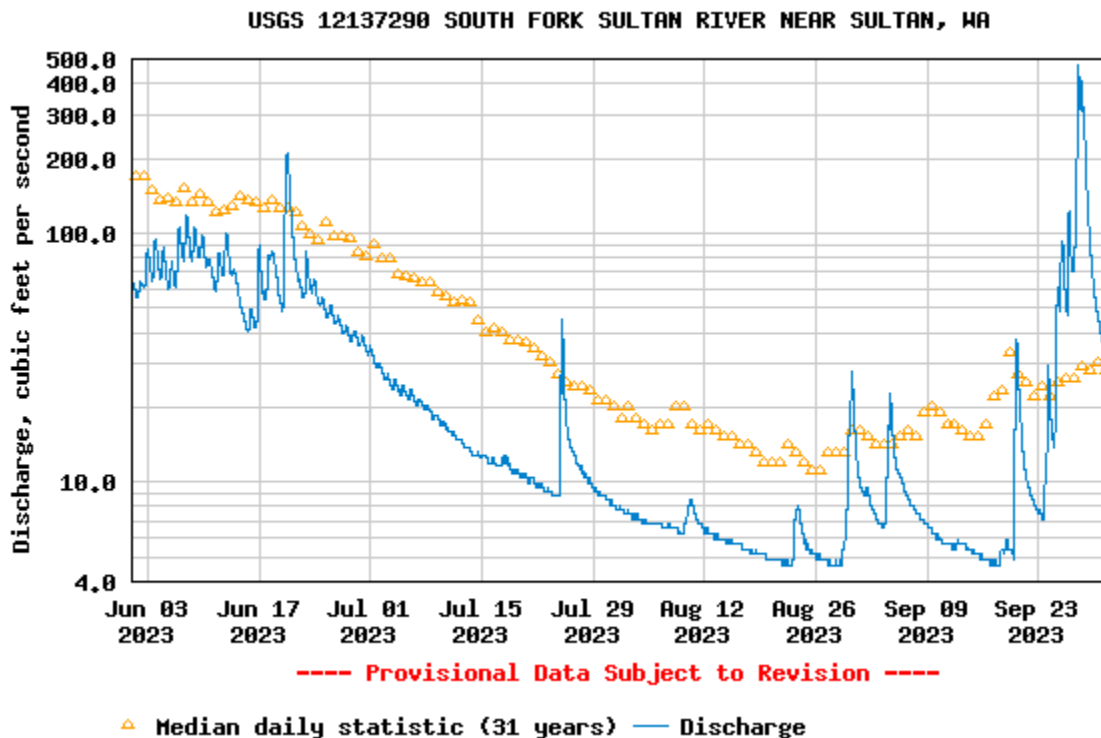


Figure 4. South Fork Sultan River discharge representing inflow conditions to Spada Lake Reservoir, Summer 2023.

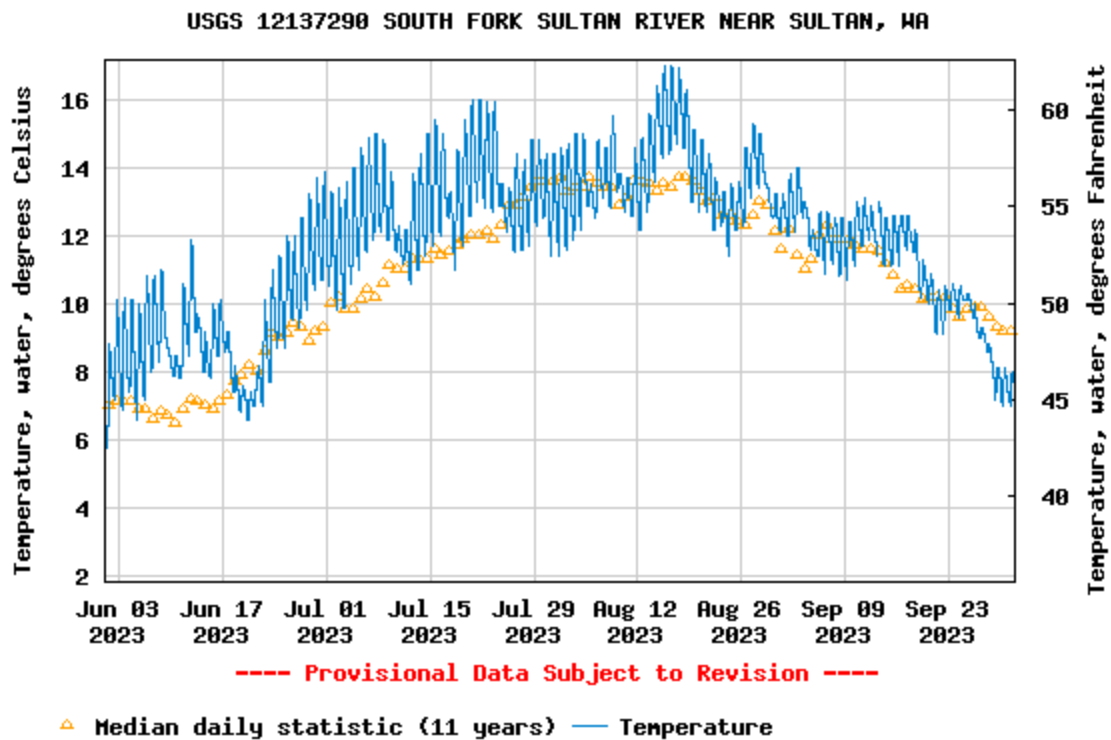


Figure 5. South Fork Sultan River water temperature representing thermal inputs to Spada Lake Reservoir, summer 2023.

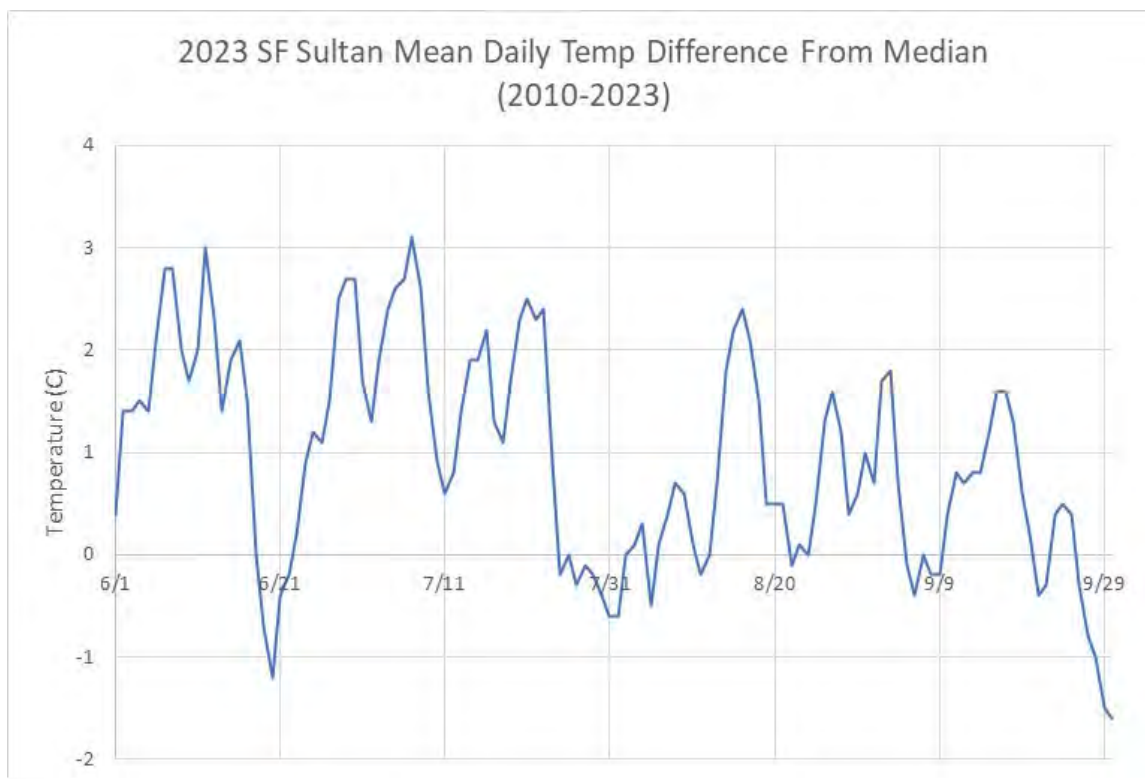


Figure 6. Mean daily water temperature departures from median values June through September 2023.

Downstream of Culmback Dam, USGS Gaging Station #12137800 located below the Diversion Dam at RM 9.6 collects discharge and water temperature data. Whereas Figure 7 shows the hydrograph during summer 2023 as being mostly on par with historic median values, the water temperature data deviates from the historic median values, especially during August (Figure 8).

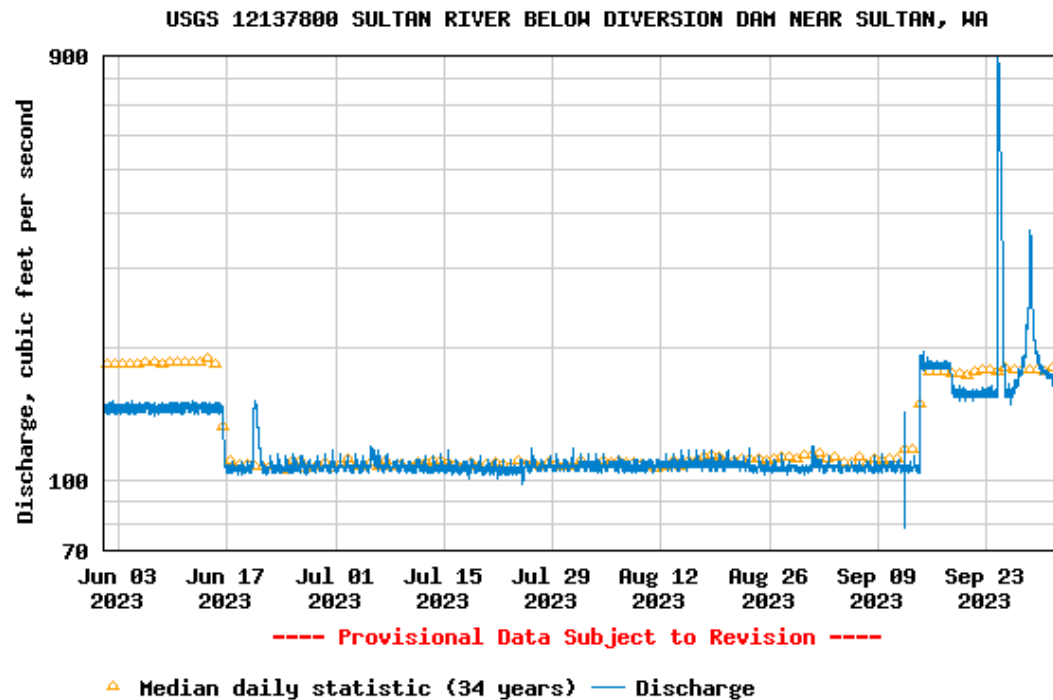


Figure 7. Sultan River below Diversion Dam hydrograph, summer 2023.

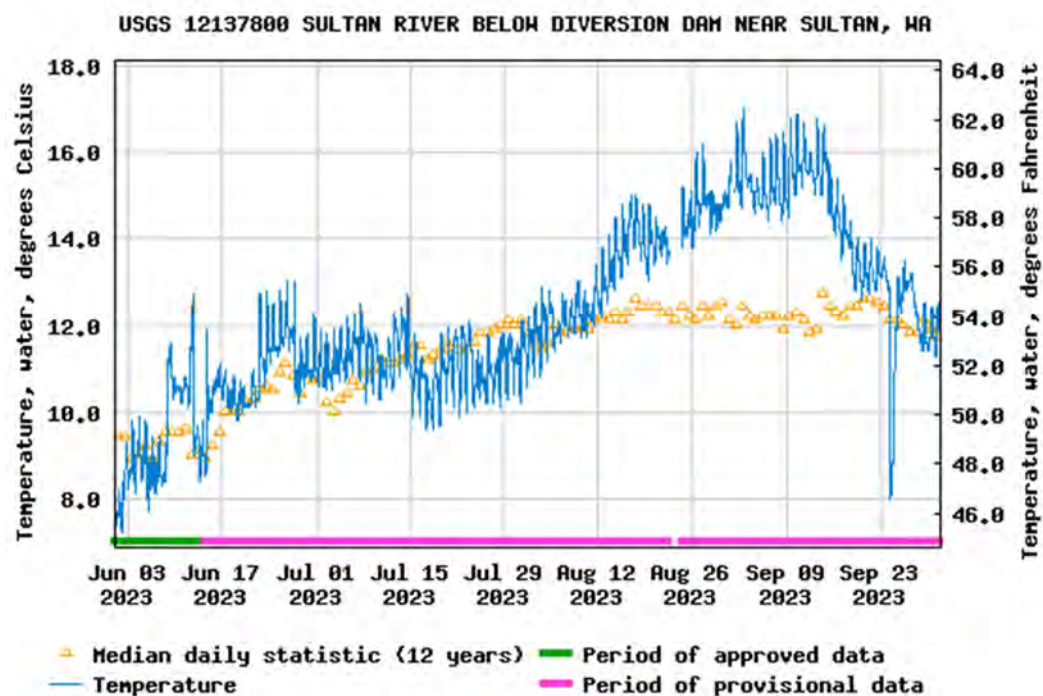


Figure 8. Sultan River below Diversion Dam water temperature trend, summer 2023.

Further downstream immediately below the Jackson Powerhouse at RM 4.3, the USGS operates and maintains stream gage station number 12138160. With a few exceptions, the Project was discharging water from the Powerhouse to maintain minimum instream flow and conserve water for much of the period spanning from June through September 2023 (Figure 9). Water temperature recorded at this location mirrored the trend from USGS stream gage below the Diversion Dam where much of August saw values above the historic median values (Figure 10). Noteworthy from Figure 10 is the time period from June through July 15, where adjustments to the intake panel configuration at Spada Lake Reservoir are apparent in the water temperature trend downstream of the Jackson Powerhouse. This proactive measure was made earlier than typically done to manage temperatures within Reach 3.

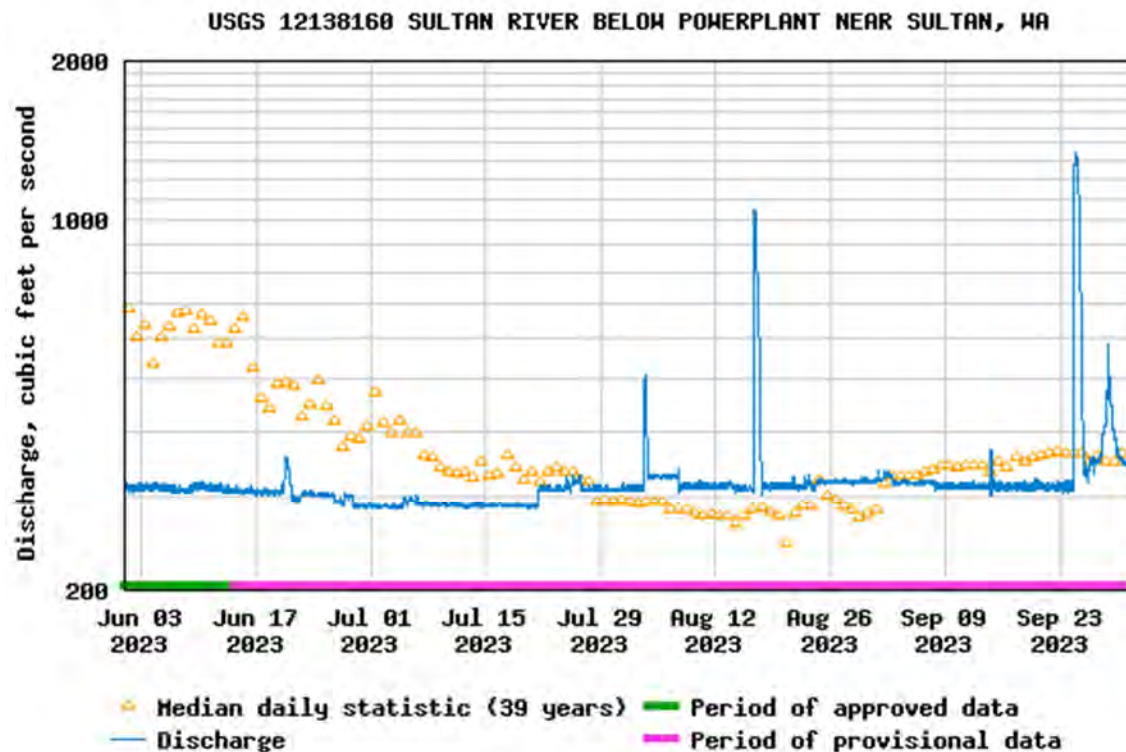


Figure 9. Sultan River below Powerhouse hydrograph, summer 2023.

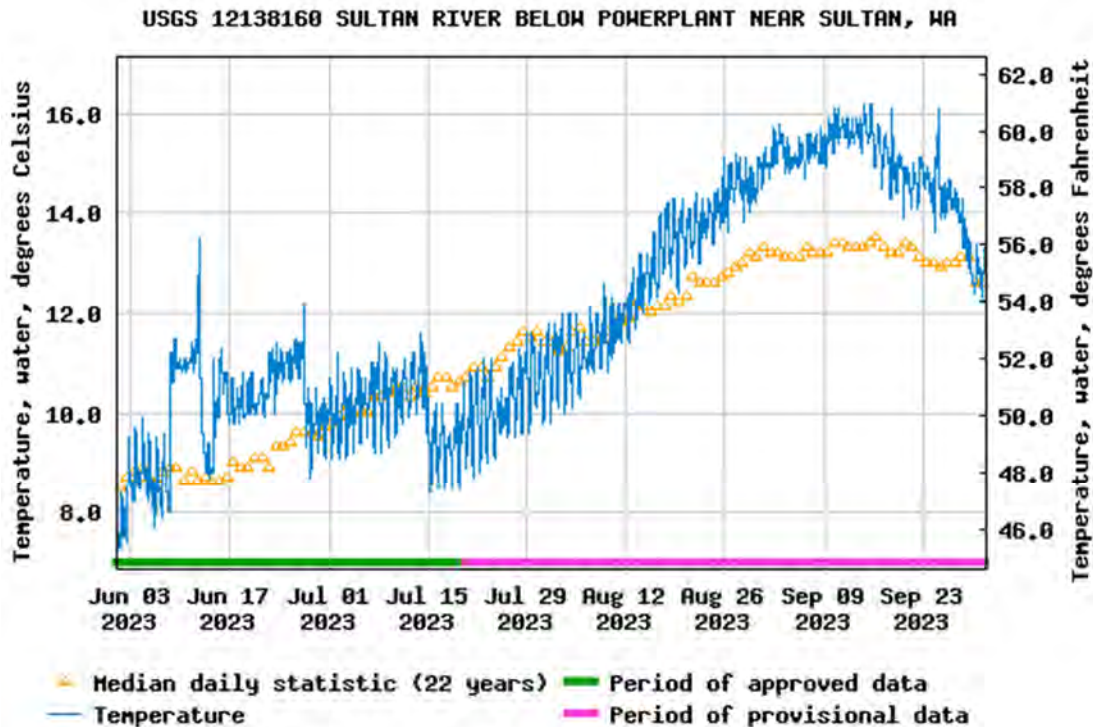


Figure 10. Lower Sultan River (RM4.3) water temperature trend, summer 2023 representing thermal conditions created in combination from outputs at Spada Lake Reservoir and longitudinal warming from the Sultan River upstream of the Powerhouse.

Beyond the Sultan River watershed, hydrologic conditions in the Skykomish River near Gold Bar were similar to that of the un-regulated South Fork Sultan River. During 2023, summer baseflow conditions on the Skykomish River were considerably less than the median values in the 94-year record (Figure 11). Raw water temperature values at the USGS Gaging Station #12134500, Skykomish River near Gold Bar at RM 22.8 consistently ranged between 16 and 20°C for much of July and August (Figure 12). The peak water temperature recorded at this location on the Skykomish River upstream of the Sultan was 23.4°C on August 15, 2023. The location on the Sultan River that experienced the greatest peak water temperature was at the lower end of Reach 3, upstream of the Diversion Dam at RM 9.8. Peak water temperature at this location reached 19.7°C, also recorded on August 15, 2023 (Figure 13). The frequency of days where water temperatures exceeded 20°C on the Skykomish River upstream of the Sultan was 25. During the same time-period, the Sultan River did not have water temperatures that exceeded 20°C.

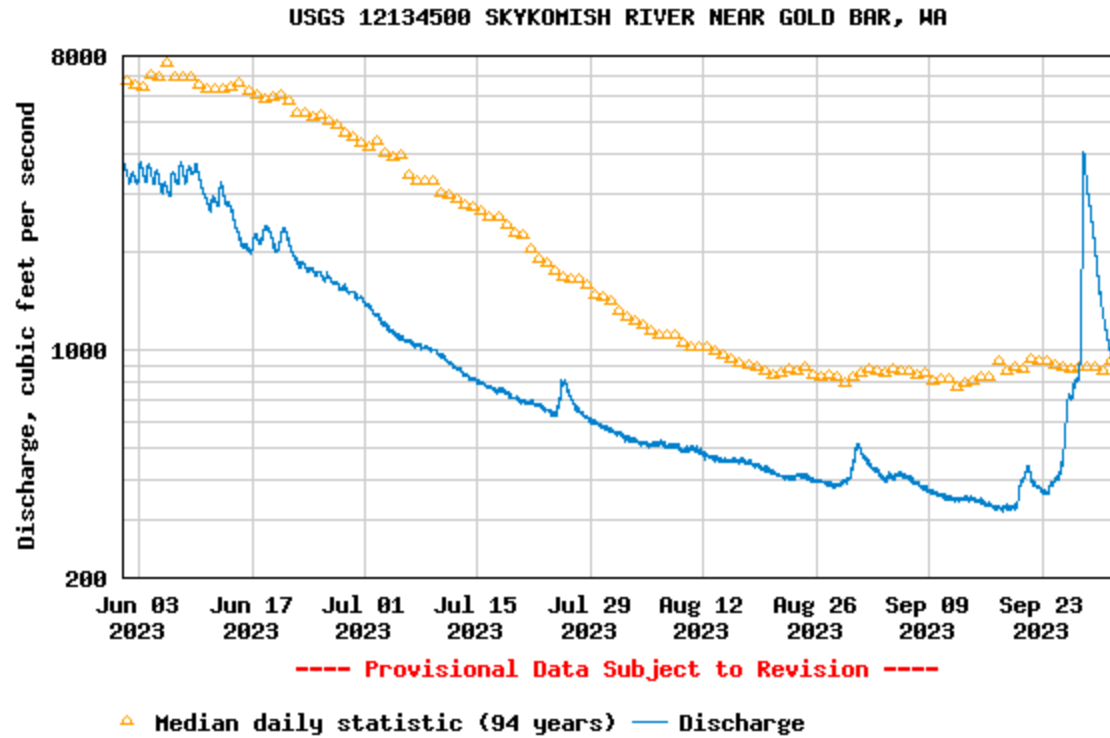


Figure 11. Skykomish River near Gold Bar hydrograph, summer 2023.

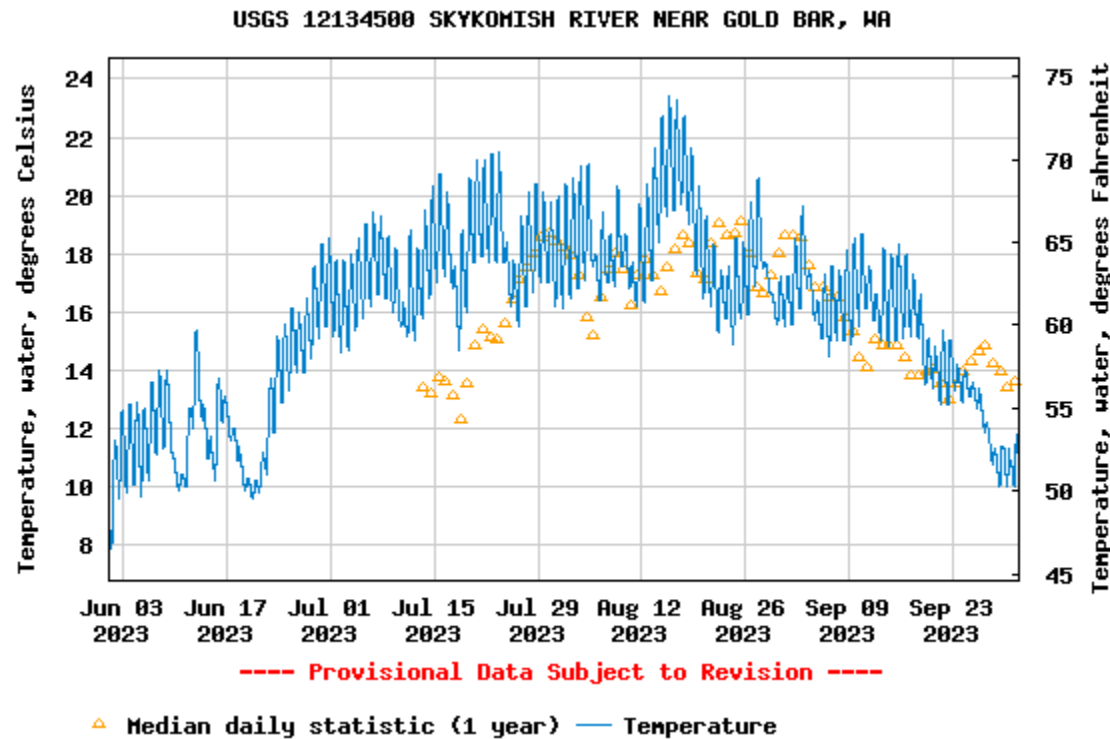


Figure 12. Skykomish River near Gold Bar water temperature trend, summer 2023.

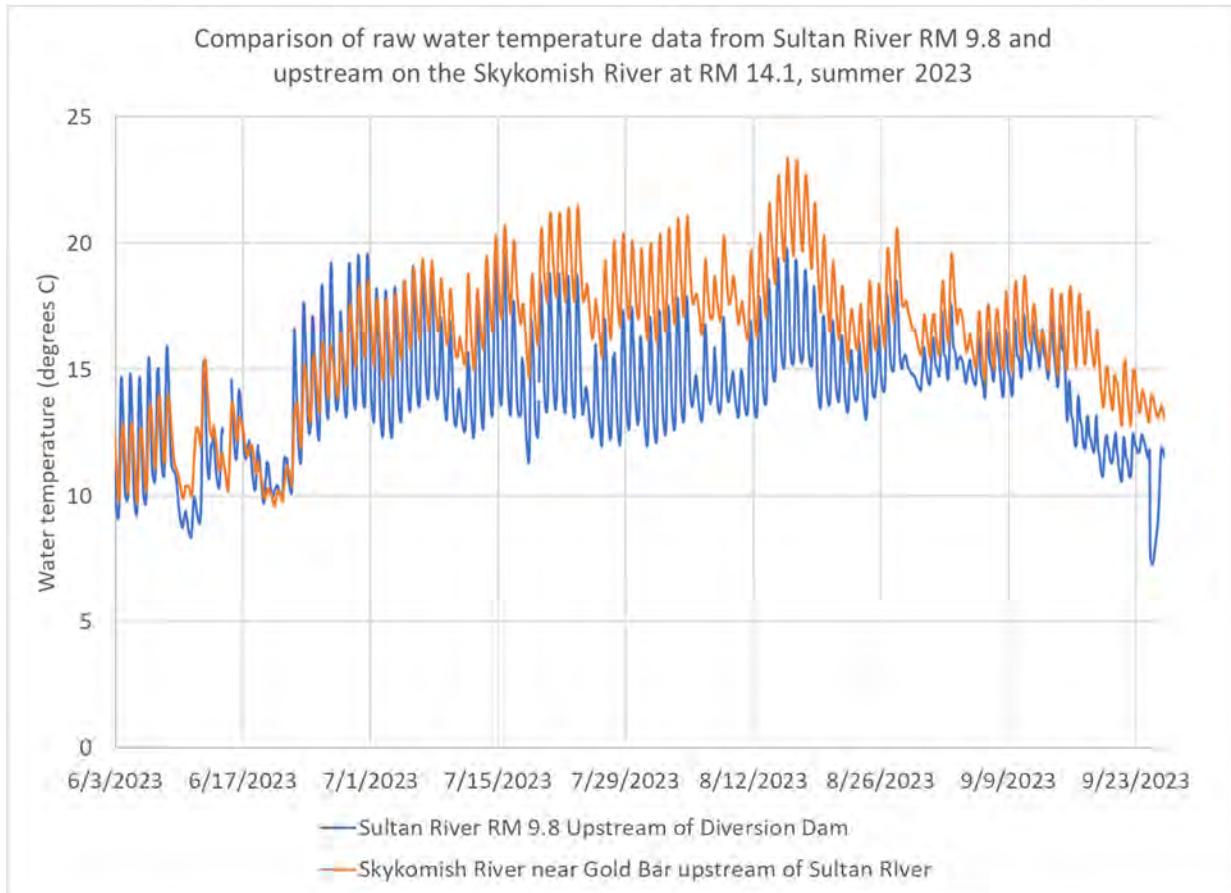


Figure 13. Comparison of raw water temperature data from Sultan River RM 9.8 and upstream on the Skykomish River at RM 14.1, summer 2023

Snohomish PUD has collected water temperature data upstream of the Sultan River on the Skykomish River since 2011. When visually comparing mean daily water temperature across years 2012-2023, it appears between late June to late July 2023, had above average water temperatures, corresponding with a pronounced decrease in streamflow over the same period. For the remainder of summer, apart from a spike in mid-August, water temperature in the Skykomish River upstream of the Sultan River did not appear to be anomalous when comparing the means across multiple recent years (Figure 14). With stream temperatures and inflow conditions in mind, it is fortunate that summer 2023 was more of a temperate summer as warmer weather would have exacerbated river temperatures in the Sultan during this valve replacement project.

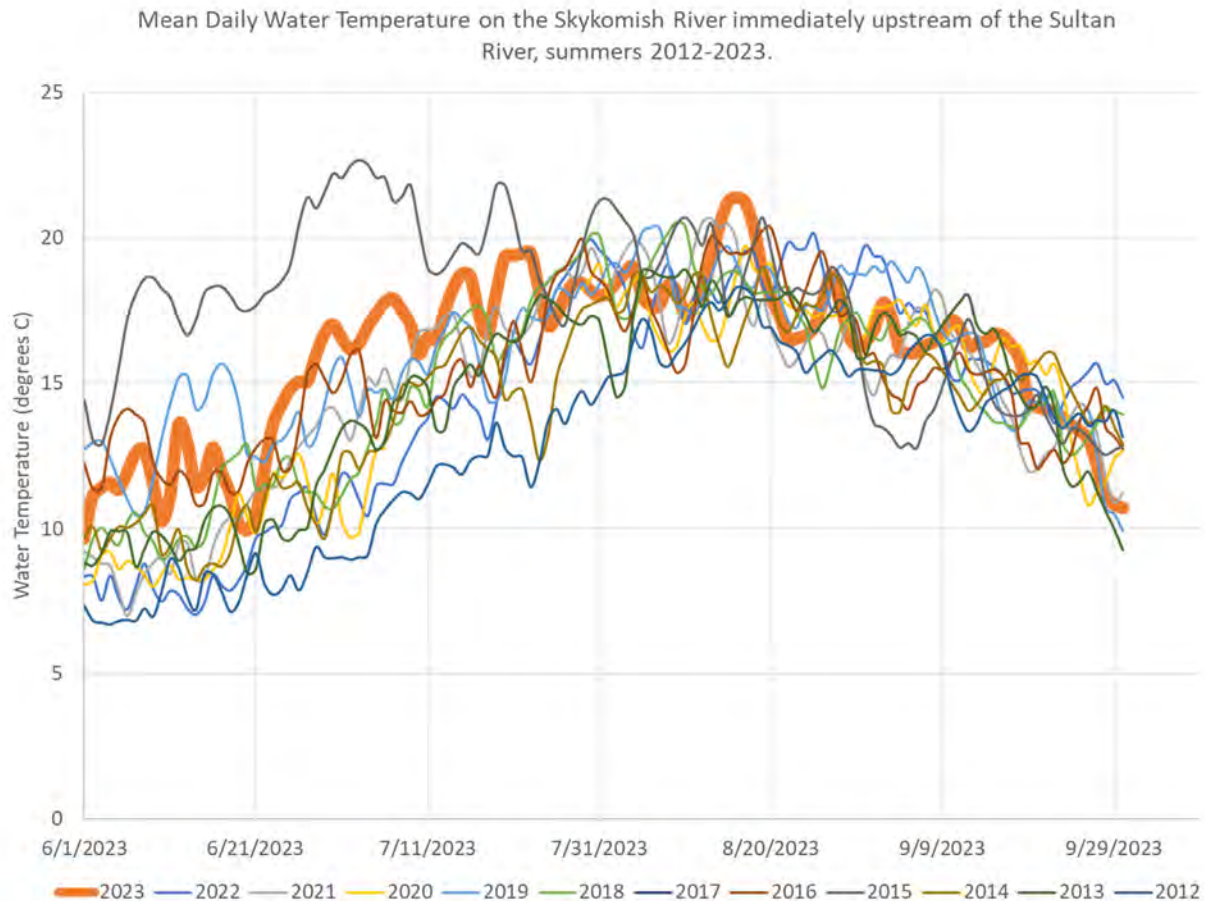


Figure 14. Mean daily water temperature at RM 14.1 on the Skykomish River, upstream of the Sultan River years 2012-2023.

Temperature Control Actions Employed during Summer 2023

Limiting thermal stress on aquatic resources and adherence to Washington State water temperature standards is a top management priority for Snohomish PUD. In 2023, the ability to meet these regulatory compliance objectives was severely constrained by a lack of access to cold-water supplied by deep water valves during a valve replacement project. Natural Resources and Operations staff coordinated daily – often more than once per day – to discuss conditions and make decisions related to water temperature management and the use of the waters within Spada Lake Reservoir to meet aquatic resources needs in each of the reaches of the Sultan River downstream of Culmback Dam. The key challenge in the beginning of the season was to provide the Sultan River with water temperatures less than 12°C to ensure optimal thermal conditions for steelhead fry emergence. Figures 3 and 15 describes the chronology of intake panel adjustments to provide cooler water over time to the Sultan River downstream of Culmback Dam. The goal of providing emerging steelhead fry with preferred water temperatures was mostly a success (Figures 8 and 10).

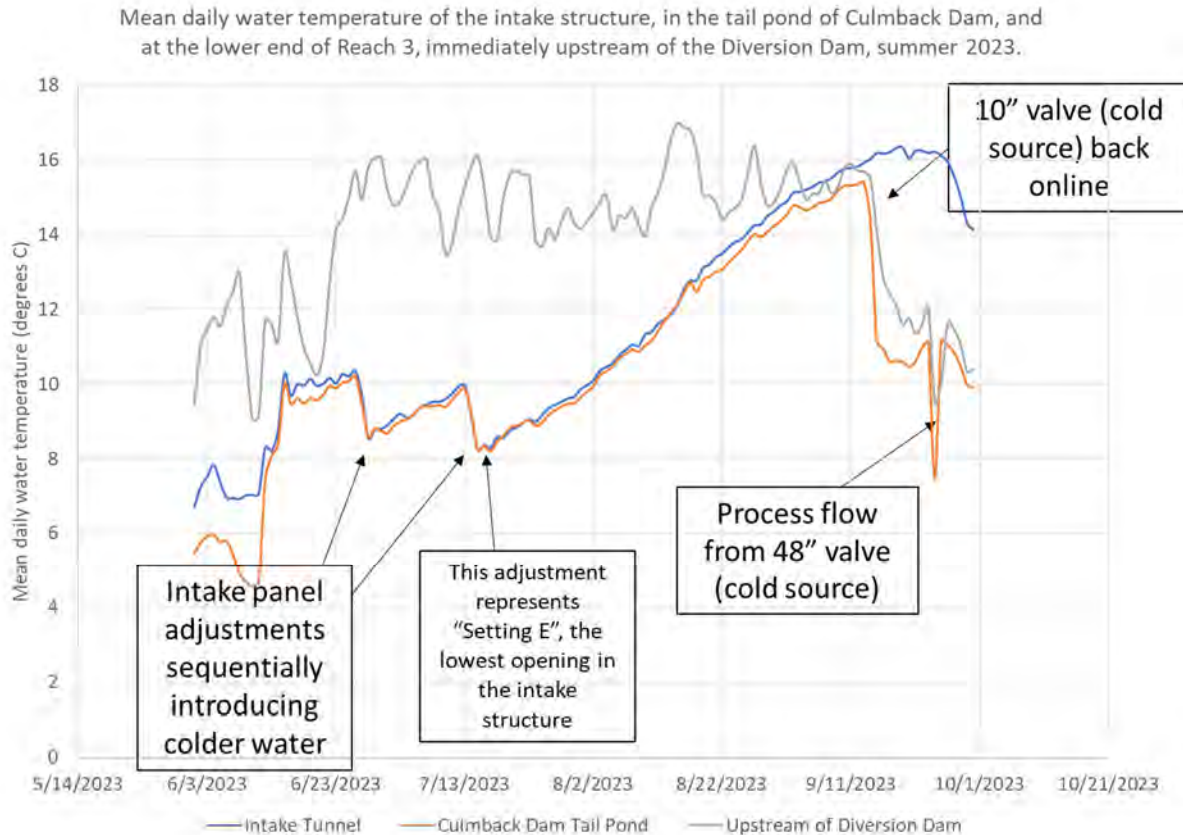


Figure 15. Chronology of water temperatures at the Project Intake which are delivered to Culmback Dam tail pond and translate downstream throughout Reach 3.

Of the entire 16.1-mile length of the Sultan River downstream of Culmback Dam, the lower portion of the 6.4 miles of Reach 3 (Culmback Dam – Diversion Dam) is most prone to the cumulative impacts of longitudinal warming. Despite the successive panel adjustments in late-June and mid-July, it was a challenge to maintain water temperatures at the lower end of Reach 3 immediately upstream of the Diversion Dam below 12°C for the entirety of steelhead emergence period (Figure 15). From an operational intervention standpoint, the panel adjustment to “Setting E” in mid-July, was the final step in a sequence to cool the Sultan River with a focus of conditions within Reach 3. At this point in the project, it was identified that the flange of the 48” valve – a critical component, needed a customized transition piece fabricated. The sourcing of materials and fabrication work itself, led to a project delay which extended the project completion date into September. Due to this project delay, the source of water available for delivery into Reach 3 of the Sultan River continued to be limited to relatively warm epilimnetic waters from the intake structure. What transpired in the weeks and months to follow was a steady increase in Spada Lake Reservoir water temperature which was then passed downstream to the Sultan River (Figure 3). For the remainder of summer (August and September) as Spada Lake Reservoir continued to draft due in part to near-record low inflows, water temperatures in the Sultan River rose gradually to values greater than the historical median. With a few exceptions, since June and continuing through the completion of the valve replacement construction in late September, Snohomish PUD attempted to preserve as much pool volume in Spada Lake Reservoir as possible by releasing only enough water to meet the City of Everett’s drinking

water demands and the Sultan River minimum instream flow requirements.

Water Temperature Criteria Exceedances in Sultan and Skykomish Rivers

Table 1 contains a snapshot of 2023 water temperature exceedances by location upstream of the Project (South Fork Sultan River), within the Project (mainstem Sultan River), and at one location outside of the Project boundary at RM 14.1 on the Skykomish River, immediately upstream of the Sultan-Skykomish confluence. More details will be provided in the 2023 Water Quality Monitoring Plan Annual Report, due June 2024. In general, the Sultan River during 2023, experienced a greater frequency of days compared to other years where water temperatures exceeded the state standard of 16°C. Most notably, the exceedances were concentrated at the lower end of each operational reach, stemming from low-flow conditions and longitudinal warming. The first exceedance of the year was documented on the Sultan River at RM 9.8 on June 24, 2023. The Skykomish River upstream of the Sultan River first exceeded the water temperature standard on June 26, 2023. The number of water temperature exceedances in the Sultan River during 2023 was an outlier compared to the past five years (Table 2). The location on the Sultan River with the most exceedances was RM 9.8 (81 days). In comparison, the Skykomish River, upstream of the Sultan, exceeded the standard for 86 days over the same time-period (Table 1). Prior to 2023, the greatest frequency of days exceeding the standard on the Sultan River over the past 5 years was 22 at RM 0.2. In the same 5-year period, the Skykomish River at RM 14.1, upstream of the Sultan River has consistently exceeded the standard ranging from 45-71 days (Table 2).

Table 1. Frequency of days, by month, where water temperature in the Sultan and Skykomish Rivers, exceeded the water temperature standard during summer 2023.

Water Temperature Monitoring Location	Days Exceeding Water Temperature Standard* (June-Sept 2023)	Month(s)
South Fork Sultan River (upstream of Project)	4	August
Sultan River RM 16 (downstream of Culmback Dam)	0	
Sultan River RM 9.8 (upstream of Diversion Dam)	81	June, July, August, September
Sultan River RM 4.9 (upstream of Powerhouse)	31	August, September
Sultan River RM 0.2 (downstream of Powerhouse)	34	August, September
Skykomish River RM 14.1 (upstream of Sultan)	86	June, July, August, September

* Core Summer Salmonid Habitat (16°C 7DADMax)

Table 2. Number of days in 2023 compared to the last five summer seasons (2018-2022) that water temperatures at locations within the Sultan and Skykomish River basins exceeded the water temperature standard.

Water Temperature Monitoring Location	Days Exceeding Water Temperature Standard* (June-Sept, 2023)	Days Exceeding Water Temperature Standard* (June-Sept, 2022)	Days Exceeding Water Temperature Standard* (June-Sept, 2021)	Days Exceeding Water Temperature Standard* (June-Sept, 2020)	Days Exceeding Water Temperature Standard* (June-Sept, 2019)	Days Exceeding Water Temperature Standard* (June-Sept, 2018)
South Fork Sultan River (upstream of project)	4	5	3	0	14	7
Sultan River RM 16 (downstream of Culmback Dam)	0	0	0	0	0	0
Sultan River RM 9.8 (upstream of Diversion Dam)	81	4	15	2	0	14
Sultan River RM 4.9 (upstream of Powerhouse)	31	8	1	0	0	0
Sultan River RM 0.2 (downstream of Powerhouse)	34	22	18	0	1	0
Skykomish River RM 14.1 (upstream of Sultan)	86	63	45	51	71	64

* Core Summer Salmonid Habitat (16°C 7DADMax)

Juvenile Salmonid Observations and Adult Spawning Distribution

Over the course of summer 2023, Snohomish PUD biologists routinely made site visits to known juvenile rearing areas to conduct presence / absence surveys, and to assess the behavior of juvenile salmonids. These informal surveys were conducted via electroshocking when thermal conditions were appropriate, and via foot, by walking along channel margins. Surveys were conducted in all three reaches of the river with a primary focus upstream of the Diversion Dam in Reach 3 where water temperatures are more prone to exceeding the state criteria. Juvenile coho, Chinook, and steelhead were present in all reaches of the Sultan River in numbers ranging from 5-50 per visit. Juvenile salmonids were routinely observed in the river near the channel margin. Size (fork-length) ranged from 30 mm (steelhead fry) to greater than 50 mm (Chinook and coho).

Sultan River spawning ground surveys for pink and Chinook salmon commenced on August 24, 2023. It was not until September 6 that live pink salmon and Chinook redds were documented. On September 6, surveys were conducted in Reach 2 of the Sultan River where 4 Chinook redds and 80 pink salmon were identified in established spawning index areas. A few days later (September 8), 7,669 pink salmon and 1 Chinook redd were identified in the established index area for Reach 1, downstream of the powerhouse. On September 13, 5 live Chinook and 11 live pink salmon were counted in the established index area for Reach 3, upstream of the Diversion Dam. Despite water temperatures that hovered near and often exceeded the criteria, pink and

Chinook salmon were found to migrate and spawn in the observed conditions. On September 14, the cold-water valve replacement project was completed, and the new valves were put into service restoring the ability to regulate water temperatures at the base of Culmback Dam.

On September 19, Snohomish PUD biologists conducted a foot survey from RM 12.0 down to the Diversion Dam at RM 9.7 and documented 80 live Chinook salmon, 29 Chinook redds, 4 Chinook carcasses, and 418 live pink salmon. Given that this was the first survey conducted in this reach for the season it is not possible to determine when the first fish arrived and if thermal conditions in any way affected their migration and/or spawn timing/behavior. Overall, Sultan River water temperatures downstream of Culmback Dam during summer 2023 more closely resembled the seasonal pattern of water temperatures observed in the Skykomish River basin. While it is well understood that the Sultan River provides cold-water refugia during summer, it is also important to acknowledge the significance of relatively warmer water temperatures necessary for juvenile salmonid growth prior to over-wintering. Realizing the vital role water temperature plays in the metabolism and growth of juvenile salmonids, and by utilizing the operational capabilities provide by the Jackson Hydroelectric Project, a seasonal revision of the 16-degree (7DADmax) water temperature standard during summer may be warranted. This would require a rule change, but this type of conditional allowance could ultimately translate to a significant resource benefit under extreme thermal conditions. A potential revision of a 7DADmax value greater than 16°C could be instituted so that the volume of cool reservoir water could potentially last longer over the summer season while providing juvenile salmonids optimal rearing conditions, and while providing adult Chinook and pink salmon thermal conditions that would continue to be cooler than the Skykomish River, thus continuing to provide an element of thermal cooling for salmonids occupying freshwater habitat downstream of the Sultan River.

APPENDIX F

Consultation Documentation and Response to Comments Regarding Draft Report

Comments of S. Bohling, WA Department of Ecology, email dated May 30, 2024		
No.	Ecology Comment	Snohomish PUD Response
1	Ecology recognizes the significant level of work, data collection, and analysis that is summarized in the draft report. We appreciate the organization of the water quality sections related to the 401 certification, as well as the document as a whole. However, additional information related to the individual standards or parameters in Section 2.3 (Water Quality) of the draft report is recommended. The following requested modifications and additions are intended to provide context and clarity to the report for current and future reviewers of this information.	Snohomish PUD met Ecology staff on 6/18/24 to discuss Ecology comments. Ecology staff noted that no water quality standards exist for the Spada Lake Reservoir given it is not a natural lake but a created reservoir; however, the data are used to both assess stratification and to track year-to-year changes in water quality. In the event of a significant deviation, Snohomish PUD will identify either a natural event or Project-related cause and propose any measures that may be needed to address the issue, if appropriate. Your comment to improve clarity by making it a stand-alone report (not having to review between the WQM Plan and the Annual Report to get all the needed information) is a good recommendation; additional information on the standards or parameters as described below has been added to improve clarity.
2	As described in section 5.3 (Specific Conditions – Water Quality Parameters) of the 401 certification (order 7918), each of the individual parameters has information related to the standards and reporting requirements in the event of an exceedance. It would be helpful to include charts of the observed water quality conditions (including representation of the standards on the chart) along with the written summaries for each parameter. If no exceedances are observed, a statement documenting compliance with water quality standards should be included for each parameter.	Table 1.1 of the report has been revised to include associated water quality standards and units. Additionally, associated standards and highlighted exceedances have been included in relevant sections in the body of the report and Appendix D. Additional or modified graphics/charts will be considered in next year's report.
3	If an exceedance is observed, as noted in section 9.0 (Monitoring and Reporting Requirements), subsection 2 (Annual Water Quality Report), "Any violations of the state water quality standards shall	All exceedances have been highlighted in the body of the report. Additionally, exceedances of the 7-DAD Max are highlighted

	be highlighted”. In the event exceedances are documented, the project licensee should describe the reason or causes for the exceedance, and provide a list of actions or strategies, including operational or physical project modifications to meet water quality criteria.	in red in the tabular data included in Appendix D. Discussion regarding the cause of the exceedance is included in the body of the report.
4	Ecology notes that the water quality data is summarized in section 4 (Data Quality and Compliance) of the draft report. As mentioned above, if no exceedances are observed, a statement of compliance with water quality standards should be included for each parameter. This section also highlights the exceedance of temperature standards and includes a reference to Appendix D (7-Day Average of the Daily Maximum (7-DAD Max) Water Temperature in Tabular Format). It may also be helpful to include a reference to Appendix E (Technical Memo Regarding 2023 Water Temperature Data), as this memo includes specific information related to the temperature exceedances in section 4 of the draft report.	For each parameter required to be monitored, the associated standard has been included. Any exceedances and proposed recommendations have also been included. Reference to Appendix E was added.
Comments of M. Rustay, Snohomish County, email dated		
No.	Snohomish County Comment	Snohomish PUD Response
1	Pg 7, figure 2-4 needs x-axis labels	Noted. Revision made.
2	Pg 10, first sentence of the last paragraph - looks like “FERC’s Portland Regional Office of Dam” might need a small edit.	Noted. This has been corrected.

From: [Presler, Dawn](#)
To: [Scott Bohling](#)
Cc: [Legare, Kyle](#); [McDonnell, Andrew](#); [Binkley, Keith](#)
Subject: FW: [External Sender] RE: Jackson Hydro (FERC No. 2157) - draft Water Quality Monitoring Plan Annual Report for 2023 for your 30-day review and comment by May 30
Date: Monday, June 3, 2024 8:27:00 AM
Attachments: [image001.png](#)
[05302024_SNOPUD_Jackson_WOMonitoringReport.pdf](#)

Hi Scott –

Appreciate your review and feedback! We'll get on updating the report to address your recommendations and let you know if we have questions.

Cheers,

Dawn

From: Bohling, Scott (ECY) <sboh461@ECY.WA.GOV>
Sent: Thursday, May 30, 2024 7:53 AM
To: Presler, Dawn <DJPresler@SNOPUD.com>
Subject: [External Sender] RE: Jackson Hydro (FERC No. 2157) - draft Water Quality Monitoring Plan Annual Report for 2023 for your 30-day review and comment by May 30

CAUTION: THIS EMAIL IS FROM AN EXTERNAL SENDER.

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Dawn,

Thank you for the opportunity to review the draft 2023 Water Quality monitoring report. Please see the attached letter.

If you have any questions or would like to discuss any comments in the letter, feel free to reach out to me.

Thank you again,

-Scott

From: Presler, Dawn <DJPresler@SNOPUD.com>
Sent: Tuesday, April 30, 2024 8:56 AM
To: Anne Savery <asavery@tulaliptribes-nsn.gov>; Anna Thelen <AThelen@everettwa.gov>; Applegate, Brock A (DFW) <Brock.Applegate@dfw.wa.gov>; Elizabeth Babcock <elizabeth.babcock@noaa.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Mike Rustay <mike.rustay@co.snohomish.wa.us>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Bohling, Scott (ECY) <sboh461@ECY.WA.GOV>; Tom O'Keefe <okeefe@americanwhitewater.org>
Cc: McDonnell, Andrew <AWMcDonnell@SNOPUD.com>; Binkley, Keith <KMBinkley@SNOPUD.com>; Legare, Kyle <KJLegare@Snopud.com>; Kees, Ashley

<ACKees@SNOPUD.com>; Baxter, Anne (ECY) <abax461@ECY.WA.GOV>

Subject: Jackson Hydro (FERC No. 2157) - draft Water Quality Monitoring Plan Annual Report for 2023 for your 30-day review and comment by May 30

External Email

Dear ARC Members,

Attached is the draft water quality monitoring plan 2023 annual report for your 30-day review and comment. Please send any comments to me by May 30 COB. Emails identifying no concerns or comments are appreciated too! If you have any questions in the meantime, please contact Kyle. Thanks everyone.

Have a great day.

Cheers,

Dawn Presler, MSIM MSSM (*she/her*)

Lead – Environmental & Licensing Compliance
Natural Resources, Generation | Snohomish PUD

O: 425-783-1709 | **C:** 425-725-0745
2320 California Street, Everett WA 98201
www.snopud.com



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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Region Office
PO Box 330316, Shoreline, WA 98133-9716 • 206-594-0000

VIA ELECTRONIC FILING

May 30th, 2024

Dawn Presler
Natural Resources, Generation
Snohomish Public Utilities District
2320 California Street, Everett WA 98201

RE: Department of Ecology comments on the Water Quality Monitoring Plan DRAFT
2023 Annual Report, License Article 401 for the Henry M. Jackson Hydroelectric
Project, FERC No. 2157.

Mrs. Presler,

Please find enclosed the Washington State Department of Ecology's (Ecology) comments on the Water Quality Monitoring Plan DRAFT 2023 Annual Report, submitted by the Snohomish Public Utilities District (PUD) on April 30th, 2024. Ecology has resource management responsibilities related to the operation and management of hydropower facilities in Washington and provides these comments under the authorities vested in the State of Washington to implement Section 401 of the Federal Clean Water Act (33 USC § 1341). Ecology has reviewed the draft monitoring report and respectfully submits the enclosed comments for consideration by the PUD.

Ecology recognizes the significant level of work, data collection, and analysis that is summarized in the draft report. We appreciate the organization of the water quality sections related to the 401 certification, as well as the document as a whole. However, additional information related to the individual standards or parameters in Section 2.3 (Water Quality) of the draft report is recommended. The following requested modifications and additions are intended to provide context and clarity to the report for current and future reviewers of this information.

As described in section 5.3 (Specific Conditions – Water Quality Parameters) of the 401 certification (order 7918), each of the individual parameters has information related to the standards and reporting requirements in the event of an exceedance. It would be helpful to

include charts of the observed water quality conditions (including representation of the standards on the chart) along with the written summaries for each parameter. If no exceedances are observed, a statement documenting compliance with water quality standards should be included for each parameter.

If an exceedance is observed, as noted in section 9.0 (Monitoring and Reporting Requirements), subsection 2 (Annual Water Quality Report), “Any violations of the state water quality standards shall be highlighted”. In the event exceedances are documented, the project licensee should describe the reason or causes for the exceedance, and provide a list of actions or strategies, including operational or physical project modifications to meet water quality criteria.

Ecology notes that the water quality data is summarized in section 4 (Data Quality and Compliance) of the draft report. As mentioned above, if no exceedances are observed, a statement of compliance with water quality standards should be included for each parameter. This section also highlights the exceedance of temperature standards and includes a reference to Appendix D (7-Day Average of the Daily Maximum (7-DAD Max) Water Temperature in Tabular Format). It may also be helpful to include a reference to Appendix E (Technical Memo Regarding 2023 Water Temperature Data), as this memo includes specific information related to the temperature exceedances in section 4 of the draft report.

These reports, analyses, and included appendices are important to demonstrate ongoing compliance with water quality standards and the Section 401 Water Quality Certification.

Thank you for the opportunity to review and comment on the Water Quality Monitoring Plan DRAFT 2023 Annual Report

Sincerely,

A handwritten signature in black ink, appearing to read "S Bohling", with a stylized flourish at the end.

Scott Bohling
Hydroelectric Projects Manager
Department of Ecology, Northwest Regional Office

From: [Presler, Dawn](#)
To: [Legare, Kyle](#); [McDonnell, Andrew](#); [Binkley, Keith](#)
Cc: [Tengs, Hayley](#)
Subject: FW: [External Sender] RE: Jackson Hydro (FERC No. 2157) - draft Water Quality Monitoring Plan Annual Report for 2023 for your 30-day review and comment by May 30
Date: Monday, June 3, 2024 2:56:00 PM
Attachments: [image003.png](#)
[image002.png](#)

Here is another comment email for the WQMP Annual Rpt...

Cheers,
Dawn

From: Rustay, Michael <mike.rustay@co.snohomish.wa.us>
Sent: Friday, May 24, 2024 4:53 PM
To: Presler, Dawn <DJPresler@SNOPUD.com>
Subject: [External Sender] RE: Jackson Hydro (FERC No. 2157) - draft Water Quality Monitoring Plan Annual Report for 2023 for your 30-day review and comment by May 30

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Hello Dawn,

Hopefully you're already off on a long weekend. I finally had a quiet Friday to review some ARC docs. For the Draft WQMP report I only have a few comments...

- Pg 7, figure 2-4 needs x-axis labels
- Pg 10, first sentence of the last paragraph - looks like "FERC's Portland Regional Office of Dam" might need a small edit.

Other than those items, looks good to me.

Cheers,
Mike

Mike Rustay | *Project Specialist IV*

[Snohomish County Department of Conservation and Natural Resources](#) | [Surface Water Management](#)

3000 Rockefeller Ave., M/S 303 | Everett, WA 98201

O: 425-262-2627 | M: 425-238-6041 | mike.rustay@snoco.org

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NOTICE: All emails and attachments sent to and from Snohomish County are public records and may be subject to disclosure pursuant to the Public Records Act (RCW 42.56).

From: Presler, Dawn <DJPresler@SNOPUD.com>
Sent: Tuesday, April 30, 2024 8:56 AM

To: Anne Savery <asavery@tulaliptribes-nsn.gov>; Anna Thelen <AThelen@everettwa.gov>; Applegate, Brock A (DFW) <brock.applegate@dfw.wa.gov>; Elizabeth Babcock <elizabeth.babcock@noaa.gov>; Jeff Garnett <Jeffrey_Garnett@fws.gov>; Rustay, Michael <mike.rustay@co.snohomish.wa.us>; Nate Morgan <nate.morgan@ci.sultan.wa.us>; Richard Vacirca <richard.vacirca@usda.gov>; Scott Bohling <sboh461@ecy.wa.gov>; Tom O'Keefe <okeefe@americanwhitewater.org>

Cc: McDonnell, Andrew <AWMcDonnell@SNOPUD.com>; Binkley, Keith <kmbinkley@snopud.com>; Legare, Kyle <KJLegare@Snopud.com>; Kees, Ashley <ACKees@SNOPUD.com>; Baxter, Anne (ECY) <abax461@ecy.wa.gov>

Subject: Jackson Hydro (FERC No. 2157) - draft Water Quality Monitoring Plan Annual Report for 2023 for your 30-day review and comment by May 30



CAUTION. This email originated from outside of this organization. Please exercise caution with links and attachments.

Dear ARC Members,

Attached is the draft water quality monitoring plan 2023 annual report for your 30-day review and comment. Please send any comments to me by May 30 COB. Emails identifying no concerns or comments are appreciated too! If you have any questions in the meantime, please contact Kyle. Thanks everyone.

Have a great day.

Cheers,

Dawn Presler, MSIM MSSM (*she/her*)

Lead – Environmental & Licensing Compliance
Natural Resources, Generation | Snohomish PUD

O: 425-783-1709 | **C:** 425-725-0745
2320 California Street, Everett WA 98201
www.snopud.com



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CERTIFICATE OF SERVICE

I hereby certify that on this I have day served via e-mail a copy of the foregoing filing upon each person or entity specified in the order to be consulted on matters relating to the filing, per the Jackson Hydro Project License dated September 2, 2011, per ordering paragraph K.

Dated at Everett, WA, this June 26, 2024.

/s/ Dawn J. Presler

Dawn J. Presler
Lead – Licensing & Compliance
Public Utility District No. 1 of Snohomish
County
2320 California Street
PO Box 1107
Everett, WA 98206-1107
(425) 783-1709
DJPresler@snopud.com

From: [Presler, Dawn](#)
To: [Anne Savery](#); [Anna Thelen \(AThelen@everettwa.gov\)](#); [Brock Applegate](#); [Elizabeth Babcock](#); [Jeff Garnett](#); [Mike Rustay](#); [Nate Morgan](#); [Richard Vacirca](#); [Scott Bohling](#); [Tom O'Keefe](#)
Cc: [Andrew McDonnell](#); [Keith Binkley](#); [Legare, Kyle](#)
Subject: JHP (FERC No. 2157) - cc WQMP 2023 Annual Rpt to FERC
Date: Wednesday, June 26, 2024 4:31:00 PM
Attachments: [image001.png](#)
[20240627_JHP LA401 WQMP 2023 Annual Rpt to FERC.pdf](#)

Dear ARC Members,

Attached is your cc: of the Water Quality Monitoring Plan 2023 Annual Report that I will be e-filing with FERC this afternoon. Let us know if you have any questions regarding it. Thanks.

Cheers,

Dawn Presler, MSIM MSSM (*she/her*)

Lead – Environmental & Licensing Compliance
Natural Resources, Generation | Snohomish PUD

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