

Willamette Valley Fish Passage Monitoring Via Rotary Screw Traps

2021/2022 Willamette RST Bi-Annual Report
Reporting Period November 16, 2021 to May 15,
2022

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Project Schedule

Table 1. Project Schedule

Site	Task	Start	End	Days
Big Cliff Dam RST	Operation	12/01/2021	2/15/2022	292
Big Cliff Dam RST	Operation	03/15/2022	10/15/2022	
Big Cliff Dam Tailrace	Trap Efficiency Release (1,000 Fish)	12/22/2021	12/22/2021	1
Green Peter Tailrace- Middle Santiam River RST	Trap Install	03/02/2022	03/02/2022	1
Green Peter Tailrace- Middle Santiam River RST	Operation	03/03/2022 [#]	05/07/2022 [*]	70
Green Peter Tailrace- Middle Santiam River	Trap Efficiency Release (643 Fish)	03/29/2022	03/29/2022	1
Green Peter Tailrace- Middle Santiam River	Trap Efficiency Release (521 Fish)	04/30/2022	04/30/2022	1
Foster Dam Head of Reservoir- South Santiam River RST	Trap Install	03/16/2022	03/16/2022	1
Foster Dam Head of Reservoir- South Santiam River RST	Operation	03/16/2022 [#]	06/30/2022	113
Cougar Dam RST	Operation	11/30/2021	11/30/2022	366
Cougar Dam Tailrace	Trap Efficiency Release (1,200 Fish, 600 per route)	01/19/2022	01/19/2022	1
Cougar Dam Tailrace	Trap Efficiency Release (735 Fish, ~365 per route)	04/20/2022	04/20/2022	1
Cougar Dam Head of Reservoir	Highline and Trap Install	03/07/2022	03/07/2022	1
Cougar Dam Head of Reservoir	Operation	03/08/2022 [#]	06/30/2022	115
Cougar Dam Head of Reservoir	Trap Efficiency Release (806 Fish)	03/18/2022	03/18/2022	1
Dexter Dam Tailrace RST	Highline Install	03/02/2022	03/02/2022	1
Dexter Dam Tailrace RST	Trap Install	03/03/2022	03/09/2022	7
Dexter Dam Tailrace RST	Operation	03/09/2022 [#]	12/16/2022	285
Dexter Dam Tailrace RST	Trap Efficiency Release (988 Fish)	03/23/2022	03/23/2022	1
Lookout Dam Tailrace RST	Operation	03/15/2022	07/31/2022	139
Lookout Dam Tailrace RST	Trap Efficiency Release (1,013 fish, PWR route)	04/13/2022	04/13/2022	1
Lookout Point Head of Reservoir RST	Trap Install	03/10/2022	03/10/2022	1
Lookout Point Head of Reservoir RST	Operation	03/10/2022 [#]	12/16/2022	285
Lookout Point Head of Reservoir RST	Trap Efficiency Release (993 fish)	04/05/2022	04/05/2022	1
Lookout Point Head of Reservoir RST	Trap Efficiency Release (989 fish)	04/14/2022	04/14/2022	1
Fall Creek Dam Tailrace RST	Operation	03/15/2022	07/15/2022	123
Fall Creek Head of Reservoir RST	Trap and Highline Install	01/11/2022	01/11/2022	1
Fall Creek Head of Reservoir RST	Operation	01/14/2022 [#]	05/31/2022	150
Hills Creek Dam RO and PWR	Deployment	10/12/2021	10/12/2021	1
Hills Creek Dam RO	Operation	10/15/2021	02/28/2022	138
Hills Creek Dam PWR	Operation	10/15/2021	02/28/2022	138
Hills Creek Dam	Trap Efficiency Release (1,200 fish, 600 per route)	01/06/2022	01/06/2022	1
Hills Creek Dam	Trap Efficiency Release (1,200 fish, 600 per route)	02/16/2022	02/16/2022	1
Hills Creek Dam	Trap Efficiency Release (1,200 fish, 600 per route)	02/23/2022	02/23/2022	1
Hills Creek Dam RST	Trap Removal	03/01/2022	03/01/2022	1

*Trap removed before end of task due to damage incurred during unexpected high flow event.

[#]Sites started sampling later than original monitoring start date

Summary of Rotary Screw Trap Data

Rotary screw traps (RSTs) have been operated at eleven locations in the southern Willamette River watershed. For this reporting period, traps were being operated at the following locations: Big Cliff Dam, Green Peter Tailrace- Middle Santiam, Foster Dam Head of Reservoir- South Santiam, Cougar Dam, Cougar Dam Head of Reservoir, Fall Creek Dam Tailrace, Fall Creek Head of Reservoir, Dexter Dam Tailrace, Lookout Dam Tailrace, Lookout Point Head of Reservoir, and Hills Creek Dam.

The RST's at Big Cliff Dam and Lookout Dam Tailrace started sampling on March 15, 2022. On March 1, 2022 the Middle Fork Willamette River below Hills Creek Dam RST's were removed for the sampling season in conjunction with the end of RO spill and to prioritize the limited number of screw traps to other locations.

Below Dam sites that include both RO and PWR to monitor passage routes include South Fork McKenzie River below Cougar Dam, the Middle Fork of the Willamette River in the Lookout Dam Tailrace, and the Middle Fork Willamette River in the Hills Creek Dam Tailrace. Below dam sites that include one RST to monitor passage include the Green Peter Tailrace- Middle Santiam, the Middle Fork of the Willamette River below Dexter Dam and Fall Creek Dam Tailrace which is a tributary on the Middle Fork of the Willamette. At the Green Peter Dam Tailrace, the single RST is placed to sample fish passing through spillways, regulating outlets, and powerhouse outlets. The RST at Dexter Dam is placed to monitor fish passage through the spillways and powerhouse outlets. The RST in the Fall Creek Dam Tailrace is placed in a position to sample fish passing through the regulating outlet.

The RST on the North Santiam River below Big Cliff Dam was not sampled while fish passage measures were not being implemented from February 16, 2022 to March 14, 2022. Sampling resumed on March 15, 2022 in accordance with Task 2.2.

Above reservoir sites include Fall Creek Head of Reservoir, Lookout Point Head of Reservoir on the Middle Fork Willamette River, Foster Dam Head of Reservoir- South Santiam, and Cougar Dam Head of Reservoir on the South Fork McKenzie.

Table 2 provides a summary of sampling metrics collected and where tagging/24-hr holds are being performed by site. Sampling start dates are included in Table 3, and season total collection numbers are displayed in Table 4. The locations of the RST's are depicted in Figures 1 through 10.

Table 2. Sampling Metrics by Site

Rotary Screw Trap Sampling Site	Trap Efficiency Trials	Target Species	Biological and Injury Data	Scale and DNA Samples	24-hr Holds (Post Collection)	PIT Tagging (<65 mm)	Elastomer Tagging (>65 mm)
Big Cliff Dam Tailrace	Yes- Hatchery Fish	Spring Chinook and Winter Steelhead	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Scales taken on subset of collected fish	Yes	Yes- on fish not included in 24-hr holds.	No
Green Peter Dam Tailrace-Middle Santiam	Yes- Hatchery Fish	Spring Chinook and Winter Steelhead	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Yes	Yes	Yes- on fish not included in 24-hr holds.	No
Foster Dam Head of Reservoir-South Santiam	Yes- Run of River Fish	Spring Chinook and Winter Steelhead	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Yes	No	Yes	No
Cougar Dam Tailrace	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Scales taken on subset of collected fish	Yes	Yes- on fish not included in 24-hr holds.	No
Cougar Dam Head of Reservoir	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Yes	No	Yes	Yes
Fall Creek Dam	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Scales taken on subset of collected fish	Yes	Yes	No
Fall Creek Head of Reservoir	Yes- Run of River	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Yes	No	Yes	No
Dexter Dam Tailrace	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Scales taken on subset of collected fish	Yes	Yes- on fish not included in 24-hr holds.	No
Lookout Dam Tailrace	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Scales taken on subset of collected fish	Yes	Yes- on fish not included in 24-hr holds.	No
Lookout Point Head of Reservoir	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Yes	No	Yes	Yes
Hills Creek Dam Tailrace	Yes- Hatchery Fish	Spring Chinook	Yes- weight (nearest 0.1 g), FL (mm), Injuries	Scales taken on subset of collected fish	Yes	Yes- on fish not included in 24-hr holds.	No

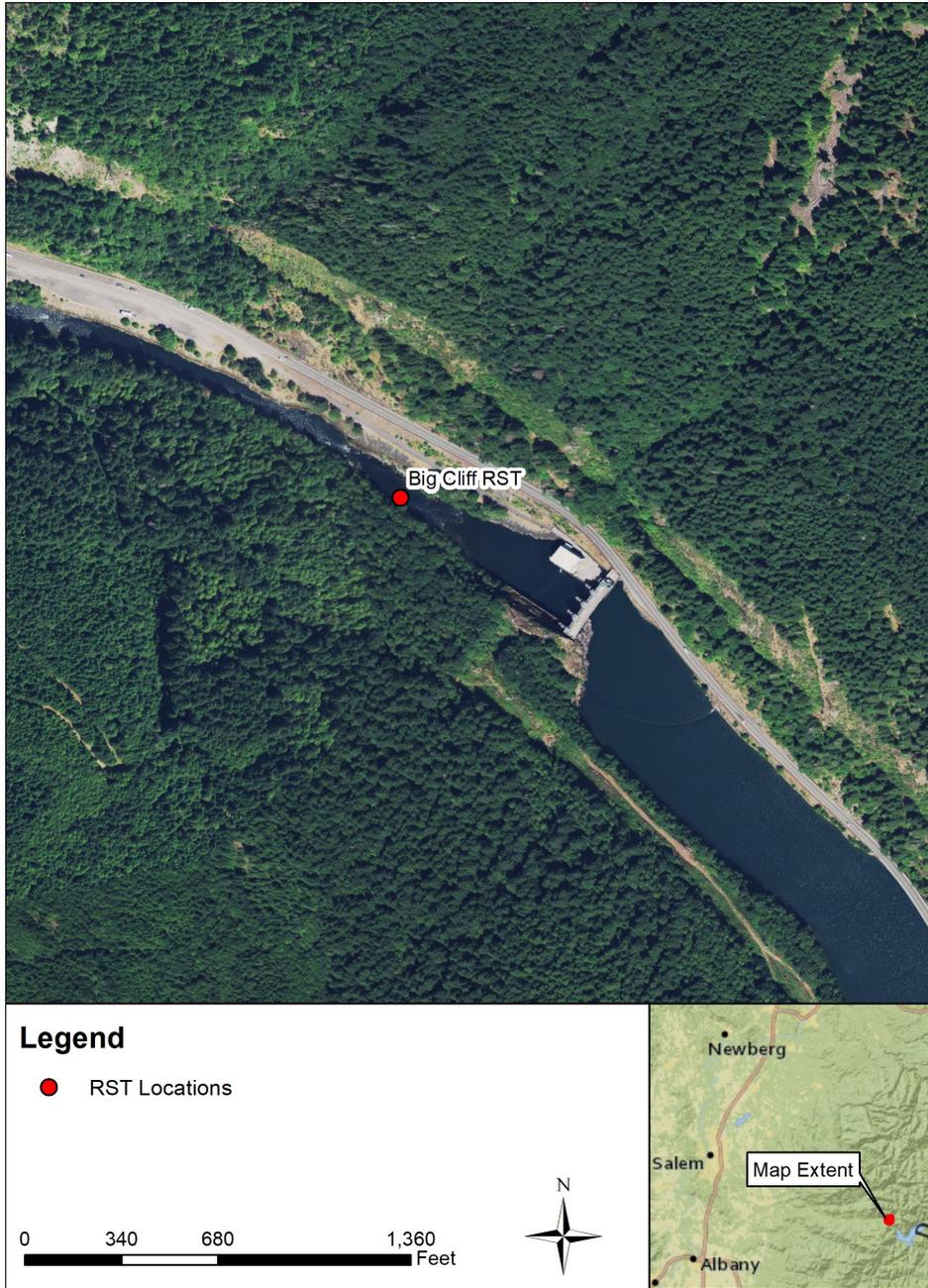


Figure 1. Big Cliff RST Location



Figure 2. Green Peter Tailrace- Middle Santiam River RST Location



Figure 3. Foster Dam Head of Reservoir- South Santiam RST Location



Figure 4. Cougar Dam RST Locations



Figure 5. Cougar Dam Head of Reservoir RST Location

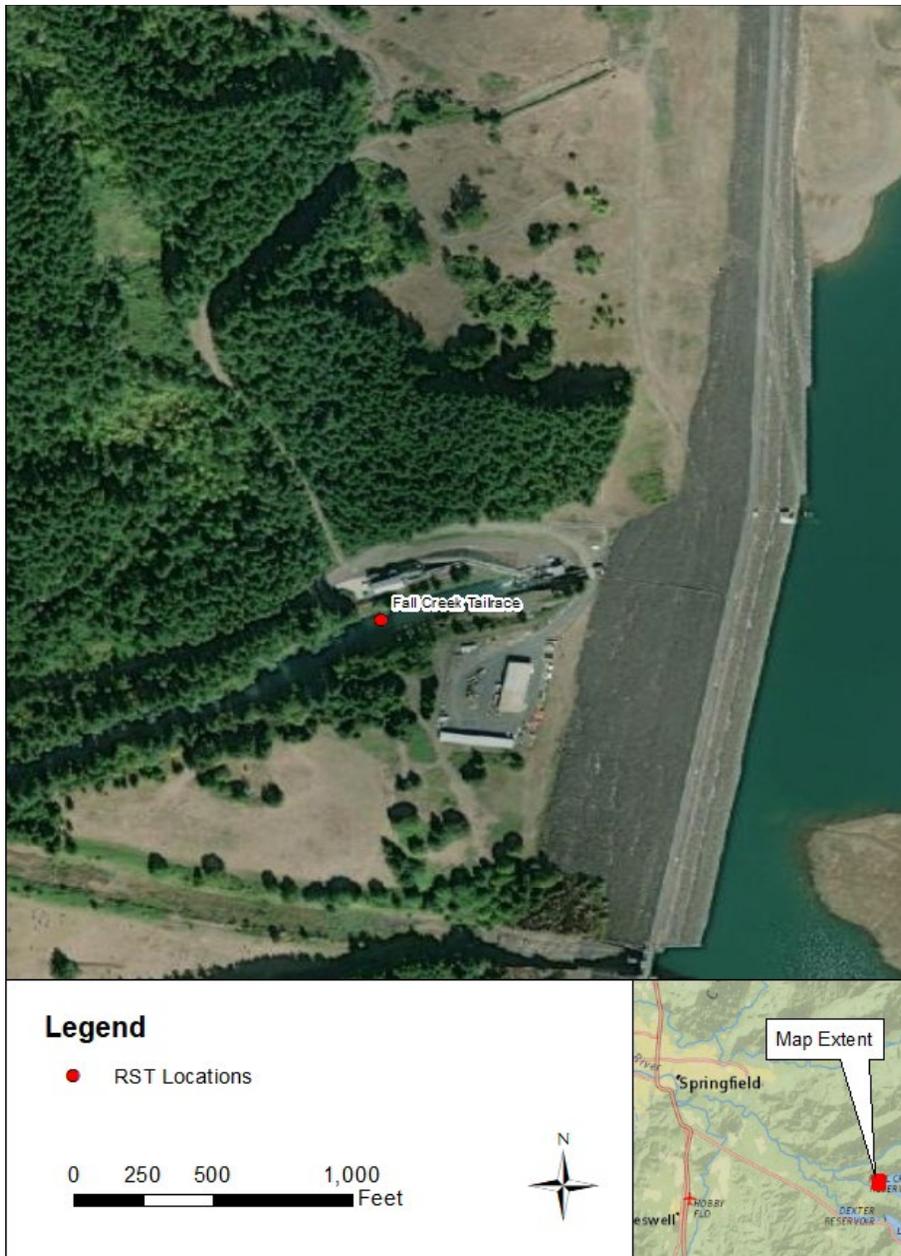


Figure 6. Fall Creek Dam Tailrace RST Location



Figure 7. Fall Creek Head of Reservoir RST Location



Figure 8. Dexter Dam RST Location



Figure 9. Lookout Point Dam Tailrace RST Location



Figure 10. Lookout Point Head of Reservoir RST Location



Figure 11. Hills Creek Dam RST Locations

Table 3. Sampling Dates for Reporting Period

Site	Sampling Period Start	Reporting Period End	Total Days Sampled
Big Cliff Dam	12/01/2021	5/15/2022	127
Green Peter Tailrace- Middle Santiam River	3/2/2022 [#]	5/07/2022	66
Foster Dam Head of Reservoir- South Santiam	3/16/2022 [#]	5/15/2022	57
Cougar Dam PH	12/01/2021	5/15/2022	166
Cougar Dam RO	12/01/2021	5/15/2022	165
Cougar Dam Head of Reservoir	3/8/2022 [#]	5/15/2022	60
Fall Creek Dam Tailrace*	3/15/2022	5/15/2022	62
Fall Creek Head of Reservoir	1/14/2022 [#]	5/15/2022	120
Dexter Dam Tailrace	3/9/2022 [#]	5/15/2022	66
Lookout Point Dam	3/15/2022	5/15/2022	58
Lookout Point Head of Reservoir	3/10/2022 [#]	5/15/2022	72
Hills Creek Dam PH	11/16/2021	2/28/2022	105
Hills Creek Dam RO	11/16/2021	2/28/2022	105

*Fall Creek Dam Tailrace trap was being operated by the Corps until EAS began sampling the site on March 15th per Task 7.1

[#]Start of monitoring began later than specified in task order

Table 4. Willamette Valley Rotary Screw Trap Monitoring Catch Summary

Site	Species	Total Catch for Reporting Period	Total Recaptures for Reporting Period
Big Cliff Dam	CHS	401	40
Big Cliff Dam	STW	10	0
Green Peter Tailrace- Middle Santiam	CHS	0	13
Green Peter Tailrace- Middle Santiam	STW	6	0
Foster Dam Head of Reservoir- South Santiam	CHS	61	0
Foster Dam Head of Reservoir- South Santiam	STW	84	1
Cougar Dam	CHS	1080	152
Cougar Dam Head of Reservoir	CHS	350	41
Fall Creek Dam Tailrace	CHS	0	0
Fall Creek Head of Reservoir	CHS	7	1
Dexter Dam Tailrace	CHS	16	45
Lookout Point Dam	CHS	21	2
Lookout Point Head of Reservoir	CHS	57	72
Hills Creek Dam	CHS	64	82

Table 5. Willamette Valley Rotary Screw Trap Monitoring Sampling Outages Summary

Site	Date(s) of Trap Outage	Reason for Outage
Big Cliff Dam	02/16/2022 to 03/15/2022	Monitoring paused while passage measures were not being implemented.
Big Cliff Dam	05/03/2022 to 05/13/2022	Flows increased to levels where the trap could not be accessed or fished safely.
Green Peter Tailrace- Middle Santiam River	04/02/2022 to 04/13/2022	Initiation of spill resulted in high debris load that created fish health concerns and resulted in the cone being raised.
Green Peter Tailrace- Middle Santiam River	05/07/2022 to end of period	Rapid increase in flow caused damage to the highline anchor, trap was removed to prevent further damage to highline or trap.
Foster Dam Head of Reservoir- South Santiam River	03/01/2022 to 03/16/2022	Trap was not available until 03/16/2022. It was installed the same day.
Foster Dam Head of Reservoir- South Santiam River	05/05/2022 to 05/10/2022	Flows and debris load increased to levels that made it unsafe to access and fish the trap.
Cougar Dam RO RST	05/05/2022	Trap was raised due to large increase in flow. Flow was reduced to a safe level during the night and the trap resumed fishing.
Cougar Dam RO RST	05/09/2022	Flows increased to a level that prevented safe access onto the trap. Flows were decreased later that night.
Cougar Dam Head of Reservoir	04/08/2022 to 04/22/2022	A large snow event restricted access to the site. Cone was raised the day before the storm in anticipation of the event. Road conditions were checked daily during this time.
Cougar Dam Head of Reservoir	05/05/2022 to 05/09/2022	Flows and debris load increased to levels that made it unsafe to fish or access the trap
Fall Creek Head of Reservoir	01/02/2022 to 01/14/2022	Trap installation was postponed until 01/11/2022 due to high flows access issues. Trap was unable to sample until 01/14/2022 when flows and debris level decreased to a safe level for sampling.
Fall Creek Head of Reservoir	03/02/2022 to 03/04/2022	Flows and debris load increased to levels that made it unsafe to fish or access the trap.
Fall Creek Head of Reservoir	05/05/2022 to 05/09/2022	Flows and debris load increased to levels that made it unsafe to fish or access the trap.
Dexter Dam Tailrace	03/01/2022 to 03/09/2022	Trap was not available to install until March 3, 2022. Additional trap structures had to be built after initial install and effective sampling was delayed until March 9, 2022.
Dexter Dam Tailrace	05/05/2022 to 05/07/2022	Forecasted high flows prompted raising the cone to the non-sampling position. Trap resumed fishing after spill patterns were changed to allow for safe access and sampling
Lookout Point Dam Tailrace	05/05/2022 to 05/10/2022	Flows and debris load increased to levels that made it unsafe to fish or access the trap
Lookout Point Head of Reservoir	03/01/2022 to 03/10/2022	Trap was not available for install until 03/10/2022
Lookout Point Head of Reservoir	05/05/2022 to 05/10/2022	Flows and debris load increased to levels that made it unsafe to fish or access the trap
Lookout Point Head of Reservoir	05/14/2022 to 05/16/2022	Flows and debris load increased to levels that made it unsafe to fish or access the trap
Hill Creek Dam PH and RO	03/01/2022 to 03/15/2022	Due to the limited number of rotary screw traps available, the Hills Creek Dam rotary screw traps were removed on March 1, 2022 following completion of nighttime spill operations. These traps were used at other higher priority sites while new traps were being built for futures use at WVP sites.

North Santiam – Big Cliff Dam

Environmental Assessment Services (EAS) began sampling below Big Cliff Dam on the North Santiam River on December 1, 2021. Sampling at this site from November 15, 2021 to November 31, 2021 was conducted by Cramer Fish Sciences (CFS). The site was not sampled while fish passage measures were not being implemented from February 16, 2022 to March 14, 2022. Sampling resumed on March 15, 2022 in accordance with Task 2.2. The RST had to be temporarily removed from May 6, 2022 to May 13, 2022 due to high flows at the site that could have damaged the trap.

Target Species

For this reporting period, sampling began on December 1, 2021 and ended on May 15, 2022. There was a total of 401 Chinook salmon (CHS) and 10 Winter Steelhead (STW) captured during the sampling period (Figures 12 and 13 respectively). Length frequencies for the reporting period can be found in Figure 14. The trap sampled for 127 days during this reporting period. Table 6 provides life stage, length, and weight data for all Chinook salmon and Winter Steelhead that have been caught at the Big Cliff Dam site for the reporting period.

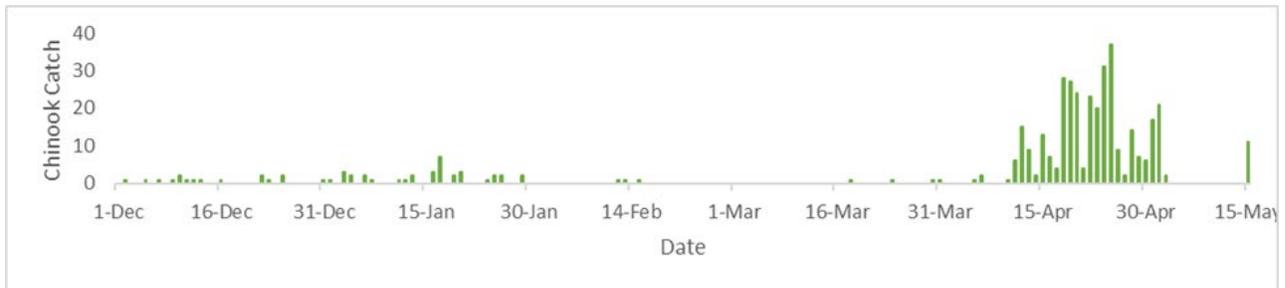


Figure 12. Total Catch of Chinook During Reporting Period

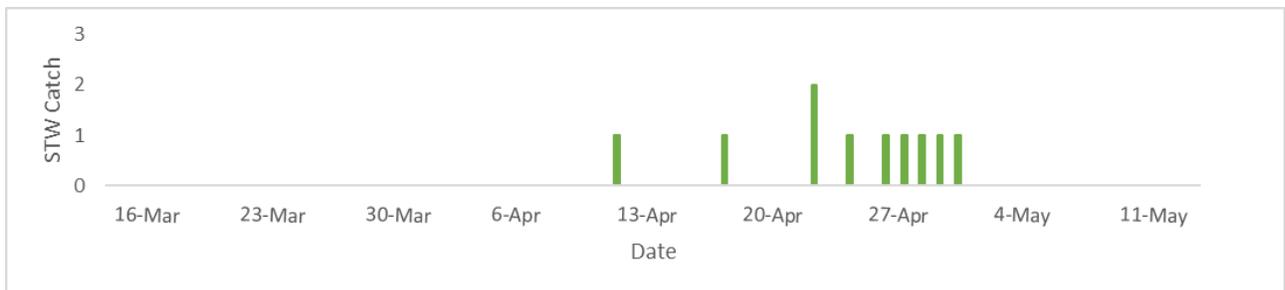
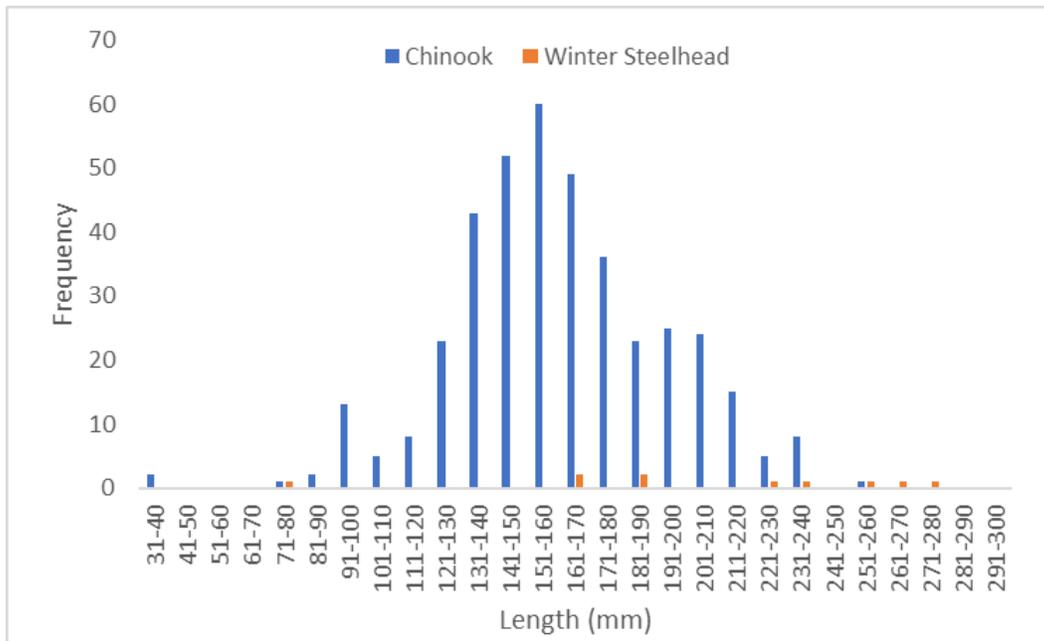


Figure 13. Total Catch of Steelhead (STW) During Reporting Period



*Figure does not include fish without heads

Figure 14. Length Frequency of Juvenile Chinook and Winter Steelhead December 1, 2021 to May 15, 2022 (Big Cliff Dam).

Trapping Efficiency

A total of 996 juvenile hatchery Chinook (parr) were bismark brown dyed, adipose clipped and released on December 22, 2021 below Big Cliff Dam. A total of 39 fish were recaptured in the 8 ft trap December 23, 2021, with 1 more fish captured in the 8ft trap February 15, 2022 for a total of 40 recaptures. Trapping efficiency was 4.01%.

Big Cliff Dam	Release #	Recapture #	Capture Efficiency
8ft Trap	996	40	4.01% (40/996)

Table 6. Descriptive Statistics of Target Species Captured at Big Cliff Dam from December 1, 2021 to May 15, 2022

December 1, 2021 to May 15, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Big Cliff	PWR	CHS	Fry	2	32	33	32.5	N/A	N/A	N/A
		CHS	Parr	19	78	130	101.2	6.1	20.1	11.9
		CHS	Smolt	380	108	260	164.9	11.7	180.6	46.9
		STW	Parr	1	75	75	75	5.2	5.2	5.2
		STW	Smolt	9	161	280	218.3	38.4	230.5	104.8

*Fish that were missing heads are not included in length and weight calculations.

24-Hour Post Collection Holding Trial

199 Chinook and 4 Winter Steelhead were captured during the current reporting period and held for 24 hours. 30 Chinook (15.1%) and 0 Winter Steelhead (0%) died in holding.

Injuries and Copepod Infection

Partial descaling <20% was observed in 219 of the 401 Chinook captured (54.6%) and 115 displayed descaling >20% (28.6%). There were 271 Chinook that displayed bodily injuries (67.5%) and 54 Chinook had eye injuries (13.5%), 340 had copepods present in the branchial cavity (84.7%) and 75 had copepods on fins (18.7%). 8 displayed gas bubble disease, level 1 (2.0), 1 displayed at level 2 (0.2%), 1 displayed at level 3 (0.2%) and 1 displayed at level 4 (0.2%). There were 115 mortalities (28.7%).

Partial descaling (<20%) was observed in 6 of the 10 Winter Steelhead captured (60%), 2 displayed descaling >20% (20%), 6 displayed body injury (60%), 0 Winter Steelhead had eye injuries, 4 had copepods present in the branchial cavity (40%) and 4 had copepods on fins (4%). There was 1 mortality (10%). A summary of injuries observed on Chinook and Winter Steelhead during the reporting period is provided in Table 7, and target species injuries for the duration of the season are provided in Appendix A.

Table 7. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon and Winter Steelhead for Sampling Period. (Big Cliff Dam).

Site	Species	# Fish Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Big Cliff Dam	Chinook	401	219	115	271	54	340	75	115
Big Cliff Dam	Winter Steelhead	10	6	2	6	0	4	4	1

Non-Target Species

135 non-targets were captured during this sampling period. A summary of non-target species catch and mortality numbers for the period are listed in Table 8.

Table 8. Summary of Non-target Species (Big Cliff Dam)

Species	Season Total	Season Total Mortality
Bluegill	17	4
Brook Lamprey	0	0
Bullhead	1	0
Crappie	0	0
Longnose Dace	0	0
Kokanee	104	38
Red-Sided Shiner	0	0
Sculpin	0	0
Spotted Bass	0	0
Sucker	0	0
Whitefish	4	0
Cutthroat	3	0
<i>O. mykiss</i> (clipped)	1	0
Pumpkinseed	3	2
Unknown	2	0
Totals	135	44

Stream Statistics

Basic stream statistics at the Big Cliff Dam site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14181410. Total dissolved gas (TDG) saturation data was received from gage 14181500, 1 rkm downstream of the trap. Gage height (feet) is the only metric provided at this gage. During the reporting period, minimum and maximum values for instantaneous gage height ranged from 1,108.7 feet to 1,118.5 feet respectively (mean: 1,110.7 feet). Figure 15 shows instantaneous gage height.

Total dissolved gas saturation ranged from 102 to 135% during the reporting period (mean: 110.9%). Figure 17 shows total dissolved gas saturation.

Stream temperatures were recorded every 2 hours for the length of the report period for the RO and PWR RST's (Figure 16). Temperature probes operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 9. Operational data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 9. Summary of salmonid CPUE, Big Cliff Dam.

	Chinook	Winter Steelhead
Description	(8 ft)	(8 ft)
Catch	401	10
Effort (hrs)	2967.7	2967.7
CPUE (fish/hr)	0.135	0.003

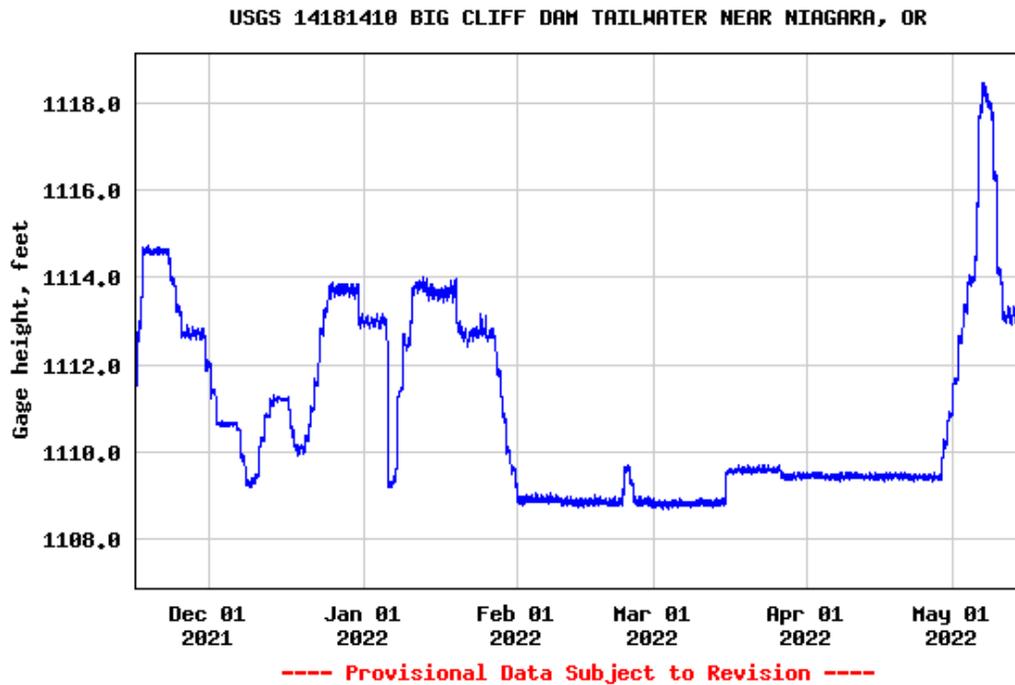


Figure 15. Gage height (ft); below Big Cliff Dam

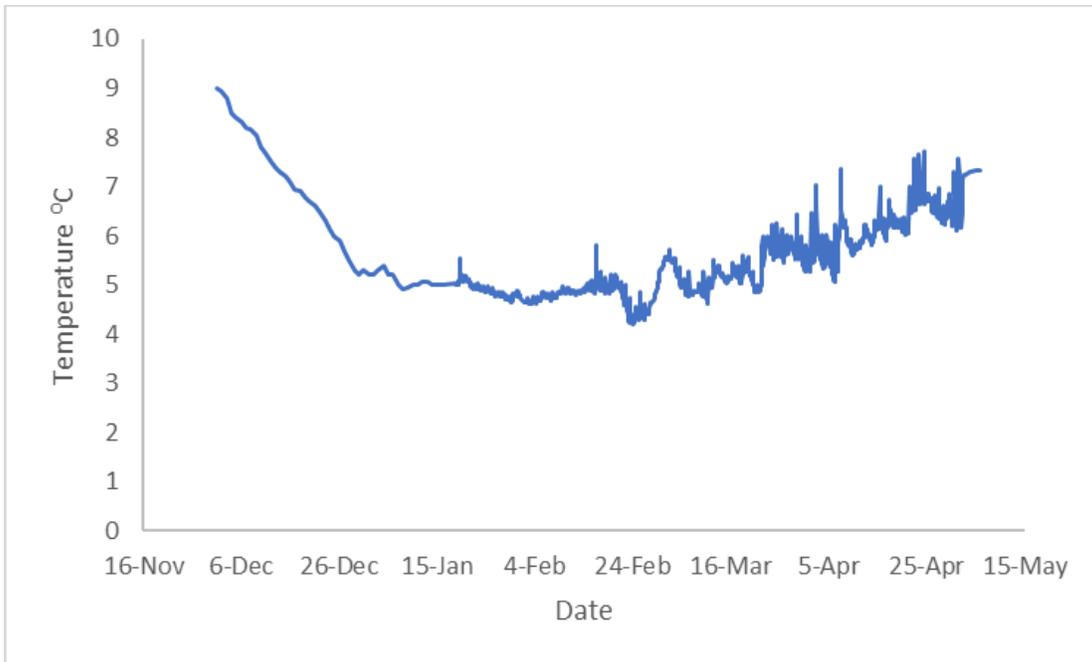


Figure 16. Temperature at RST (Big Cliff Dam)

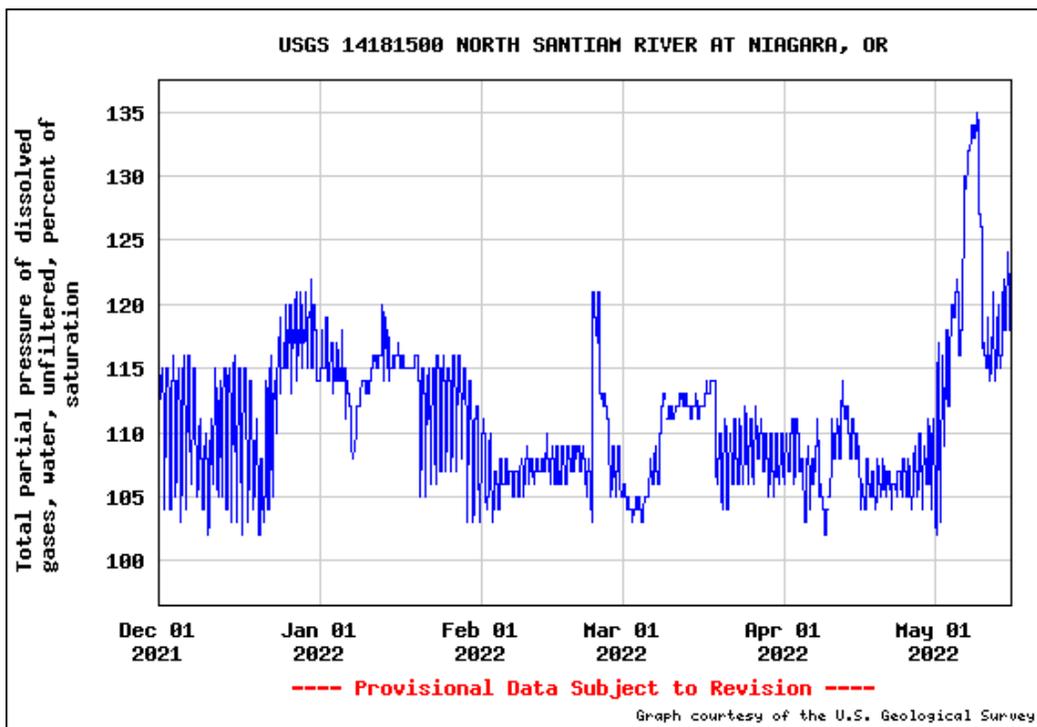


Figure 17. Total Dissolved Gas (%); below Big Cliff Dam

Middle Fork Santiam– Green Peter Tailrace

Target Species

For this reporting period, sampling began on March 2, 2022 and ended on May 7, 2022. The Green Peter tailrace site was installed on March 2, 2022 after the rotary screw trap was delivered by the manufacturer on March 1, 2022. The trap was placed into the non-sampling position on May 7, 2022 after a high flow event damaged the highline anchors and the site was deemed not safe for sampling. The trap was removed on March 12, 2022. No Chinook Salmon (CHS) were captured during the bi-annual sampling period. 6 non-marked *O. mykiss* (potential Winter Steelhead (STW)) were captured during the bi-annual sampling period (Figure 16). 3 radio-tagged Chinook were captured during this reporting period (2 on April 20 and 1 on April 22). The trap sampled for 67 days during this period. Table 10 provides life stage, length, and weight data for all target species that have been caught at the Green Peter Dam Tailrace site. Figure 16 shows the daily capture numbers for winter steelhead and Figure 17 shows length frequency data March 2, 2022 to May 15, 2022.

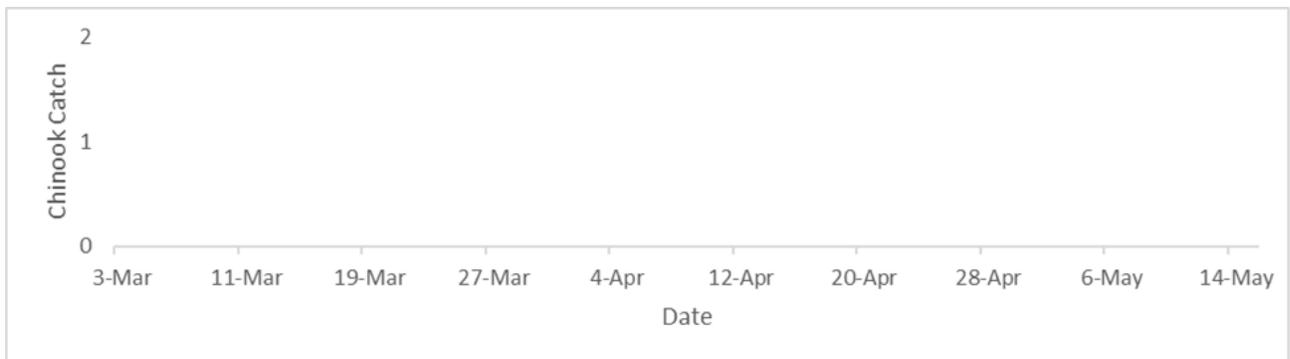


Figure 18. Total Catch of Chinook During Reporting Period

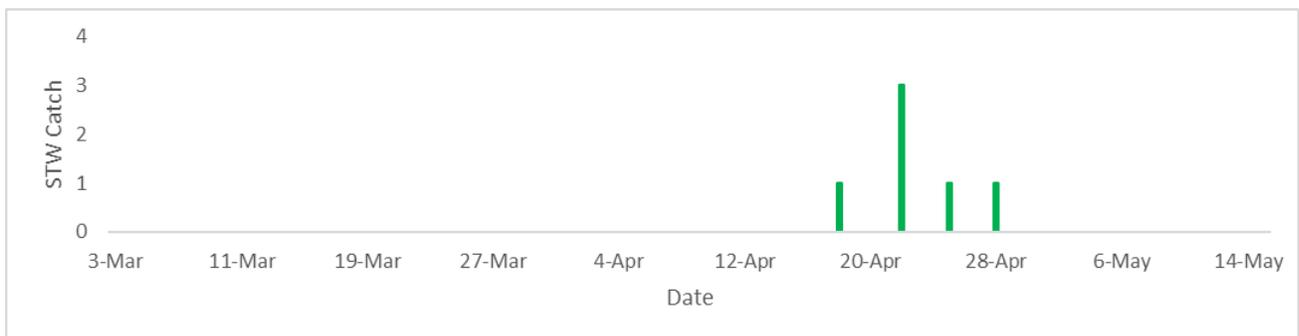
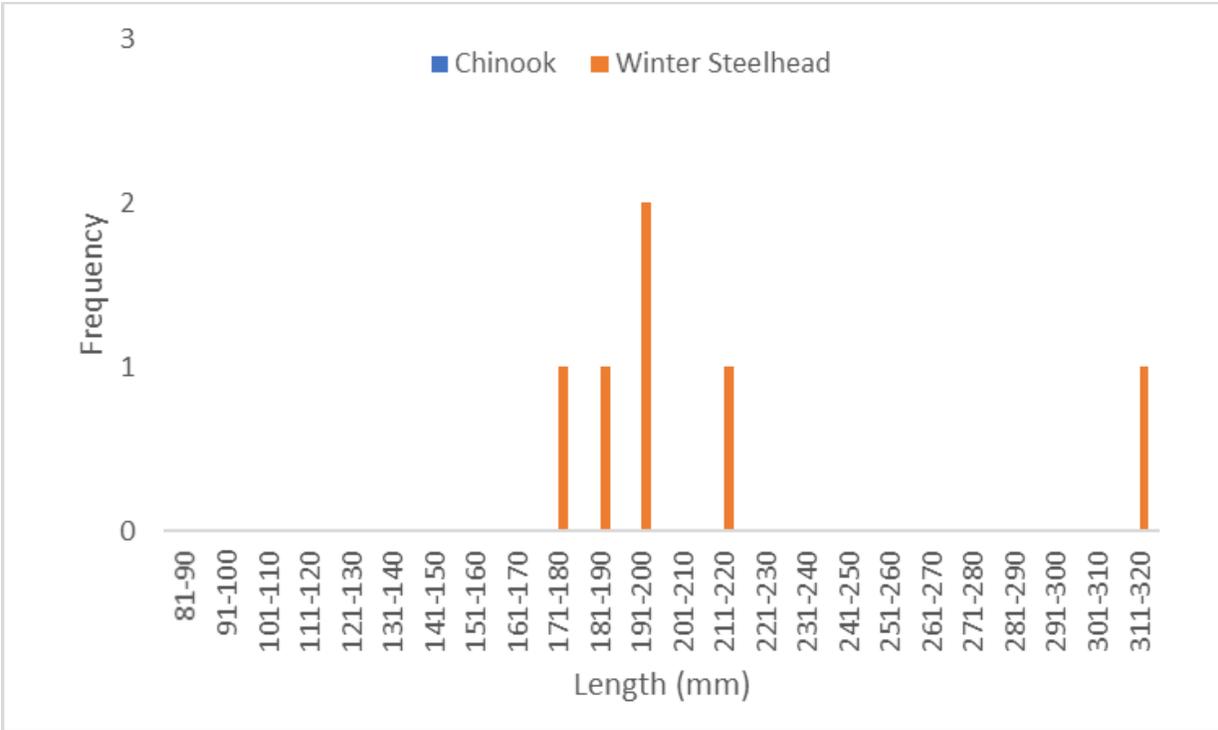


Figure 19. Total Catch of Winter Steelhead During Reporting Period



*Figure does not include fish without heads or fish used for trapping efficiency trials.

Figure 20. Length Frequency of Juvenile Chinook and Winter Steelhead Sampled from the install date of March 2, 2022 to May 15, 2022 (Green Peter Tailrace- Middle Santiam River)

Trapping Efficiency

A total of 643 juvenile hatchery Chinook (parr) were bismark brown dyed, adipose clipped and released on March 29, 2022 below Green Peter Dam. 214 dyed and adipose clipped fish were released below the PWR and 429 dyed and adipose clipped fish were released below the Spillway to evaluate the efficiency of the screw trap in the tailrace. A total of 4 fish were recaptured in the 8ft trap on March 30, 2022. Trapping efficiency was 0.62%

521 juvenile Chinook salmon were adipose clip, bismark brown dyed and released on April 30, 2022. All fish were released below the Spillway. A total of 9 fish were recaptured in the 8 ft trap on May 1, 2022. Trapping efficiency was 1.7%.

Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery.

Green Peter Dam Tailrace- Middle Santiam	Release #	Recapture #	Capture Efficiency
3/29/22	643	4	0.62% (4/643)
4/30/22	521	9	1.7% (9/521)

Table 10. Descriptive Statistics of Target Species Captured at the Green Peter Tailrace-Middle Santiam River Season March 2, 2022 to May 15, 2022

March 2, 2022 to May 15, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Green Peter Dam Tailrace-Middle Santiam	Spill	STW	Parr	0	0	0	0	0	0	0
		STW	Smolt	6	175	320	213.7	46.2	316.1	107.1

*Fish that were missing heads are not included in length and weight calculations.

24-Hour Post Collection Holding Trial

6 *O. mykiss* (potential Winter Steelhead) were captured during the current reporting period; All fish died in holding (100%).

Injuries and Copepod Infection

No natural origin spring Chinook were captured at Green Peter Dam; therefore, no injuries were reported for spring Chinook. There were 16 spring Chinook captured in the trap, but all fish were either trapping efficiency fish (13) or radio tagged fish recaptures (3) from a forebay release study being conducted by PNNL. A total of 6 Winter Steelhead were captured during this reporting period. 3 of the 6 (50%) Winter Steelhead showed partial descaling <20% and 2 showed descaling >20% (33.3%). 6 of the fish showed body injuries (100%) and 1 had eye injury (16.7%). 0 fish had copepods (0%) in the branchial cavity and 1 fish had copepods on the fins (16.7%). 5 displayed gas bubble disease (83.3%, 2 at level 1, 1 at level 2, 1 at level 3, and 1 at level 4). A summary of injuries observed on Winter Steelhead during the reporting period is provided in Table 11, and target species injuries for the duration of the season are provided in Appendix A.

Table 11. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Winter Steelhead for Sampling Period. (Green Peter Tailrace- Middle Santiam River).

Site	Trap	# Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Green Peter	8 ft	6	3	2	6	1	0	1	6

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Collected DNA and Scale Samples

No live target fish were captured for the reporting period and thus, no scale or DNA samples were collected.

Non-Target Species

A total of 229 non-target species fish were captured during the reporting period; the data is summarized below in Table 12.

Table 12. Summary of Non-target Species (Green Peter Tailrace- Middle Santiam River).

Species	Season Total Capture	Season Total Mortality
Bluegill	86	59
Brook Lamprey	0	0
Bullhead	0	0
Crappie	0	0
Longnose Dace	0	0
Kokanee	125	61
Red-Sided Shiner	0	0
Sculpin	0	0
Smallmouth Bass	1	0
Sucker	2	2
Whitefish	0	0
Cutthroat	0	0
<i>O. mykiss</i> (clipped)	4	2
Unknown	11	11
Totals	229	135

Stream Statistics

Basic stream statistics at the Green Peter Dam Tailrace- Middle Santiam site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14186110. Gage height (feet) is the only metric provided at this gage. Total dissolved gas saturation data was received from gage number 14186200, 50 meters upstream of the trap. During the reporting period, minimum and maximum values for instantaneous gage height ranged from 692.2 feet to 706.1 feet respectively (mean: 696.2 feet). Figure 21 shows instantaneous gage height.

Total dissolved gas saturation ranged from 102 to 123% (mean: 111.3%) during the reporting period. Figure 23 shows the total dissolved gas saturation.

Stream temperatures were recorded every 2 hours for the length of the report period for the RST (Figure 22). Temperature probes operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 13. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 13. Summary of salmonid CPUE, Green Peter Tailrace- Middle Santiam River.

	Chinook	Winter Steelhead
Description	8ft	8 ft
Catch	0	6
Effort (hrs)	1263.2	1263.2
CPUE (fish/hr)	0	0.005

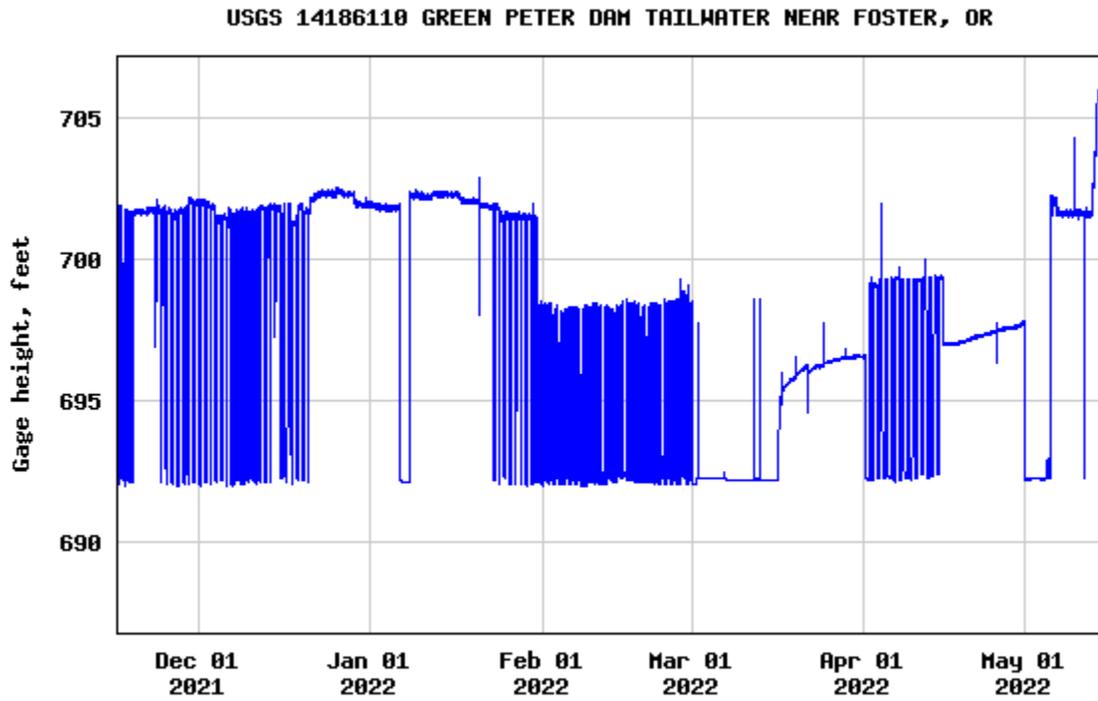


Figure 21. Gage Height (feet); below Green Peter Dam

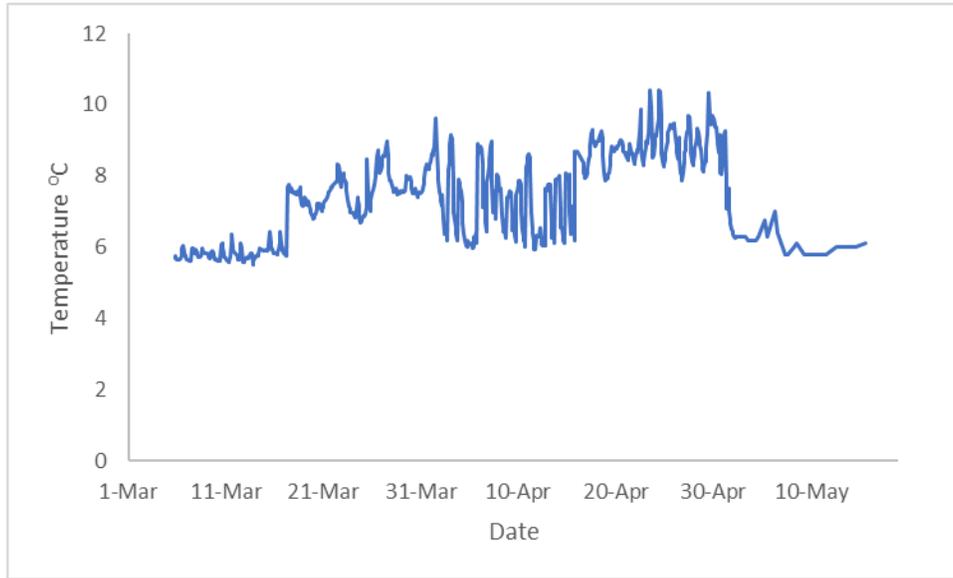


Figure 22. Temperature at RST (Green Peter Tailrace- Middle Santiam River)

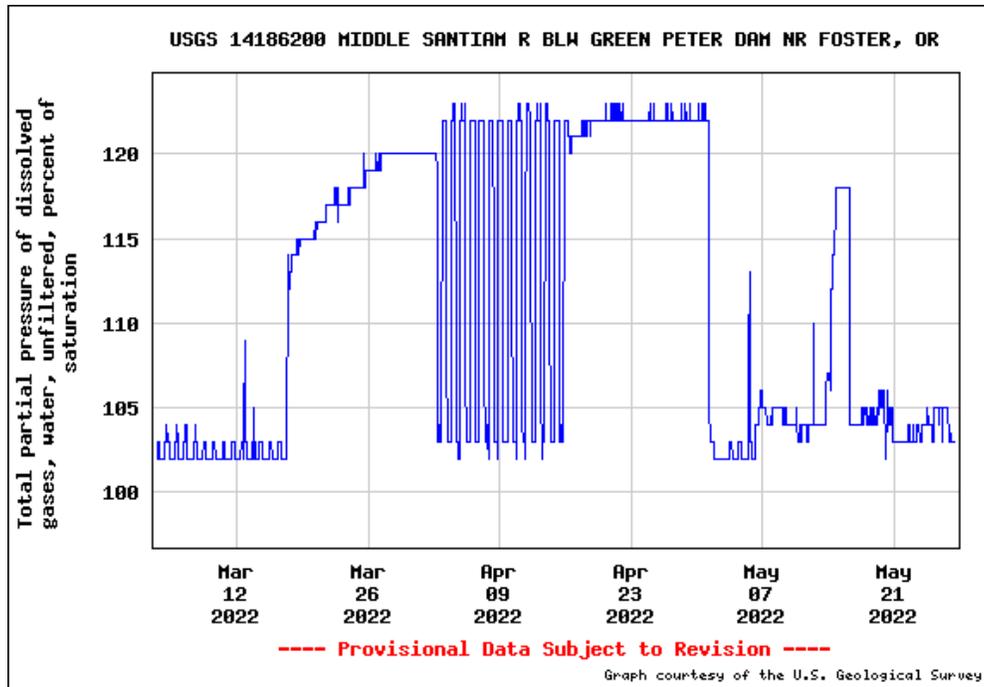


Figure 23. Total Dissolved Gas (%); below Green Peter Tailrace-Middle Santiam River

South Fork Santiam– Foster Dam Head of Reservoir

Target Species

For this reporting period, sampling began on March 16, 2022 and ended on May 15, 2022. The Foster Dam Head of Reservoir site was installed on March 16, 2022 after the rotary screw trap was built and delivered by the manufacturer on March 16, 2022. There was a total of 61 Chinook salmon (CHS) and 84 Winter Steelhead captured (Figures 24 and 25 respectively) during the reporting period. The trap sampled 57 days during this period. Trap sampling outages occurred from May 5, 2022 to May 10, 2022 due to high flows and debris loads that made it too hazardous for crews to access the trap. Table 14 provides life stage, length, and weight data for all Chinook Salmon and Winter Steelhead that have been caught at the Foster Dam Head of Reservoir- South Santiam for the reporting period. Figure 26 shows length frequency data for both species caught during the reporting period.

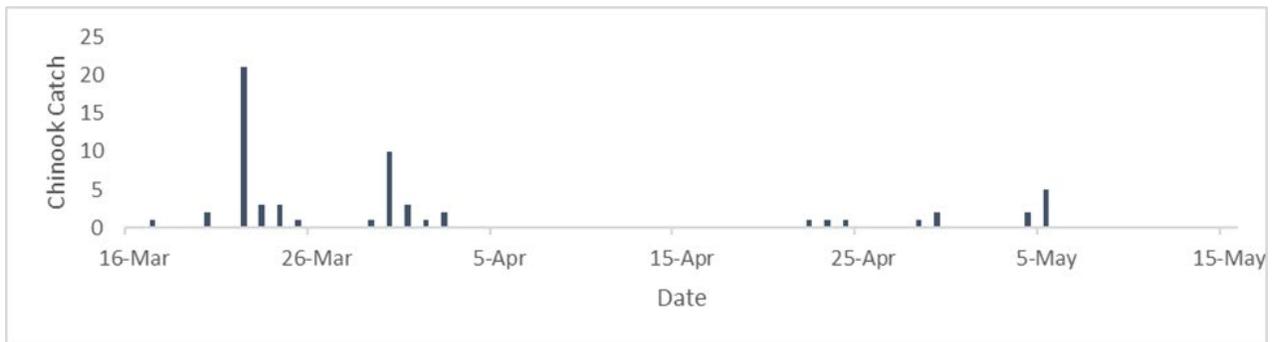


Figure 24. Total Catch of Chinook During Reporting Period

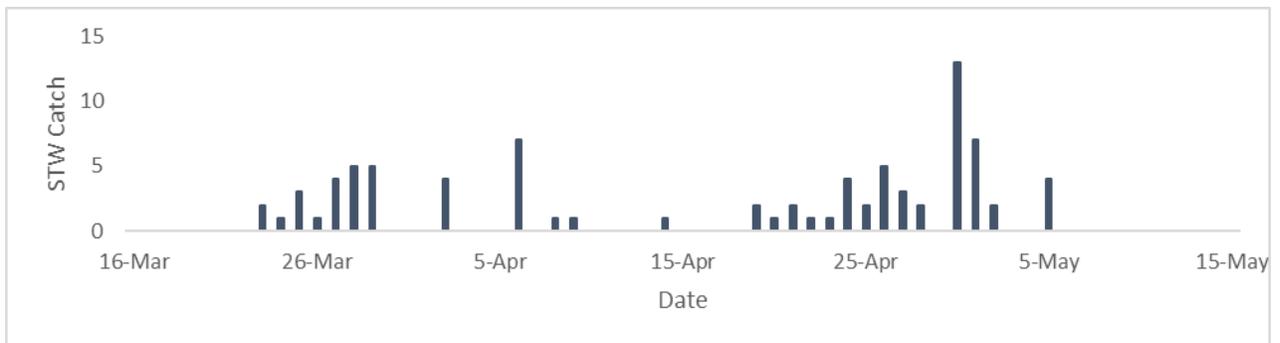


Figure 25. Total Catch of Winter Steelhead During Reporting Period

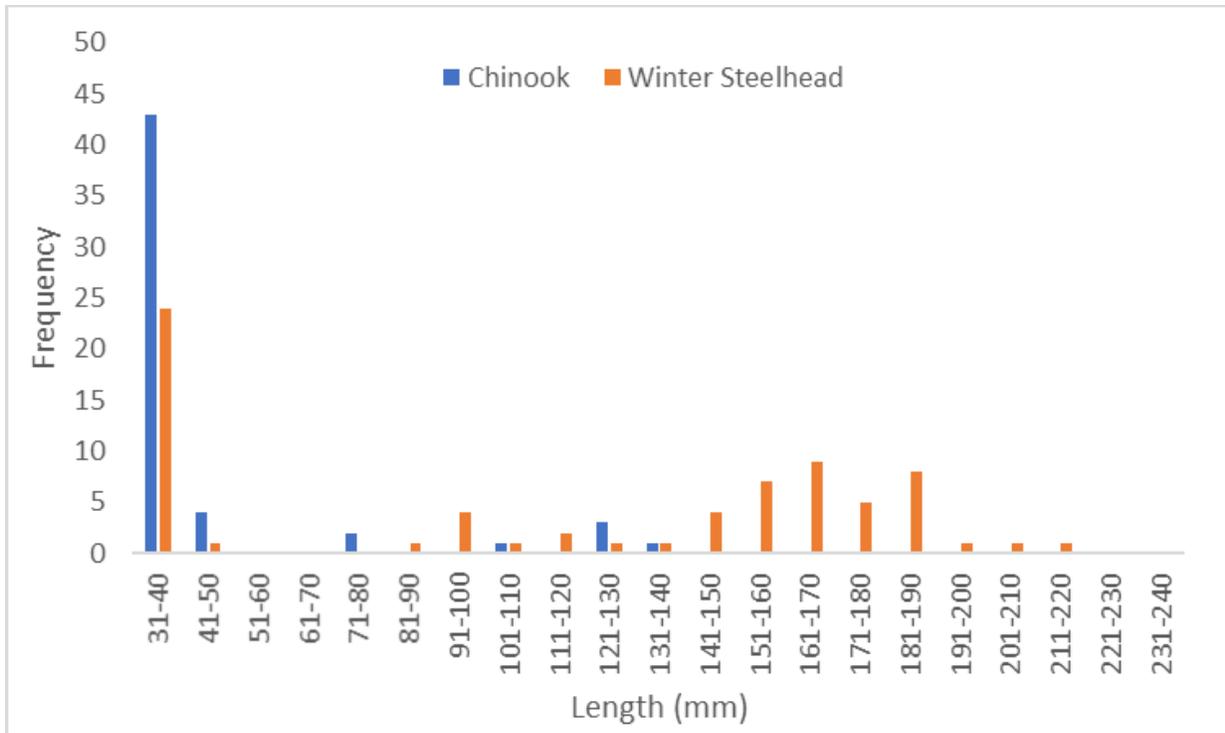


Figure 26. Length Frequency of Juvenile Chinook and Winter Steelhead Sampled Season To-Date (Foster Dam Head of Reservoir- South Santiam)

Trapping Efficiency

10 Chinook and 47 Winter Steelhead have been caudal clipped and released upstream for the purpose of conducting run of river trapping efficiency trials. To date, one of the released Winter Steelhead has been recaptured. Currently, trapping efficiency for Winter Steelhead is 2.1%. Only fish large enough to be safely caudal clipped have been used for efficiency trials.

Table 14. Descriptive Statistics of Target Species Captured at the Foster Dam Head of Reservoir- South Santiam Site March 16, 2022 to May 15, 2022

March 16, 2022 to May 15, 2022										
Site	Trap	Species	Life stage	Collected	Length (mm)*		Weight (g)*			
					Min	Max	Mean	Min	Max	Mean
Foster Dam Head of Reservoir- South Santiam	5 ft	CHS	Fry	54	32	49	35.7	N/A	N/A	N/A
		CHS	Parr	4	73	127	97	3.1	24.7	11.7
		CHS	Smolt	3	120	138	129	19.6	27.5	23.5
		STW	Fry	29	31	46	35.0	N/A	N/A	N/A
		STW	Parr	13	65	183	118.5	2.4	63.6	22.6
		STW	Smolt	42	112	213	168.7	11.2	75.3	47.4

*Most fry are too small to collect accurate weight measurements in the field.

Injuries and Copepod Infection

Partial descaling <20% was observed in 6 of the 61 Chinook captured (9.8%) and 0 displayed descaling >20% (0%), 1 displayed body injury (1.6%) and 0 displayed copepods (0%). One Chinook had eye injuries present (1.6%). Partial descaling <20% was observed on 23 of the 81 Winter Steelhead captured (28.3%). Body injuries were present on 11 Winter Steelhead (13.5%) and 0 displayed eye injury (0%). One copepod was present on a Winter Steelhead captured (1.2%). A summary of injuries observed during the reporting period are provided in Table 15, and for the duration of the season are provided in Appendix A.

Table 15. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon and Winter Steelhead for Sampling Period. (Foster Dam Head of Reservoir- South Santiam).

Site	Species	# Fish Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Foster Dam Head of Reservoir-South Santiam	Chinook	61	6	0	1	1	0	0	0
	Winter Steelhead	84	23	0	11	0	0	1	0

Collected DNA and Scale Samples

For the reporting period, DNA was collected from 20 Winter Steelhead and 4 Spring Chinook. Scale samples were collected from 9 Winter Steelhead. All other target fish were too small to sample (less than 45 mm fork length for DNA and less than 50 mm fork length for scales).

Non-Target Species

There were 38 non-target species fish were captured during the reporting period; the data is summarized below in Table 16.

Table 16. Summary of Non-target Species (Foster Dam Head of Reservoir).

Species	Season Total	Season Total Mortality
Bluegill	0	0
Brook Lamprey	0	0
Bullhead	0	0
Crappie	0	0
Longnose Dace	3	0
Kokanee	0	0
Red-Sided Shiner	0	0
Sculpin	0	0
Spotted Bass	0	0
Sucker	3	0
Whitefish	0	0
Cutthroat	28	0
<i>O. mykiss</i>	0	0
Pumpkinseed	0	0
Unknown	4	0
Totals	38	0

Stream Statistics

Basic stream statistics at the Foster Dam Head of Reservoir- South Santiam site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14185000. Discharge (cfs) and Gage height (feet) are available at this gage. During the reporting period, minimum and maximum values for instantaneous discharge ranged from 443.0 cfs to 7,010.0 cfs respectively (mean: 1,437.2 cfs). Figure 27 shows instantaneous discharge.

Stream temperatures were recorded every 2 hours for the length of the report period for the 5-foot RST (Figure 28). Temperature probes operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 17. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 17. Summary of salmonid CPUE, Foster Dam Head of Reservoir- South Santiam.

	Chinook	Winter Steelhead
Description	(5 ft)	
Catch	61	84
Effort (hrs)	1289.7	1289.7
CPUE (fish/hr)	0.047	0.065

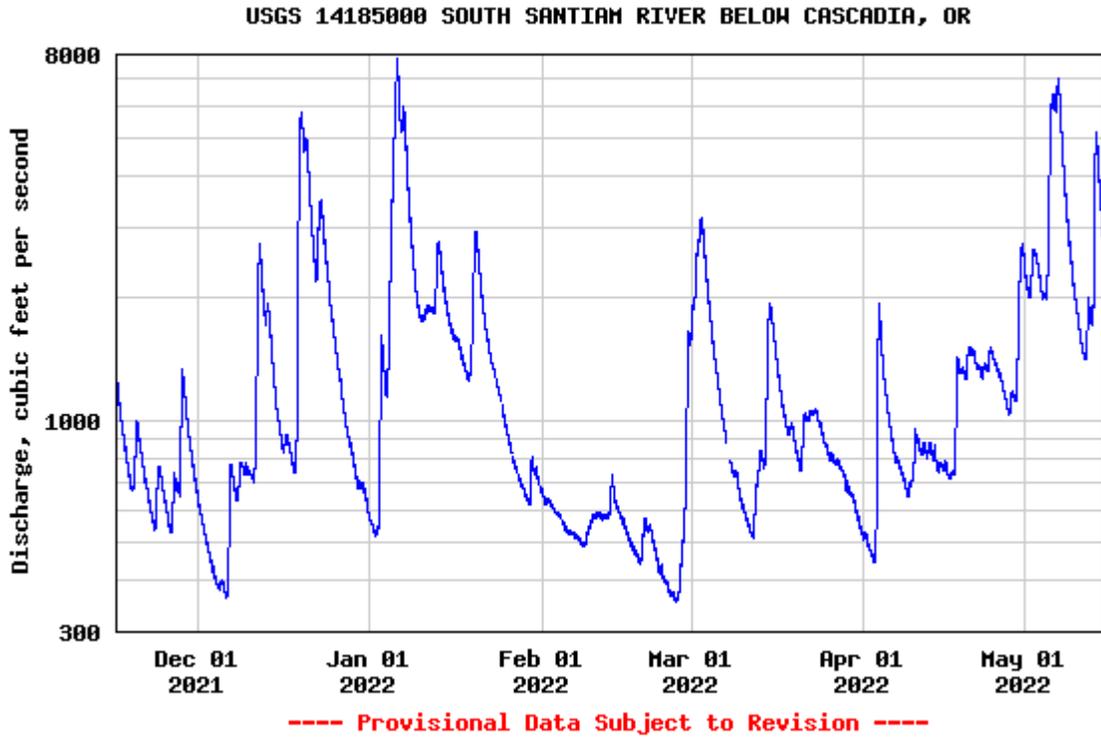


Figure 27. Discharge (cfs); Foster Dam Head of Reservoir – S. Santiam)

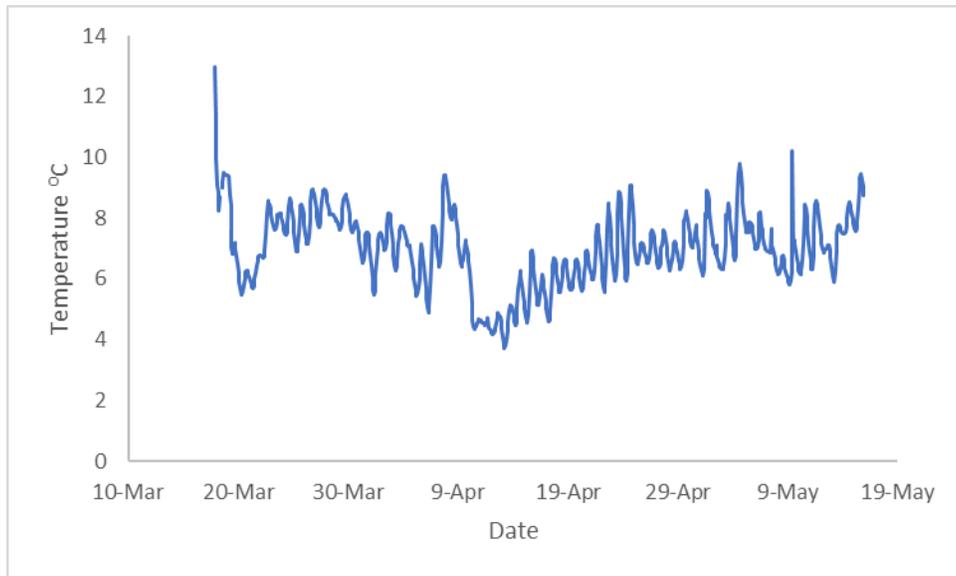


Figure 28. Temperature at RST (Foster Dam Head of Reservoir – S. Santiam)

South Fork McKenzie – Cougar Dam

Target Species

For this reporting period, sampling began on December 1, 2021, and ended on May 15, 2022. Traps were operated by Cramer Fish Sciences (CFS) prior to December 1, 2021. There was a total of 1080 Chinook Salmon (CHS) captured during the sampling period (Figure 29). The RO RST sampled 165 days and the Powerhouse RSTs sampled 166 days. On May 5th, the RO channel flow increased and the RST cone was raised as it was unsafe to access. Flows decreased and the RST began fishing again May 6th. Table 18 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Cougar Dam site during the reporting period. Figure 29 shows the daily capture numbers for chinook and Figure 30 shows length frequency data for the reporting period.

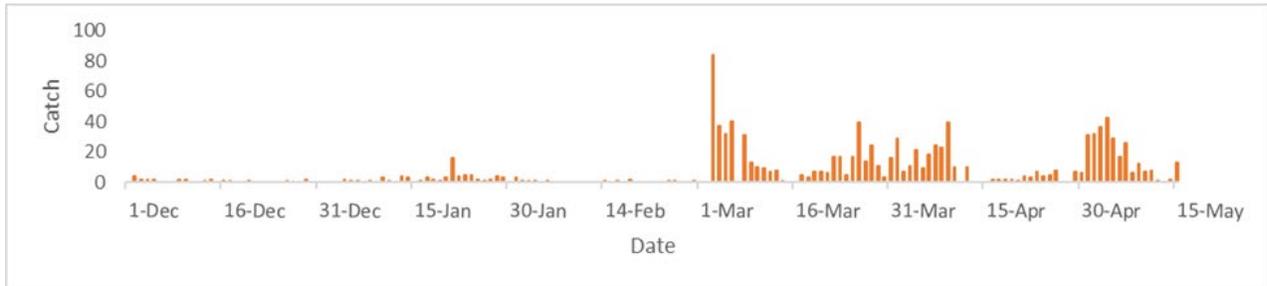
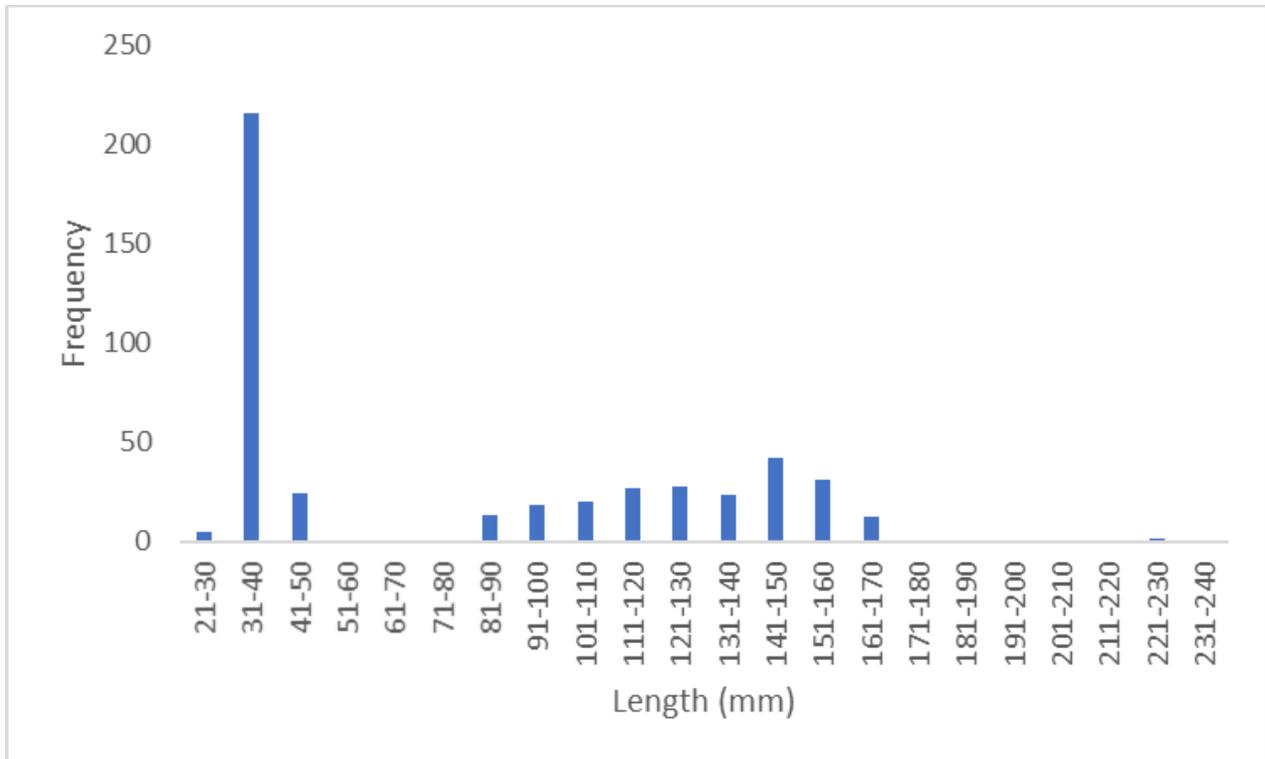


Figure 29. Total Catch of Chinook During Reporting Period



*Figure does not include fish without heads or fish used for trapping efficiency trials.

Figure 30. Length Frequency of Juvenile Chinook Sampled During the Reporting Period (Cougar Dam)

Trapping Efficiency

Two releases of marked hatchery fish occurred at Cougar Dam during this reporting period. Fish for trapping efficiency releases were bismark brown dyed, adipose clipped, left and right ventrally clipped and released in either the PH or RO to evaluate the efficiency of the screw traps at these locations. Fish that were dyed, ad clipped and left ventral clipped were released in the RO channel while fish that were dyed, ad clipped and right ventral clipped were released in the PH channel. A third release occurred on May 15, 2022. However, fish were not processed until the next day and will be reported as part of the next reporting period. A summary of fish release numbers by route and date along with recapture statistics are summarized below.

Date	Route	Release #	Recapture #	Capture Efficiency
4/20/22	PH Route	357	62	17.4% (62/357)
	RO Route	378	21	5.6% (21/378)
1/19/22	PH Route	405	40	9.9% (40/405)
	RO Route	410	28	6.8% (28/410)

Table 18. Descriptive Statistics of Target Species Captured at the Cougar Dam December 01, 2021 to May 15, 2022

December 01, 2021 to May 15, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Cougar Dam	RO	CHS	Fry	15	34	48	39.6	N/A	N/A	N/A
		CHS	Parr	129	56	164	108.2	1.2	41.1	14.6
		CHS	Smolt	210	92	230	140.0	8.8	86.1	29.1
Cougar Dam	PWR	CHS	Fry	331	27	47	37.5	N/A	N/A	N/A
		CHS	Parr	224	58	165	100.3	1.6	41.0	10.9
		CHS	Smolt	169	76	167	134.3	4.2	45.6	25.0

*Fish that were missing heads (2) are not included in length and weight calculations.

24-Hour Post Collection Holding Trial

A total of 589 Chinook captured in the RSTs, 300 fish from the PWR RST and 289 from the RO RST, were held for ~24 hours in holding tanks and then evaluated for survival rates. In total, 472 of the fish (80.1%) held during this period were released alive. 31 of the 300 PWR RST captured fish (10.3%) died during holding and 86 of the 289 RO RST captured fish (29.8%) died during holding.

Injuries and Copepod Infection

Partial descaling <20% was observed on 199 of 354 Chinook collected at the RO RST (56.2%), and descaling >20% was observed on 73 of 354 Chinook collected at the RO RST (20.6%). Of the 354 Chinook captured in the RO RST 163 displayed body injuries (46.0%) and 57 had eye injuries (16.1%). 12 RO RST Chinook displayed Gas Bubble Disease (level 1) (3.4%), 12 displayed level 2 (3.4%), 2 displayed level 3 (0.6%) and 1 displayed level 4 (0.3%). 187 of the RO RST Chinook had copepods present in the branchial cavity (52.8%) and 127 had copepods present on fins (35.9%). Partial descaling <20% was observed on 236 of the 726 Chinook collected at the PWR RST (32.5%). Descaling >20% was observed on 40 of the 726 Chinook collected at the PWR RST (5.5%). 145 PWR RST fish had bodily injuries (20.0%) and 21 had eye injuries (2.9%). 172 fish had copepods present in the branchial cavity (23.7%) and 149 had copepods present on fins (20.5%). There were 46 chinook mortalities collected in the RO RST (6.3%) and 49 in the PWR RST (6.7%). Data is summarized below in Table 19. A summary of injuries observed during the reporting period, and for the duration of the season are provided in Appendix A.

Table 19. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Cougar Dam).

Site	Route	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Cougar	RO	354	199	73	163	57	187	127	46
Cougar	PWR	726	236	40	145	21	172	149	49

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Non-Target Species

A total of 165 non-target species fish were captured during the reporting period; the data is summarized below in Table 20.

Table 20. Summary of Non-target Species (Cougar Dam).

Species	RO Capture	RO Mortality	PWR Capture	PWR Mortality	Season Total Capture	Season Total Mortality
Bluegill	0	0	0	0	0	0
Lamprey	0	0	1	0	1	0
Bullhead	0	0	0	0	0	0
Crappie	0	0	0	0	0	0
Dace	1	1	4	0	5	1
Kokanee	0	0	0	0	0	0
Red-Sided Shiner	0	0	0	0	0	0
Sculpin	0	0	26	0	26	0
Spotted Bass	0	0	0	0	0	0
Sucker	0	0	1	0	1	0
Whitefish	0	0	1	0	1	0
Cutthroat	1	0	27	1	28	1
<i>O. mykiss</i>	11	1	71	0	82	1
Bull Trout	0	0	1	0	1	0
Unknown	1	0	19	1	20	1
Totals	14	2	151	2	165	4

Stream Statistics

Basic stream statistics at the Cougar Dam site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14159410. Gage height (feet) is the only metric provided at this gage. Total dissolved gas saturation data was received from gage 14181500, 500 meters downstream of the trap. During the reporting period, minimum and maximum values for instantaneous gage height ranged from 1,251.0 feet to 1,256.1 feet respectively (mean: 1,253.0 feet). Figure 31 shows instantaneous gage height.

Total dissolved gas saturation ranged from 96 to 120% (mean: 104.2%). Figure 34 shows total dissolved gas saturation.

Stream temperatures were recorded every 2 hours for the length of the report period for the RO and PWR RST's (Figure 32 and 33 respectively). Temperature probes for the RO and PWR RST operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 21. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 21. Summary of salmonid CPUE, Cougar Dam.

Description	Chinook	
	RO (5ft)	PWR(8ft)
Catch	354	726
Effort (hrs)	3882.6	6865.3
CPUE (fish/hr)	0.091	0.106

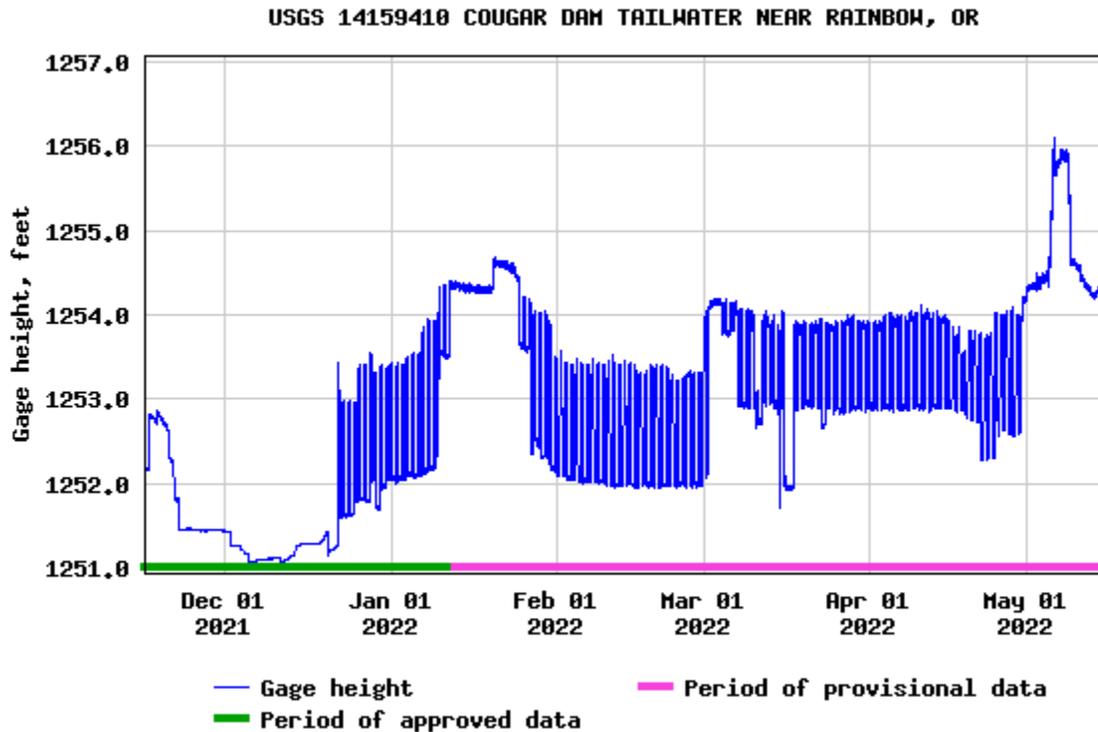


Figure 31. Gage Height (feet); below Cougar Dam, South Fork McKenzie River

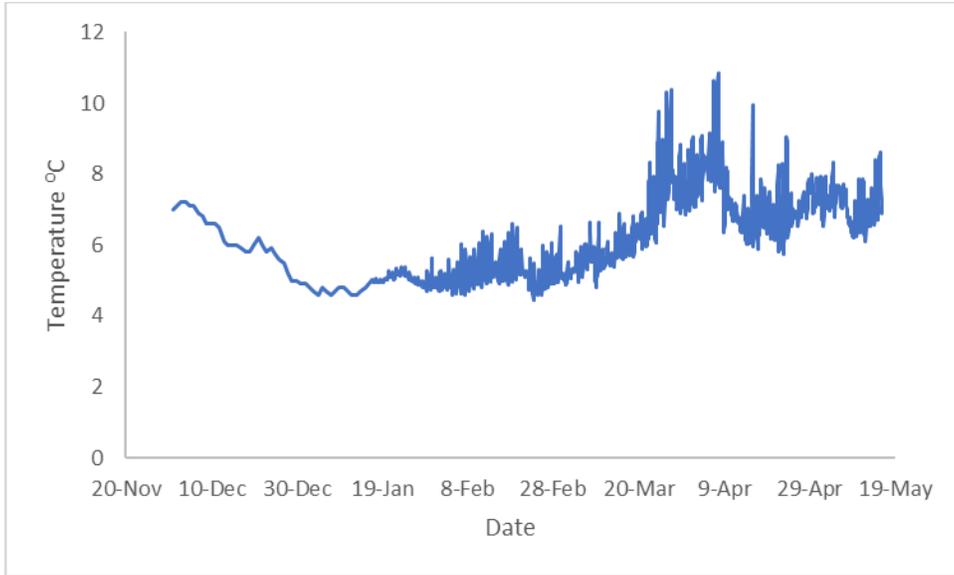


Figure 32. Temperature at RO RST (Cougar Dam)

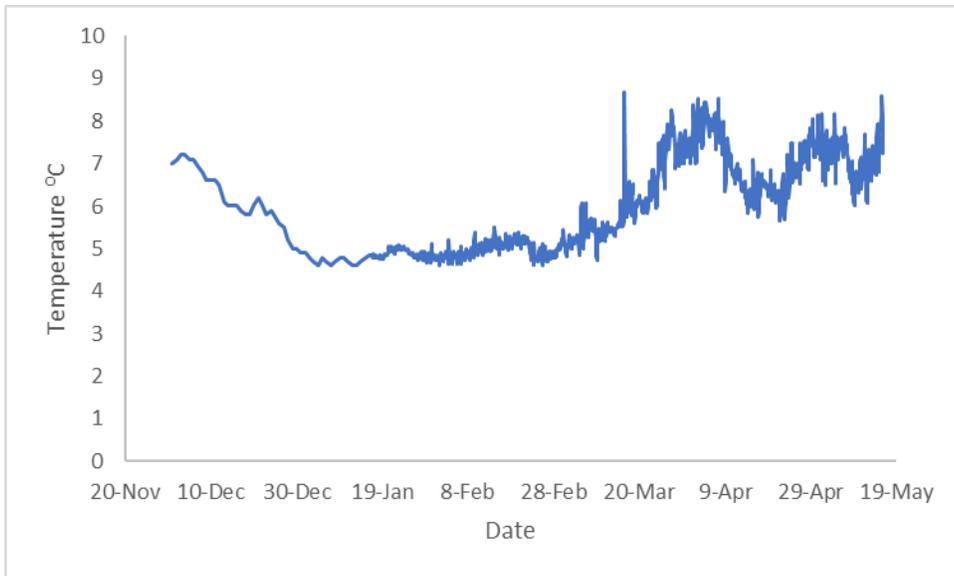


Figure 33. Temperature at PWR RST (Cougar Dam)

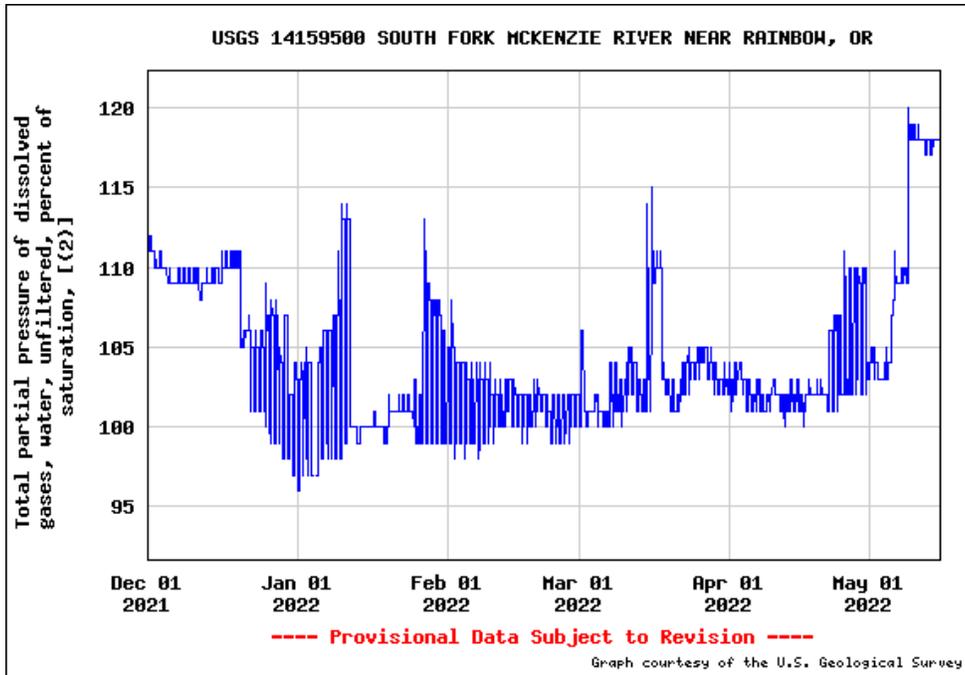


Figure 34. Total Dissolved Gas (%); below Cougar Dam

South Fork of the McKenzie–Cougar Dam Head of Reservoir

Target Species

Sampling for this reporting period began March 7, 2022 and ended May 15, 2022. 350 Chinook salmon were captured during the reporting period (Figure 35). The trap for this site was not refurbished and delivered by the manufacturer until March 6, 2022 which resulted in a delayed trap install and sampling start. The cone was raised into the non-sampling position on April 8th due to access concerns from a forecasted snow event. A snowstorm restricted access to the site from April 9th to April 22nd. Fishing resumed April 22nd. Road conditions were checked daily by RST crews during the sampling outage to determine when access was restored. The trap was operated 60 days during the reporting period. Table 22 provides life stage, length, and weight data for all Chinook salmon that have been caught at the site during the reporting period and Figure 36 shows length frequency data for captured fish.

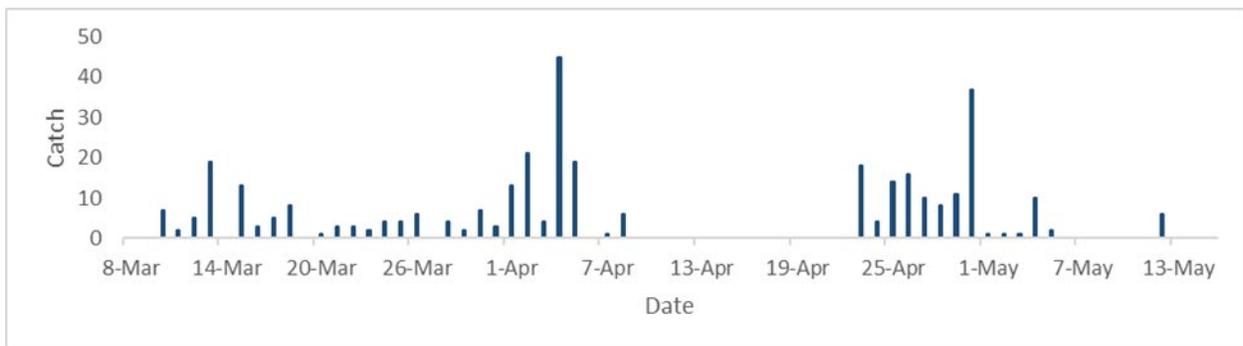


Figure 35. Total Catch of Chinook During Reporting Period

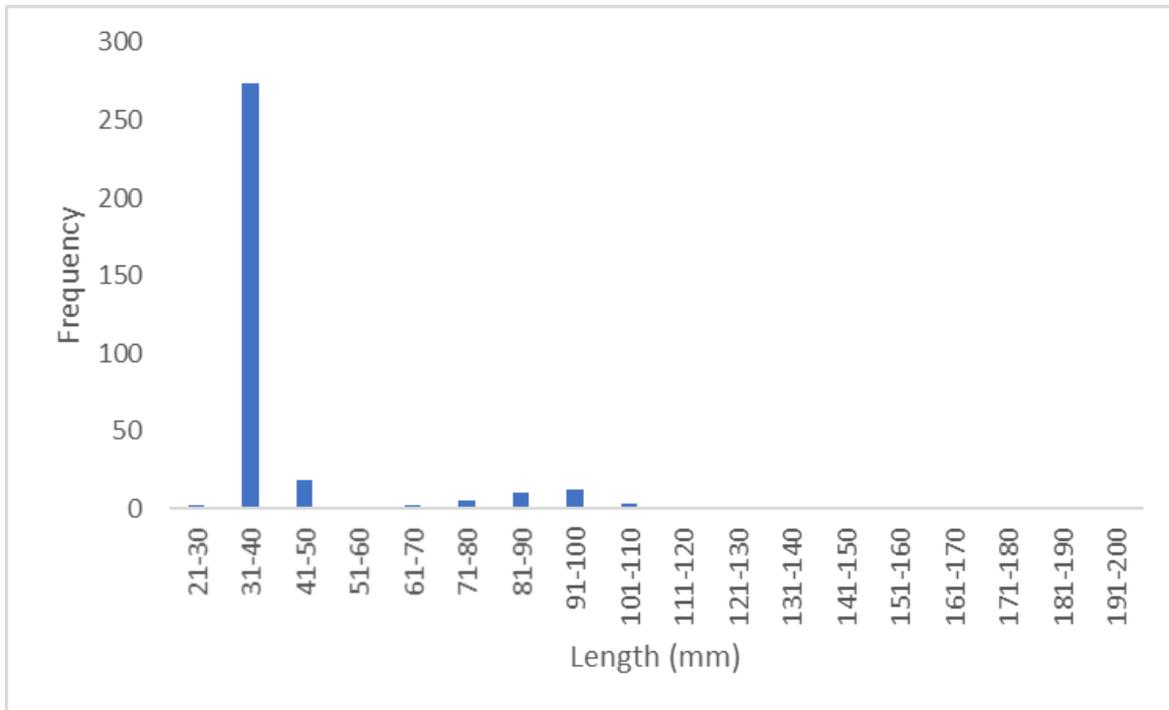


Figure 36. Length Frequency of Juvenile Chinook Sampled Season During the Reporting Period (Cougar Dam Head of Reservoir)

Table 22. Descriptive Statistics of Target Species Captured at Cougar Dam Head of Reservoir, for the Reporting Period

March 7, 2022 to May 15, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Cougar Dam Head of Reservoir	5 ft	CHS	Smolt	0	0	0	0	0	0	0
		CHS	Parr	36	58	150	90.3	2.3	11.2	7.4
		CHS	Fry	314	28	49	36.4	N/A	N/A	N/A

*Most fry are too small to collect accurate weights and thus some metrics are not available for them.

Trapping Efficiency

A total of 806 juvenile hatchery Chinook (smolt) were adipose clipped, left or right ventrally clipped and released on March 18, 2022 upstream of the Cougar Head of Reservoir trap site. A total of 41 fish were recaptured in the 5 ft trap between March 19th and March 25th. Trapping efficiency was 5.1%.

Of the 41 fish recaptured, 26 showed minor descaling and 32 had fin damage. Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery, only noting descaling and fin damage which is common in hatchery raised fish.

Cougar Dam Head of Reservoir	Release #	Recapture #	Capture Efficiency
5ft trap	806	41	5.1% (41/806)

Injuries and Copepod Infection

There were 350 Chinook captured for the reporting period. Of the fish captured, partial descaling <20% was observed on 22 fish (6.3%), 1 had copepods in the brachial cavity (0.3%), 3 had copepods on the fins (0.9%) and 10 had bodily injuries (2.9%). There were 5 mortalities (1.4%). Injury data for the reporting period is summarized in Table 23. To date injury data can be found in Appendix A.

Table 23. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Cougar Dam Head of Reservoir)

Site	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Cougar Dam Head of Reservoir	350	22	0	10	0	1	3	5

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Collected DNA and Scale Samples

Scales and DNA were collected from 45 of the 350 Chinook captured (12.9%). The rest of the captured fish were under the minimum fork length threshold and samples were not collected (less than 45 mm fork length for DNA and less than 50 mm fork length for scales).

Non-Target Species

A total of 268 non-target fish were captured at the Cougar Dam Head of Reservoir RST during the reporting period; the data is summarized below in Table 24.

Table 24. Summary of Non-target Species (Cougar Dam Head of Reservoir)

Species	Season Total	Season Total Mortality
Bluegill	0	0
Lamprey	0	0
Bullhead	0	0
Bull Trout	1	0
Crappie	0	0
Cutthroat Trout	39	1
Longnose Dace	3	0
Speckled Dace	1	0
Red-Sided Shiner	0	0
Sculpin	2	1
Spotted Bass	0	0
Sucker	0	0
Whitefish	0	0
<i>O. mykiss</i>	221	1
Unknown	1	0
Totals	268	3

Stream Statistics

Basic stream statistics at the site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14159200. During the reporting period, minimum and maximum values for instantaneous discharge ranged from 493.0 cfs to 3,980.0 cfs respectively (mean: 1,021.5 cfs). Figure 37 shows instantaneous discharge.

Stream temperature was recorded every two hours with a temperature probe at the trap. The temperature probe operated normally during this period (Figure 38).

Catch per unit of effort (CPUE) data are summarized in Table 25. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 25. Summary of Chinook CPUE, Cougar Dam Head of Reservoir

	Chinook
Description	5 ft
Catch	350
Effort (hrs)	1173.1
CPUE (fish/hr)	0.298

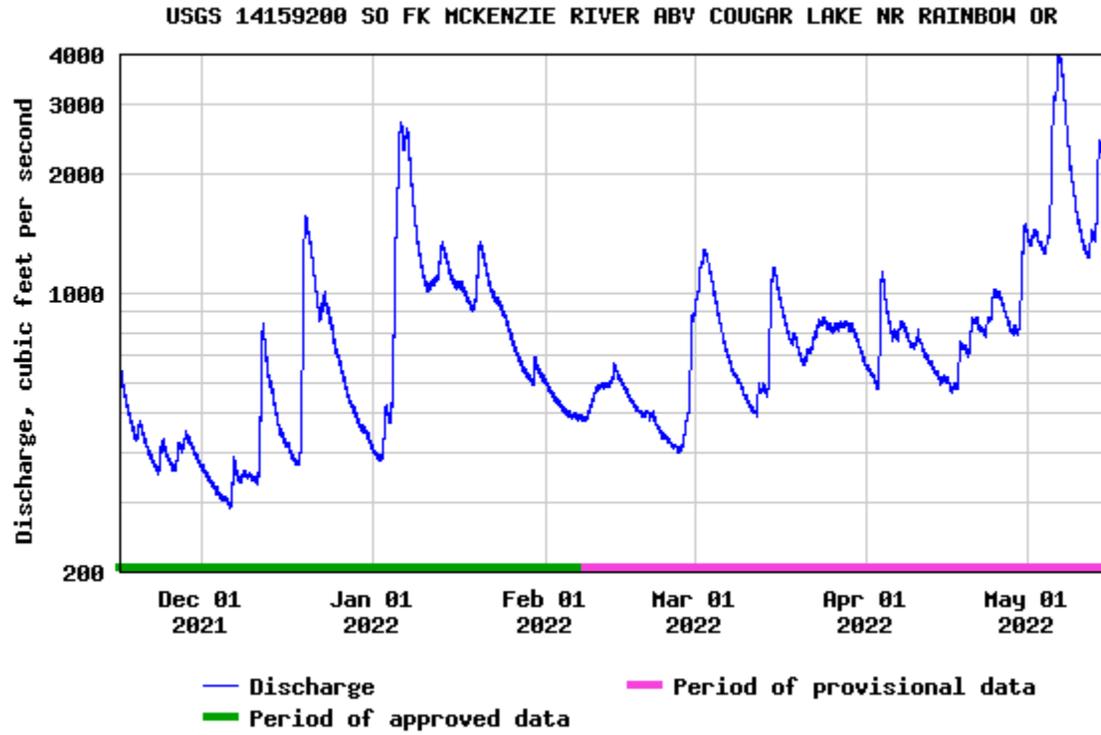


Figure 37. Gage Height (feet); South Fork McKenzie above Cougar Dam

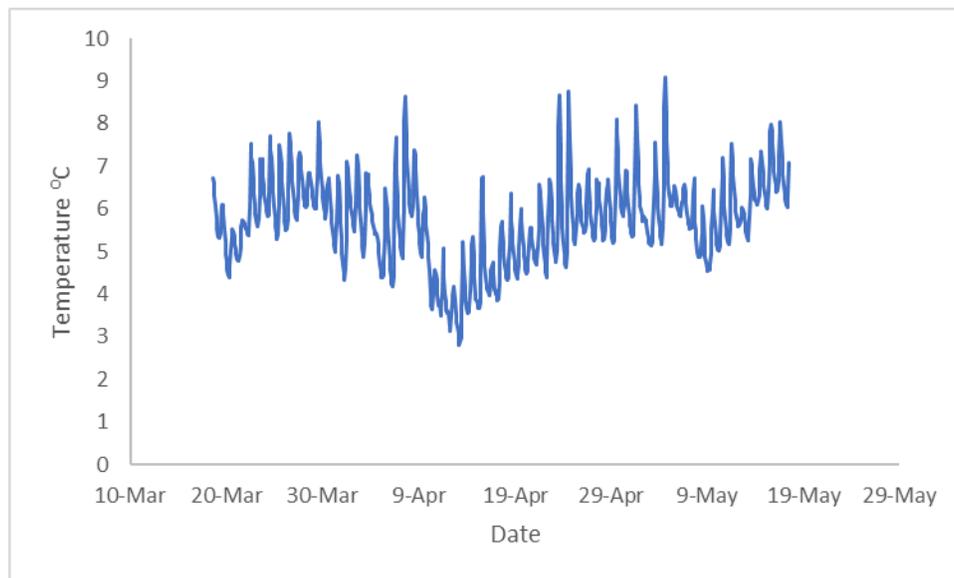


Figure 38. Temperature at RST (Cougar Dam Head of Reservoir)

Middle Fork Willamette – Fall Creek Dam Tailrace

Target Species

Sampling for this reporting period began March 15, 2022 and ended May 15, 2022. The Fall Creek Dam tailrace monitoring was transferred to EAS from USACE biologists on March 15, 2022. No Chinook salmon were captured during the sampling period (Figure 39). The trap was operated by EAS for 62 days during the reporting period. Table 26 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Fall Creek Dam Tailrace site during the reporting period and Figure 40 shows length frequency data of captured fish.

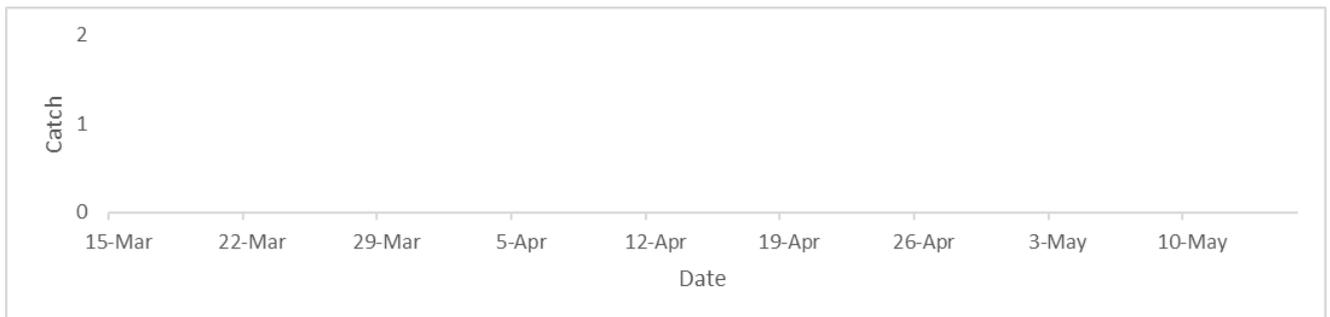


Figure 39. Total Catch of Chinook During Reporting Period

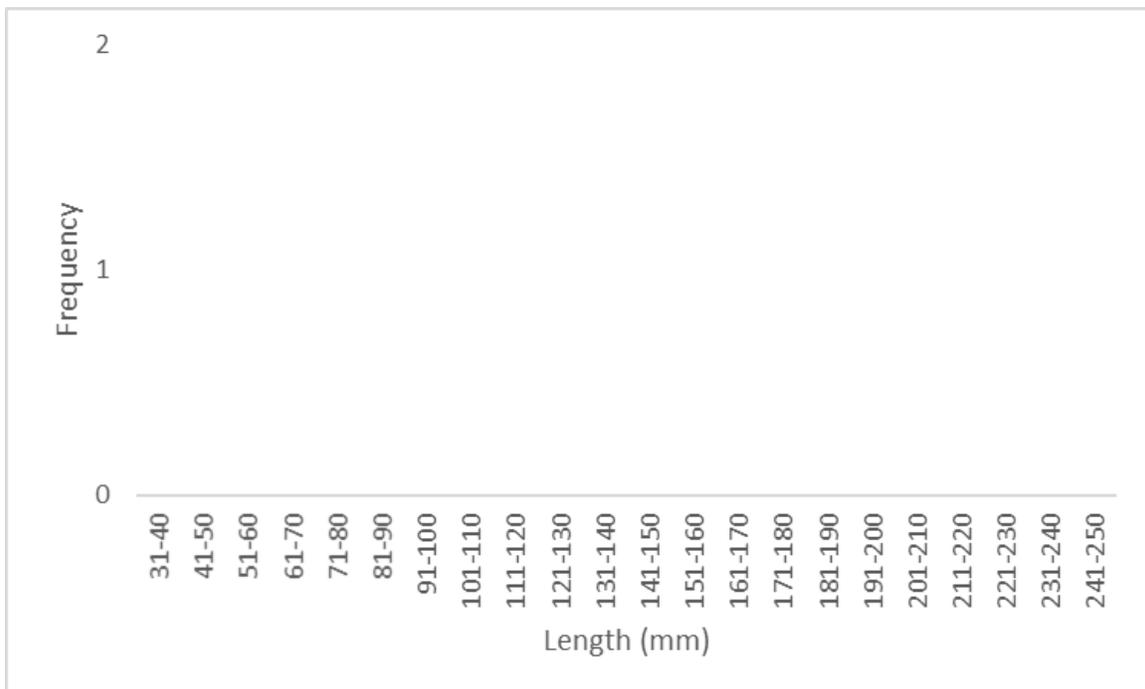


Figure 40. Length Frequency of Juvenile Chinook Sampled by EAS for the Reporting Period (Fall Creek Dam Tailrace)

Table 26. Descriptive Statistics of Target Species Captured at Fall Creek Dam Tailrace, by EAS During the Reporting Period

March 15, 2022 to May 15 ,2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Fall Creek Dam	RO	CHS	Smolt	0	0	0	0	0	0	0
		CHS	Parr	0	0	0	0	0	0	0

Injuries and Copepod Infection

No Chinook were captured during this reporting period. The data is summarized in Table 27. To date injury data is listed in Appendix A.

Table 27. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Fall Creek)

Site	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Fall Creek Dam	0	0	0	0	0	0	0	0

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Trapping Efficiency

Trapping efficiency trials have not been conducted at the Fall Creek Dam Tailrace site to date.

Non-Target Species

A total of 101 non-target fish were captured at the Fall Creek Dam Tailrace site during the reporting period; the data is summarized below in Table 28.

Table 28. Summary of Non-target Species (Fall Creek Dam Tailrace)

Species	Season Total	Season Total Mortality
Bluegill	0	0
Lamprey	0	0
Bullhead	0	0
Bull Trout	0	0
Crappie	0	0
Cutthroat Trout	4	0
Dace	86	0
Red-Sided Shiner	3	0
Sculpin	0	0
Spotted Bass	0	0
Sucker	3	0
Whitefish	0	0
<i>O. mykiss</i>	5	1
Totals	101	1

Stream Statistics

Basic stream statistics at the site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14151000 and 1415000. Dissolved oxygen (mg/L) concentration data was received from gage 1415000, 1.2 rkms downstream of the trap. During the reporting period, minimum and maximum values for instantaneous discharge ranged from 49.1 cfs to 1,190.0 cfs respectively (mean: 271.5 cfs). Figure 41 shows instantaneous discharge.

Dissolved oxygen concentrations ranged from 11.1 to 12.7 mg/L (mean: 11.8 mg/L) during the reporting period. Figure 43 shows dissolved oxygen concentrations.

Stream temperatures were recorded using temperature probes for the Fall Creek Dam Tailrace RST site during this reporting period. The temperature probe operated normally during this period (Figure 42).

Catch per unit of effort (CPUE) data are summarized in Table 29. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B

Table 29. Summary of Chinook CPUE, Fall Creek Dam Tailrace

	Chinook
Description	(8 ft)
Catch	0
Effort (hrs)	1462.1
CPUE (fish/hr)	0

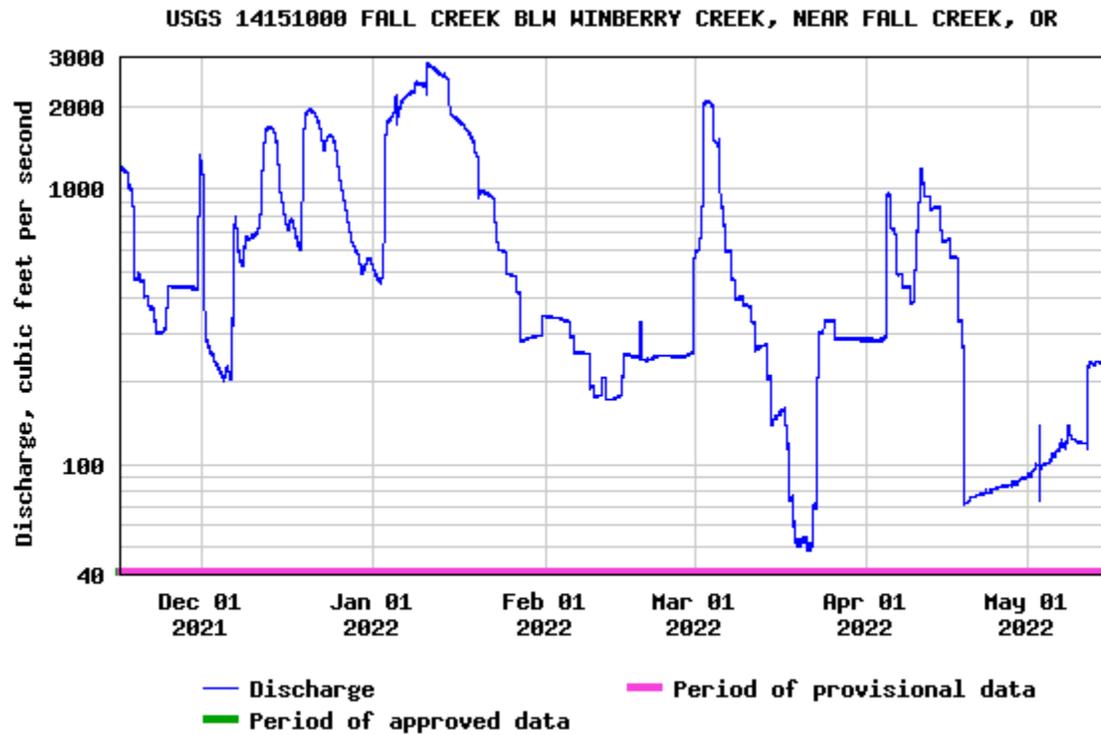
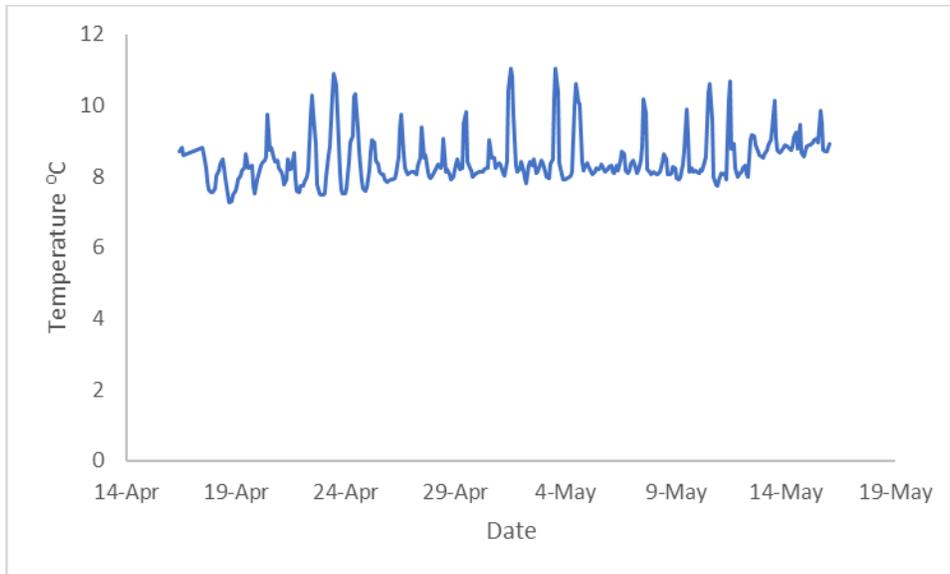


Figure 41. Discharge (cfs); Fall Creek Below Winberry Creek, Near Fall Creek, OR



*Hobo loggers were not available until 04/16/2022

Figure 42. Temperature at RST (Fall Creek Dam Tailrace)

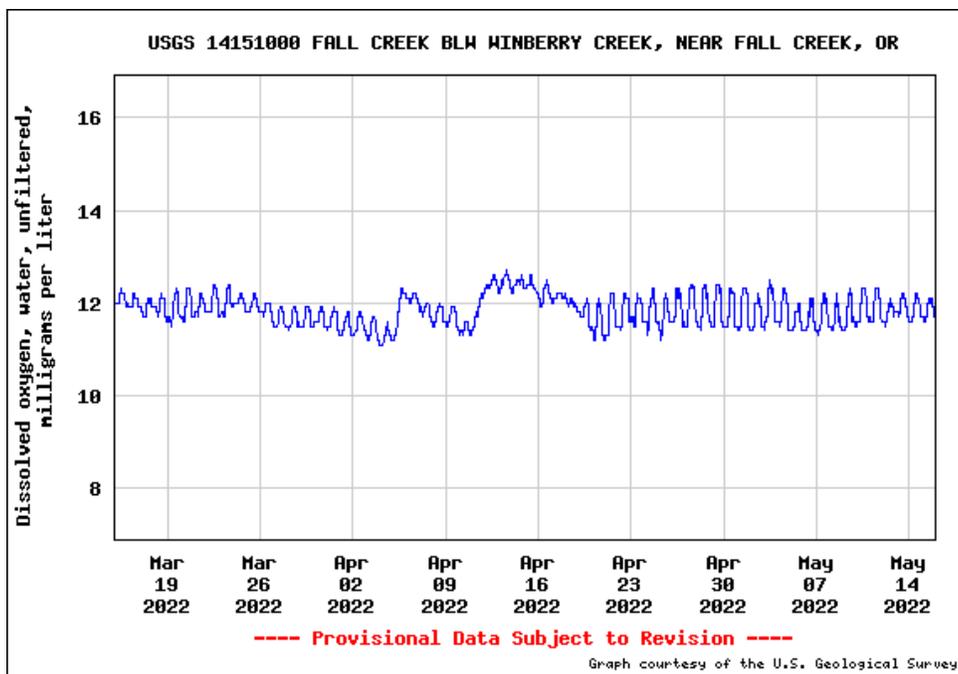


Figure 43. Total Dissolved Oxygen (mg/L); below Fall Creek Dam

Middle Fork Willamette – Fall Creek Head of Reservoir

Target Species

Sampling for this reporting period began January 14, 2022 and ended May 15, 2022. The Fall Creek Head of Reservoir RST was installed January 11, 2022 due to snowstorms and high flows that made

installing the trap impossible prior to this date. Flows and debris levels did not drop to fishable levels until January 14, 2022. Additional sampling outages occurred from March 2, 2022 to March 4, 2022 and May 5, 2022 to May 9, 2022 due to high flow and debris load creating unsafe conditions for crew and captured fish. 7 Chinook salmon were captured during the sampling period (Figure 44). The trap was operated 120 days during the reporting period. Table 30 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Fall Creek Head of Reservoir site during the reporting period and Figure 45 shows length frequency data of captured Chinook.

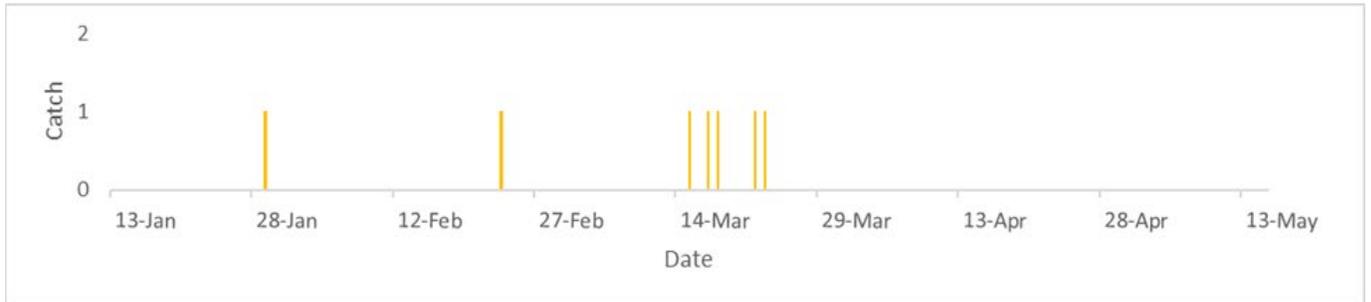


Figure 44. Total Catch of Chinook During Reporting Period

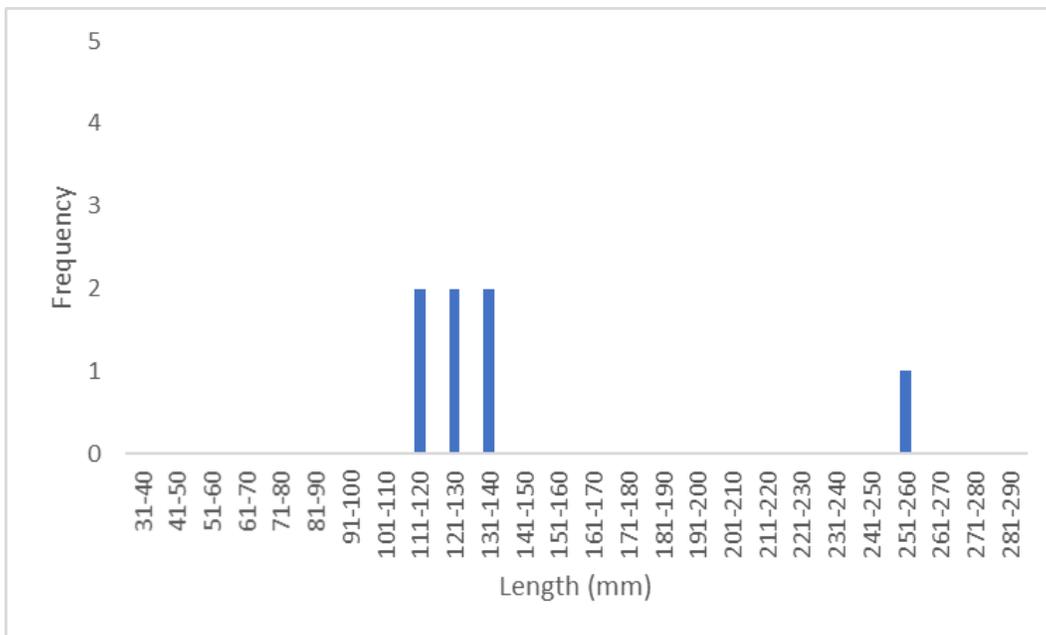


Figure 45. Length Frequency of Juvenile Chinook Sampled During the Reporting Period (Fall Creek Head of Reservoir)

Table 30. Descriptive Statistics of Target Species Captured at Fall Creek Head of Reservoir, During the Reporting Period

January 14, 2022 to May 15 ,2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Fall Creek Head of Reservoir	8 ft	CHS	Smolt	5	127	255	157.2	21.5	108.5	214.3
		CHS	Parr	2	119	120	119.5	16.1	19.8	18.0

Injuries and Copepod Infection

A total of 7 Chinook were captured during this reporting period. Of the 7 Chinook, 3 had partial descaling <20% (42.9%), 1 had bodily injuries (14.3%), 1 with copepods in the brachial cavity (14.3%) and 2 with copepods on the fins (28.6%). There were no mortalities. Injury data for the reporting period is summarized in Table 31. To date injury data can be found in Appendix A.

Table 31. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Fall Creek Head of Reservoir)

Site	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Fall Creek Head of Reservoir	7	3	0	1	0	1	2	0

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Trapping Efficiency

7 fish have been released for efficiency testing to for the reporting period. 1 fish was recaptured during this reporting period (released March 18 and recaptured March 22) for an efficiency of 14.3%.

Collected DNA and Scale Samples

DNA and scales were taken from 5 of the 7 (71.4%) Chinook captured during the reporting period.

Non-Target Species

A total of 682 non-target fish were captured at the Fall Creek Head of Reservoir site during the reporting period; the data is summarized below in Table 32. ODFW released AD clipped hatchery *O. mykiss* near our trap site during this reporting period. Therefore, 79 hatchery *O. mykiss* captured were assessed for condition and then released (fish were not anaesthetized).

Table 32. Summary of Non-target Species (Fall Creek Head of Reservoir)

Species	Season Total	Season Total Mortality
Bluegill	0	0
Lamprey	251	3
Bullhead	0	0
Bull Trout	0	0
Crappie	0	0
Cutthroat Trout	54	0
Longnose Dace	10	0
Speckled Dace	2	0
Red-Sided Shiner	0	0
Sculpin	1	1
Spotted Bass	0	0
Sucker	0	0
Whitefish	0	0
<i>O. mykiss</i>	285	10
<i>O. mykiss (clipped)</i>	79	0
Totals	682	14

Stream Statistics

Basic stream statistics at the Fall Creek site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14150290. During the reporting period, minimum and maximum values for instantaneous gage height ranged from 3.3 feet to 6.7 feet respectively (mean: 3.9 feet). Figure 46 shows instantaneous gage height.

Stream temperatures were recorded every 2 hours for the Fall Creek RST (Figure 47). Temperature probes for the Fall Creek RST operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 33. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 33. Summary of Chinook CPUE, Fall Creek Head of Reservoir

	Chinook
Description	8 ft
Catch	7
Effort (hrs)	2739.9
CPUE (fish/hr)	0.003

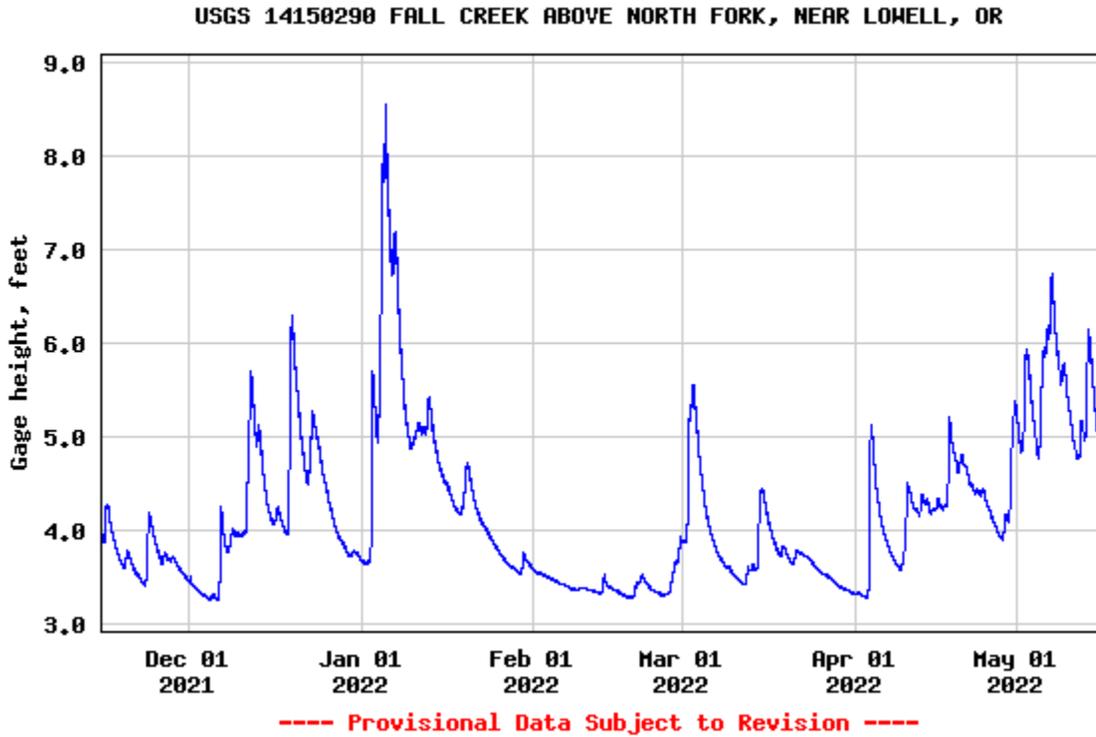


Figure 46. Gage Height (feet); Fall Creek Above North Fork, Near Lowell OR

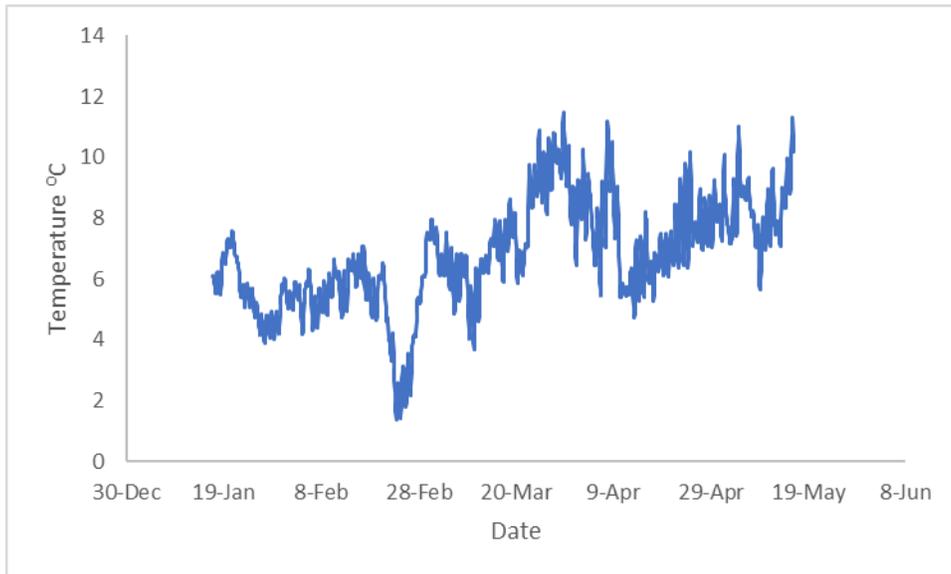


Figure 47. Temperature at RST (Fall Creek Head of Reservoir)

Middle Fork Willamette– Dexter Dam

Target Species

Sampling for this reporting period began on March 9, 2022 and ended on May 15, 2022. The Dexter Dam trap was installed on March 3, 2022. Additional trap structures had to be built and installed after initial installation in order to allow the trap to sample effectively and thus pushed the effective sampling start date to March 9, 2022. There were 16 Chinook salmon (CHS) captured during the sampling period (Figure 48). The trap sampled 69 days during the reporting period. Table 34 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Dexter Dam site for the reporting period. Figure 48 shows the daily capture numbers for Chinook and Figure 49 shows length frequency data of captured fish during the reporting period.

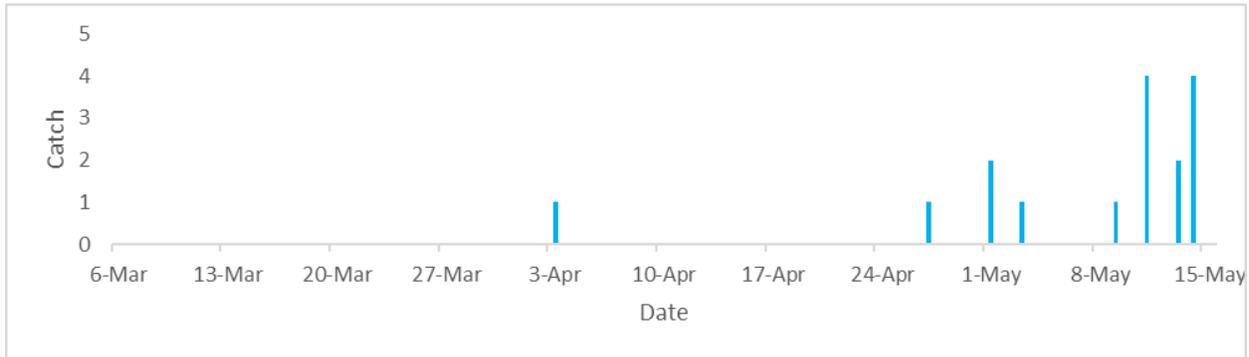
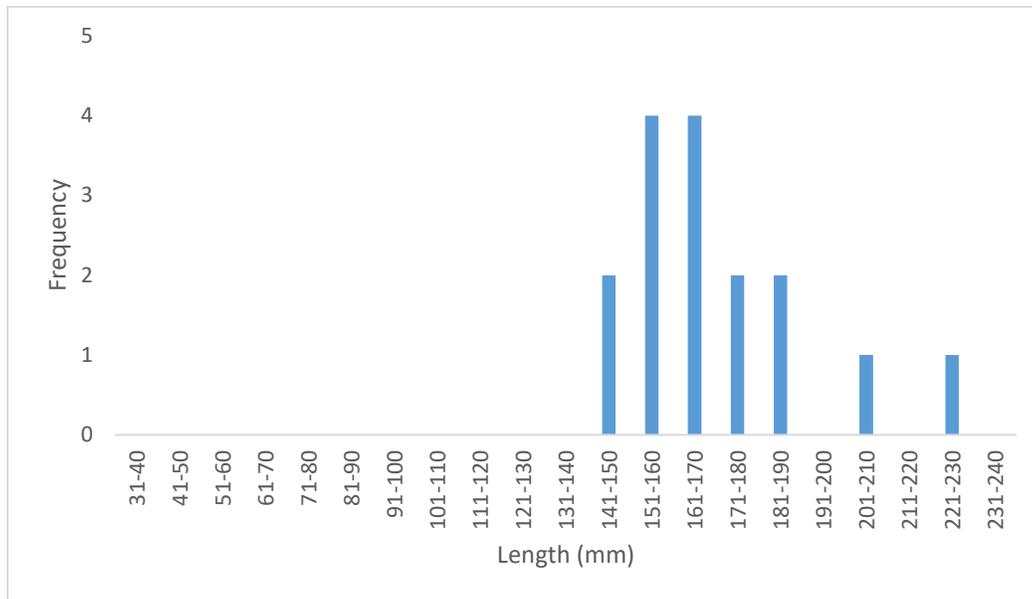


Figure 48. Total Catch of Chinook During Reporting Period



*Figure does not include fish without heads or fish used for trapping efficiency trials.

Figure 49. Length Frequency of Juvenile Chinook Sampled During the Reporting Period (Dexter Dam)

Table 34. Descriptive Statistics of Target Species for the Reporting Period captured at the Dexter Dam RST.

March 9, 2022 to May 15, 2022										
Site	Trap	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Dexter Dam	5 ft	CHS	Parr	0	0	0	0	0	0	0
		CHS	Smolt	16	142	224	170.7	27.8	118.4	47.3

*Fish that were missing heads are not included in length and weight calculations.

Trapping Efficiency

A total of 988 juvenile hatchery Chinook (parr) were bismark brown dyed, adipose clipped, upper caudal clipped and released on March 23, 2022 below Dexter Dam. Fish were released in small groups into different locations in the spillway flow to evaluate the traps efficiency capturing fish passing through spill. A total of 2 fish were recaptured in the 5-foot RST for an efficiency of 0.2%. Both fish recaptured were injured. Injuries were descaling and fin damage. Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery but did note some descaling and fin damage present as is common among hatchery fish of this age.

A total of 1,000 juvenile hatchery Chinook (parr) were bismark brown dyed, adipose clipped, upper caudal clipped and released on May 4, 2022 below Dexter Dam. Fish were released in small groups into different locations in the spillway flow to evaluate the traps efficiency capturing fish passing through spill. A total of 43 fish were recaptured in the 5-foot RST for an efficiency of 4.3%. Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery and all fish were captured unharmed.

Date	Route	Release #	Recapture #	Capture Efficiency
3/23/22	Spill	988	2	0.2% (2/988)
5/4/22	Spill	1,000	43	4.3% (43/1,000)

24-Hour Post Collection Holding Trial

There were 16 Chinook captured during this reporting period and held for 24 hours. A total of 14 fish were released alive (87.5%). 2 fish did not survive holding (12.5%).

Injuries and Copepod Infection

A total of 16 Chinook were captured during this reporting period. Of the 16 Chinook, 12 displayed partial descaling <20% (75%), 4 displayed descaling >20% (25%), 10 had bodily injuries (62.5%), 3 with eye injuries (18.8%) and 1 had copepods on the fins (6.3%). Three Chinook exhibited gas bubble trauma –

level 1 and 2 (18.8%). There were 3 mortalities (18.8%). Injury data for the reporting period is summarized in Table 35. To date injury data can be found in Appendix A.

Table 35. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Dexter Dam).

Site	Route	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Dexter Dam	PWR	16	12	4	10	3	0	1	3

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Non-Target Species

A total of 236 non-target species fish were captured during the reporting period; the data is summarized below in Table 36. Dexter Fish Facility releases adipose clipped Chinook near our trapping site. Adipose clipped Chinook caught in our trap are being counted as non-target fish to provide better clarity on data concerning run of river Chinook. 3 sculpin captured during this period displayed gas bubble disease (1 level 2, 1 level 3, and 1 level 4).

Table 36. Summary of Non-target Species (Dexter Dam).

Species	Season Total	Season Total Mortality
Bluegill	1	0
Brook Lamprey	0	0
Bullhead	0	0
Crappie	7	2
Longnose Dace	25	2
Speckled Dace	1	0
Kokanee	0	0
Red-Sided Shiner	0	0
Sculpin	159	6
Spotted Bass	0	0
Sucker	2	0
Whitefish	0	0
Cutthroat	2	0
<i>O. mykiss</i>	6	0
<i>O. mykiss (clipped)</i>	14	0
Chinook (AD Clipped)	18	0
Totals	236	10

Stream Statistics

Basic stream statistics at the Dexter Dam site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14149510 and 14150000. Gage height (feet) is the only metric provided at this gage. Total dissolved gas saturation data was received from gage 14150000, 4.75 rkms downstream of the trap. During the reporting period, minimum and maximum values for instantaneous

gage height ranged from 636.8 feet to 641.2 feet respectively (mean: 637.6 feet). Figure 50 shows instantaneous gage height.

Total dissolved gas saturation ranged from 99 to 117% (mean: 108.9%) during the reporting period. Figure 52 shows total dissolved gas saturation.

Stream temperatures were recorded every two hours using a temperature probe at the Dexter Dam RST site during this reporting period. Temperature probes operated normally, and the data is shown below in figure 51.

Catch per unit of effort (CPUE) data are summarized in Table 37. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 37. Summary of salmonid CPUE, Dexter Dam.

	Chinook
Description	8 ft
Catch	16
Effort (hrs)	1556.3
CPUE (fish/hr)	0.010

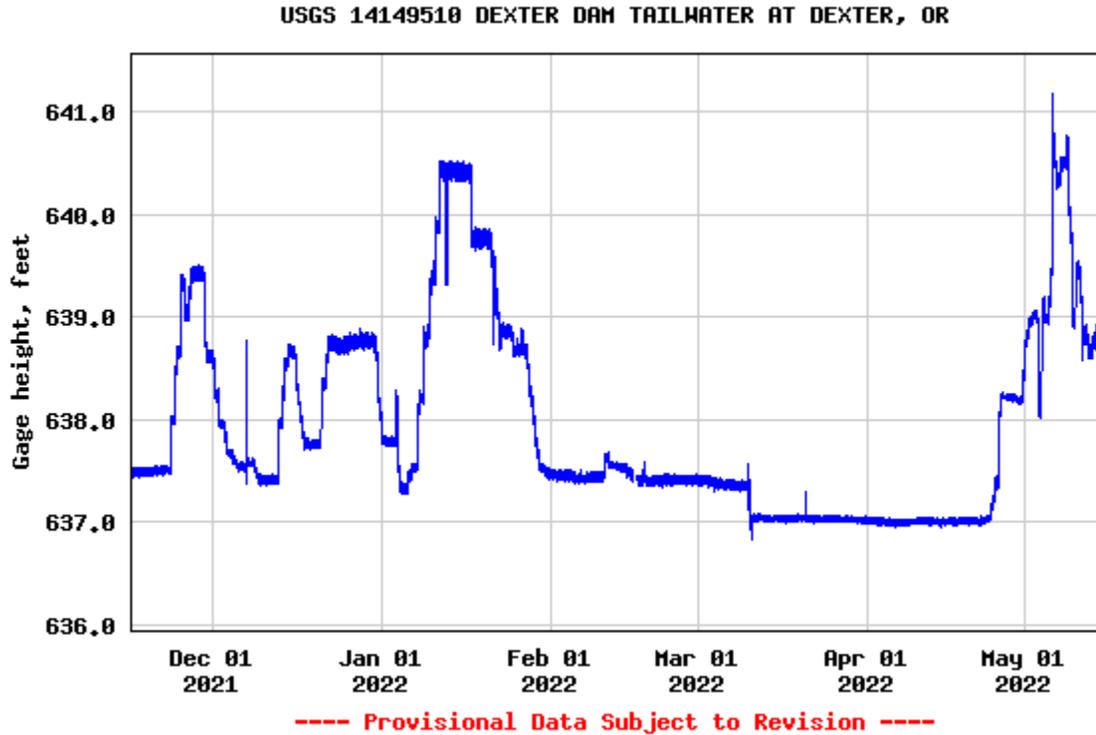


Figure 50. Gage Height (feet); below Dexter Dam, Middle Fork Willamette

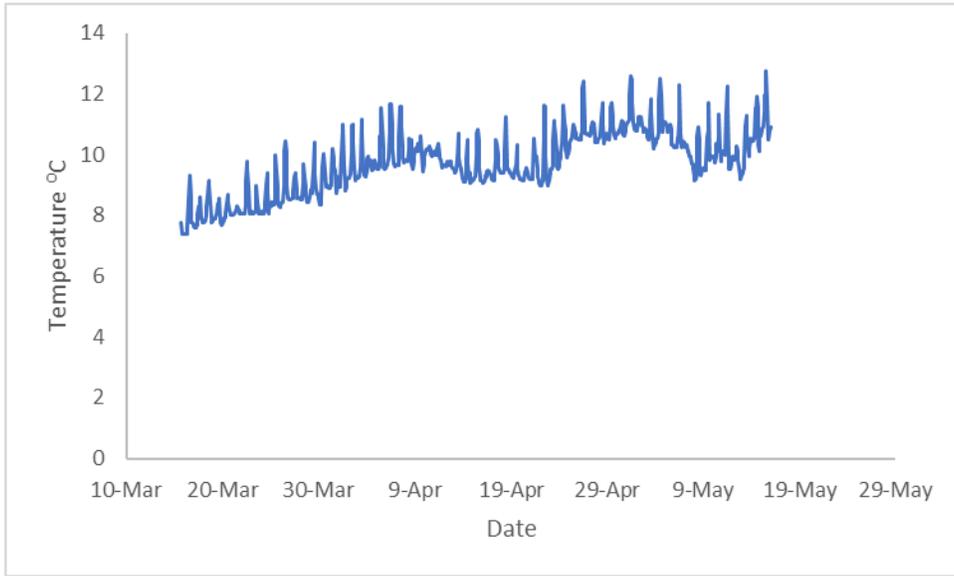


Figure 51. Temperature at RST (Dexter Dam)

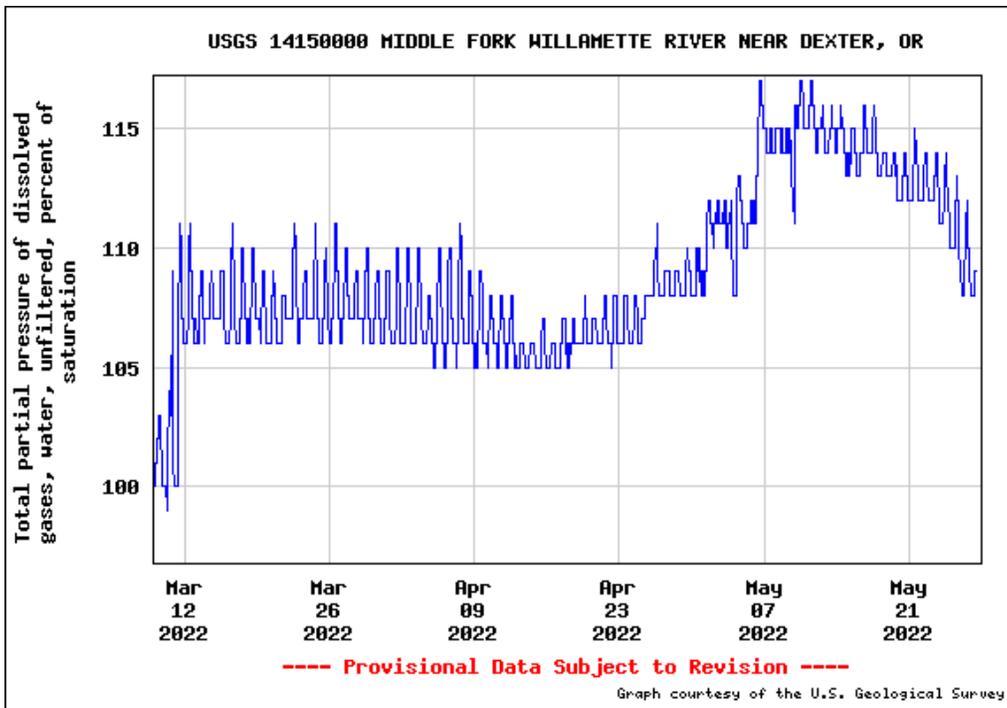


Figure 52. Total Dissolved Gas (%); below Dexter Dam

Middle Fork Willamette – Lookout Dam Tailrace

Target Species

Sampling for this reporting period began March 15, 2022 and ended May 15, 2022. 21 Chinook salmon were captured during the reporting period (Figure 53). The traps were operated 58 days during the reporting period. A sampling outage occurred from May 5, 2022 to May 10, 2022 due to a high flow event that made accessing traps hazardous for crew. Table 38 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Lookout Dam Tailrace site for the reporting period and Figure 54 shows length frequency data for all Chinook captured during this period.



Figure 53. Total Catch of Chinook Salmon During Reporting Period

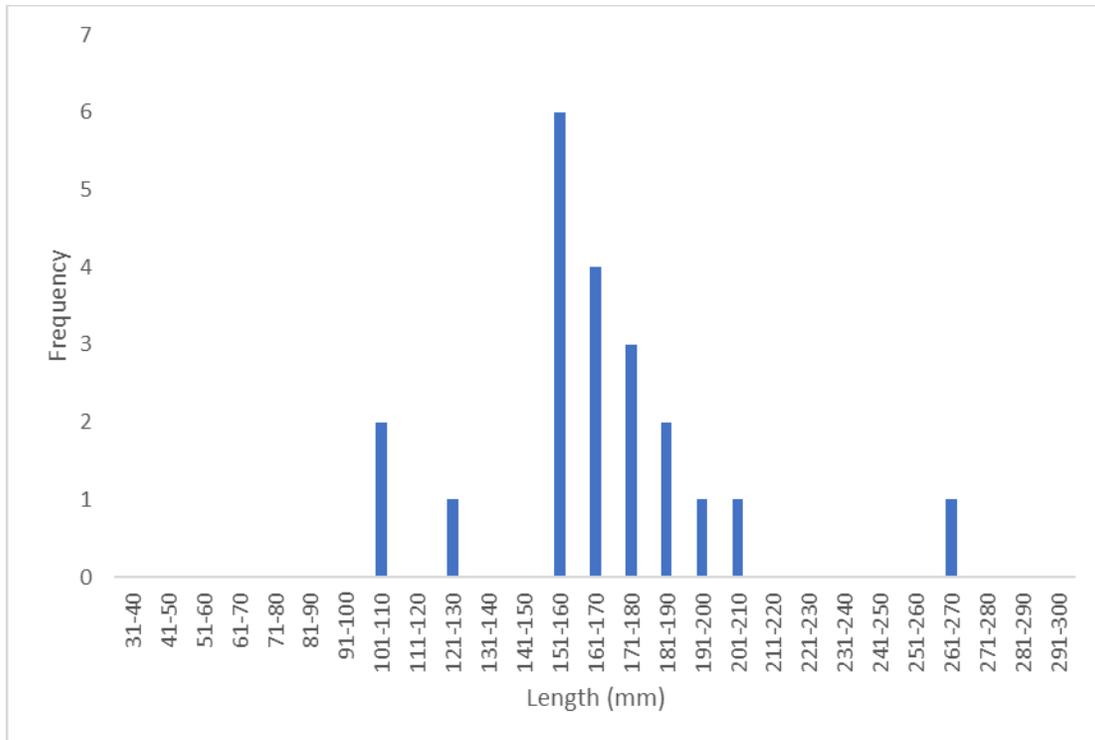


Figure 54. Length Frequency of Juvenile Chinook Sampled March 15, 2022 to May 15, 2022 (Lookout Point Dam Tailrace)

Table 38. Descriptive Statistics of Target Species Captured at Lookout Point Dam Tailrace During the Reporting Period

March 15, 2022 to May 15, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)		
					Min	Max	Mean	Min	Max	Mean
Lookout Point Dam	PH 1	CHS	Smolt	10	154	266	183.4	44.5	108.9	70.6
		CHS	Parr	1	107	107	107	5.3	5.3	5.3
		CHS	Fry	0	0	0	0	0	0	0
	PH 2	CHS	Smolt	0	0	0	0	0	0	0
		CHS	Parr	0	0	0	0	0	0	0
		CHS	Fry	0	0	0	0	0	0	0
	Spill	CHS	Smolt	9	124	194	161.2	19.7	63.0	47.1
		CHS	Parr	1	104	104	104	13.5	13.5	13.5
		CHS	Fry	0	0	0	0	0	0	0

24-Hour Post Collection Holding Trial

A total of 9 Chinook captured in the RSTs were held for 24 hours during this reporting period. 7 of the 9 fish were released alive (77.8%). One fish was captured and held from the Powerhouse RST furthest from the Powerhouse. This fish survived hold. 2 of the 8 fish caught in the Spill RST did not survive hold (25.0%).

Trapping Efficiency

A total of 1,013 juvenile hatchery Chinook (parr) were bismark brown dyed and adipose clipped, right ventral fin clipped and released on 04/13/2022 below Lookout Point Dam. Fish were released in small groups directly into powerhouse flow and 2 fish were recaptured in the PH 1 RST for an efficiency of 0.2%. There was 1 Lookout Point Dam trap efficiency fish was captured downstream in the Dexter RST on 4/15/2022.

Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery but did note some descaling and fin damage present as is common among hatchery fish of this age.

Lookout Dam	Release #	Recapture #	Capture Efficiency
Powerhouse	1,013	2	0.2% (2/1,013)

Injuries and Copepod Infection

A total of 11 Chinook were captured in the Powerhouse channel RST. Of the 11 Chinook, 5 displayed partial descaling <20% (45.4%), 8 displayed descaling >20% (72.7%), 9 had bodily injuries (81.8%), 8 had eye injuries (72.7%), 5 had copepods in the brachial cavity (45.4%) and 1 with copepods on the fins (9.1%). There were 7 mortalities in the PWR traps (63.6%). 10 Chinook were captured in the Spill RST. Of the 10 Chinook, 4 displayed partial descaling <20% (40%), 3 displayed descaling >20% (30%), 5 had bodily injuries (50%), 1 had eye injuries (10%) and 1 with copepods on the fins (10%). 3 Chinook exhibited gas bubble trauma – level 1 (30%). There were no mortalities in the Spill trap. Injury data is summarized below in table 39.

Table 39. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period (Lookout Point Dam Tailrace).

Site	Route	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Lookout Point Dam Tailrace	PWR	11	5	8	9	8	5	1	7
	Spill	10	4	3	5	1	0	1	0

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Non-Target Species

63 non-target species were captured during the reporting period; the data is summarized below in Table 40.

Table 40. Summary of Non-target Species (Lookout Point Dam Tailrace).

Species	PWR Capture	PWR Mortality	Spill Capture	Spill Mortality	Season Total	Season Total Mortality
Bluegill	1	0	0	0	1	0
Lamprey	0	0	0	0	0	0
Bullhead	1	0	0	0	1	0
Bull Trout	0	0	0	0	0	0
Crappie	3	1	1	0	4	1
Cutthroat Trout	0	0	1	0	1	0
Longnose Dace	0	0	0	0	0	0
Red-Sided Shiner	0	0	0	0	0	0
Sculpin	0	0	3	0	3	0
Smallmouth Bass	37	10	0	0	37	10
Sucker	7	3	1	0	8	3
Whitefish	0	0	0	0	0	0
<i>O. mykiss</i>	0	0	1	0	1	0
<i>O. mykiss</i> (clipped)	1	1	0	0	1	1
Chinook (clipped)	4	0	2	0	6	0
Totals	54	15	9	0	63	15

Stream Statistics

Basic stream statistics at Lookout Dam Tailrace site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14149010. Gage height (feet) is the only metric provided at this gage. During the reporting period, minimum and maximum values for instantaneous gage height ranged from 630.8 feet to 695.5 feet respectively (mean: 692.6 feet). Figure 55 shows instantaneous gage height.

Stream temperatures were recorded using both temperature probes and daily with handheld thermometers for the Lookout Dam Tailrace RST site during this reporting period. Temperature was taken during daily site visits and was used to formulate figure data for PWR and Spill until the 28th when probes were deployed (figures 56 and 57).

On April 21 at 22:00, powerhouse flow ceased and spill began at 11:00 on April 22. Catch per unit of effort (CPUE) data are summarized in Table 41. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 41. Summary of Chinook CPUE at Lookout Point Dam Tailrace.

Description	Chinook		
	PH 1	PH 2	Spill
Catch	11	0	10
Effort (hrs)	1351.4	1351.0	1350.3
CPUE (fish/hr)	0.008	0	0.007

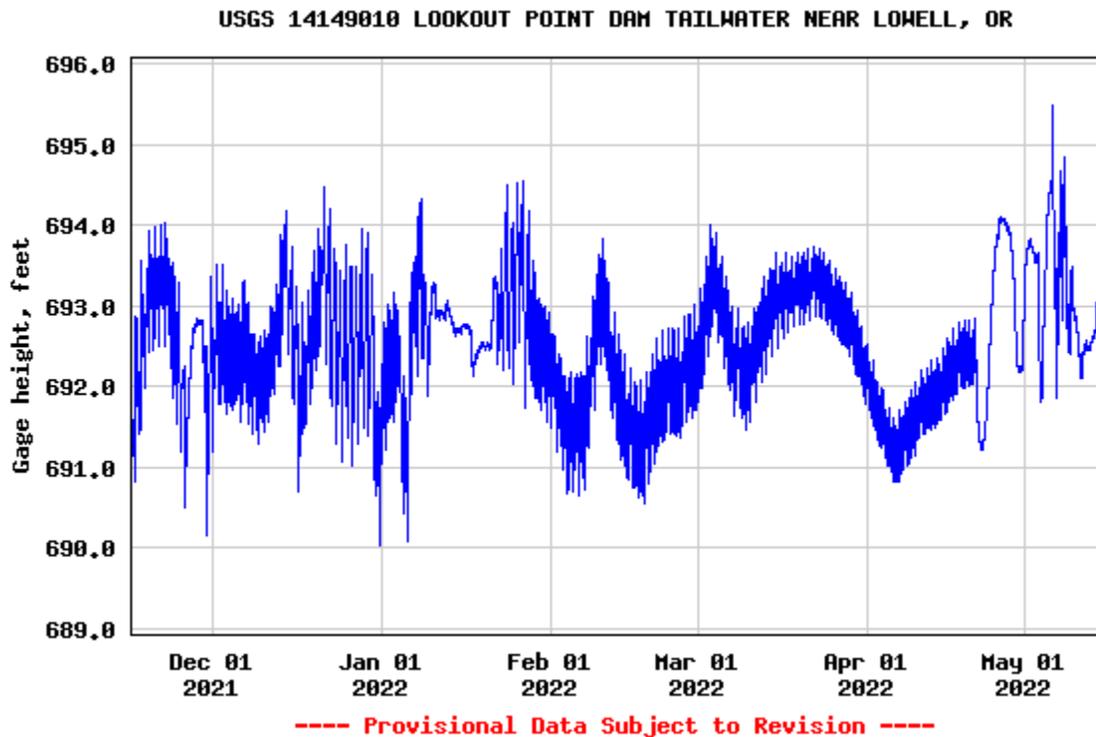


Figure 55. Gage Height (feet); below Lookout Dam

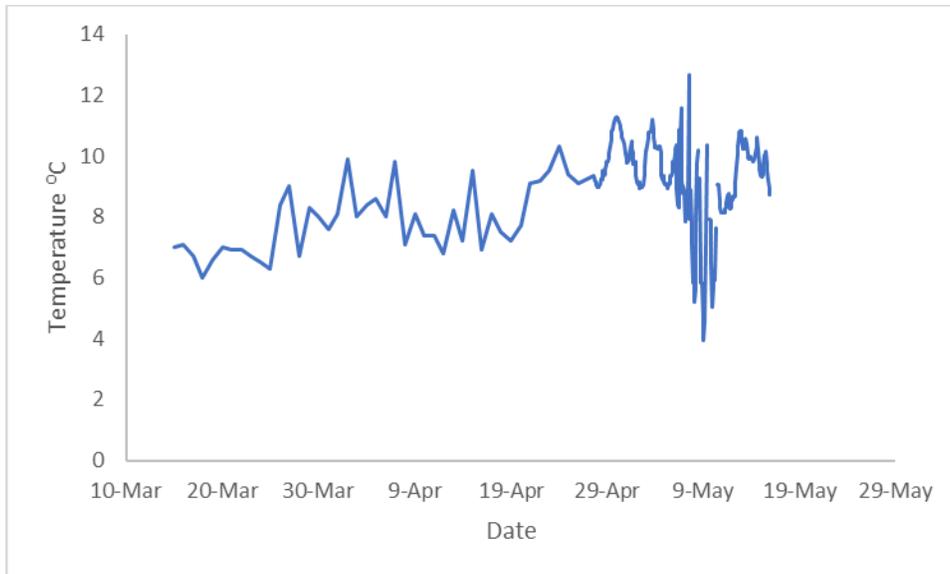


Figure 56. Temperature at RST (Lookout Dam PWR)

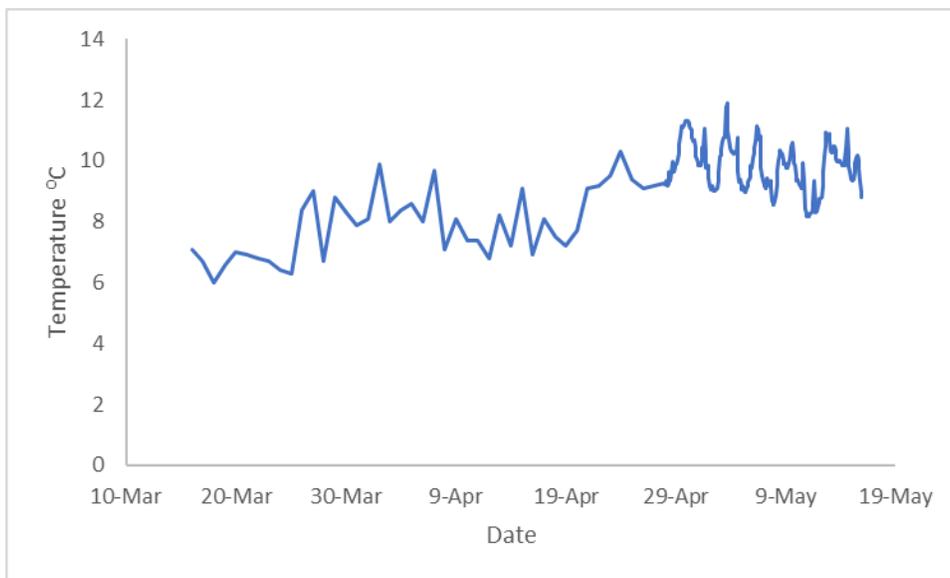


Figure 57. Temperature at RST (Lookout Dam Spill)

Middle Fork Willamette – Lookout Point Head of Reservoir

Target Species

Sampling for this reporting period began March 10, 2022 and ended May 15, 2022. The Lookout Point head of Reservoir site was not installed until March 10, 2022 as a trap was not available until then. Additional sampling outages occurred from May 5, 2022 to May 10, 2022 and May 14, 2022 to May 15, 2022 due to high water and debris loads making it unsafe to operate the trap. 57 spring Chinook salmon were captured during the sampling period (Figure 58). The trap was operated 72 days during the

reporting period. Table 42 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Middle Fork Willamette Above Lookout Point site during this period and Figure 59 shows length frequency data for all chinook captured from March 10, 2022 to May 15, 2022.

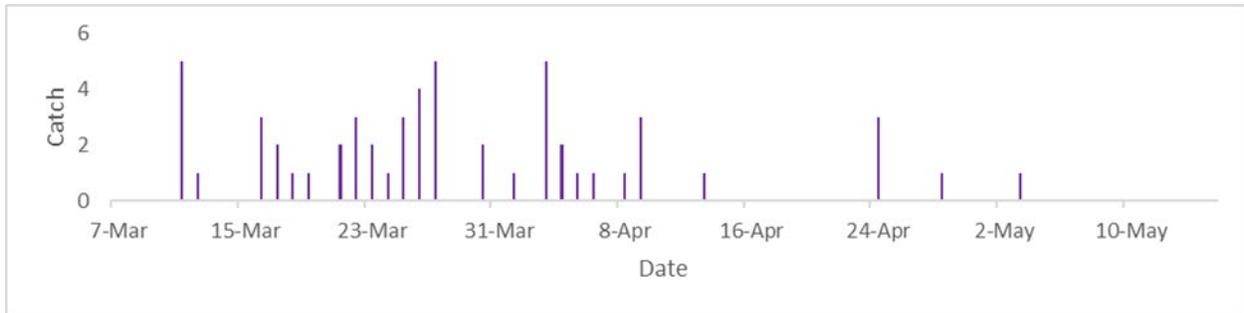


Figure 58. Total Catch of Chinook During Reporting Period

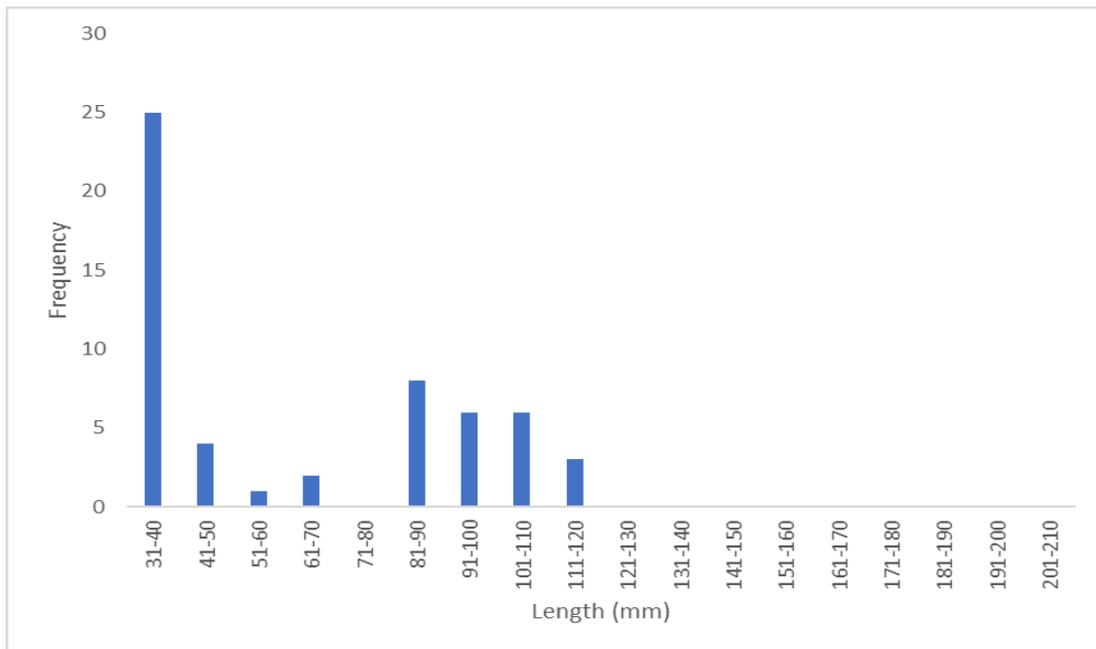


Figure 59. Length Frequency of Juvenile Chinook Sampled During the Reporting Period (Lookout Point Head of Reservoir)

Table 42. Descriptive Statistics of Target Species Captured at Lookout Point Head of Reservoir, for the Reporting Period.

March 10, 2022 to May 15, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Lookout Point Head of Reservoir	5 ft	CHS	Smolt	0	0	0	0	0	0	0
		CHS	Parr	26	51	115	93.0	1.5	19.8	8.5
		CHS	Fry	31	28	49	35.7	N/A	N/A	N/A

*Some fry are too small to accurately weigh and are omitted from the above tables.

Trapping Efficiency

Two trapping efficiency trials have been conducted to date, one on April 5, 2022 and one on April 14, 2022.

A total of 993 juvenile hatchery Chinook (parr) were bismark brown dyed and adipose clipped and released on April 5, 2022 above the Lookout Point Head of Reservoir trap. Fish were released in small groups to evaluate the traps efficiency capturing fish migrating downstream. 53 fish were recaptured in the 5-foot RST for an efficiency of 5.3%.

A total of 989 juvenile hatchery Chinook (parr) were bismark brown dyed and adipose clipped and released on April 14, 2022 above the Lookout Point Head of Reservoir trap. Fish were released in small groups to evaluate the traps efficiency capturing fish migrating downstream. 19 fish were recaptured in the 5-foot RST for an efficiency of 1.9%.

Of the 53 fish recaptured from the April 5th release, 6 were dead and the rest were injured. Injuries were descaling and fin damage. Of the 19 fish recaptured from the April 14th release, all 19 were injured. Injuries were descaling and fin damage. Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery but did note some descaling and fin damage present as is common among hatchery fish of this age.

Lookout Point Head of Reservoir	Release #	Recapture #	Capture Efficiency
04/05/2022	993	53	5.3% (53/993)
04/14/2022	989	19	1.9% (19/989)

Injuries and Copepod Infection

A total of 57 Chinook were captured during the reporting period. Of the 57 Chinook, 13 displayed partial descaling <20% (22.8%), 6 had bodily injuries (10.5%) and 1 had copepods on the fins (1.8%). There

were no mortalities. Injury data for the reporting period is shown in table 43. To date data can be found in Appendix A.

Table 43. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period (Lookout Point Head of Reservoir).

Site	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Lookout Point Head of Reservoir	57	13	0	6	0	0	1	0

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Collected DNA and Scale Samples

Of the 57 Chinook captured, 30 had DNA sampled and 28 had scales taken. All other Chinook were under sampling size thresholds. The rest of the captured fish were under the minimum fork length threshold and samples were not collected (less than 45 mm fork length for DNA and less than 50 mm fork length for scales).

Non-Target Species

58 non-target species were captured during the reporting period; the data is summarized below in Table 44.

Table 44. Summary of Non-target Species (Lookout Point Head of Reservoir).

Species	Season Total	Season Total Mortality
Bluegill	1	0
Lamprey	0	0
Bullhead	0	0
Bull Trout	0	0
Crappie	0	0
Cutthroat Trout	5	0
Longnose Dace	3	0
Redside Shiner	2	0
Sculpin	1	1
Smallmouth Bass	5	0
Sucker	7	1
Whitefish	0	0
<i>O. mykiss</i>	34	1
<i>O. mykiss</i> (clipped)	1	0
Totals	59	3

Stream Statistics

Basic stream statistics for the Lookout Point Head of Reservoir RST site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14148000. During the reporting

period, minimum and maximum values for instantaneous discharge ranged from 1,650.0 cfs to 10,100.0 cfs respectively (mean: 3,471.8 cfs). Figure 60 shows instantaneous discharge.

Stream temperatures were recorded every two hours using a temperature probe at the Lookout Point Head of Reservoir RST site during this reporting period. The probe operated normally during this period. (Figure 61)

Catch per unit of effort (CPUE) data are summarized in Table 45. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 45. Summary of Chinook CPUE at Lookout Point Head of Reservoir.

	Chinook
Description	5 ft
Catch	57
Effort (hrs)	1436.7
CPUE (fish/hr)	0.04

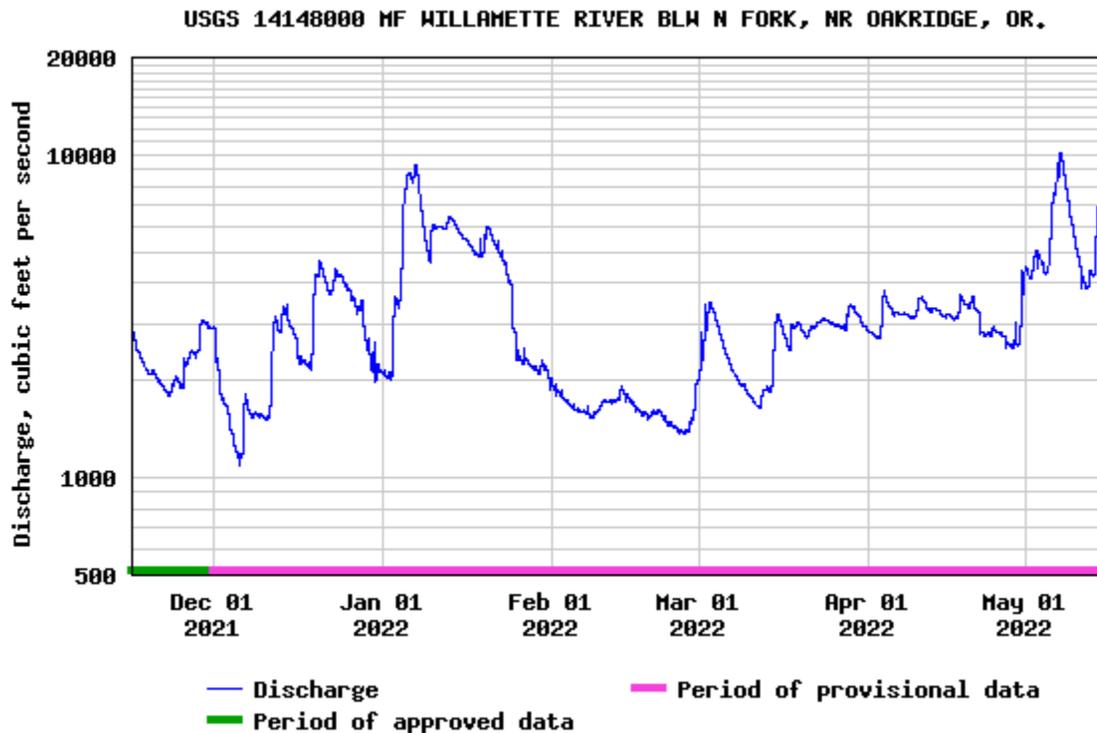


Figure 60. Discharge (cfs); above Lookout Point Reservoir, Below Oakridge, OR

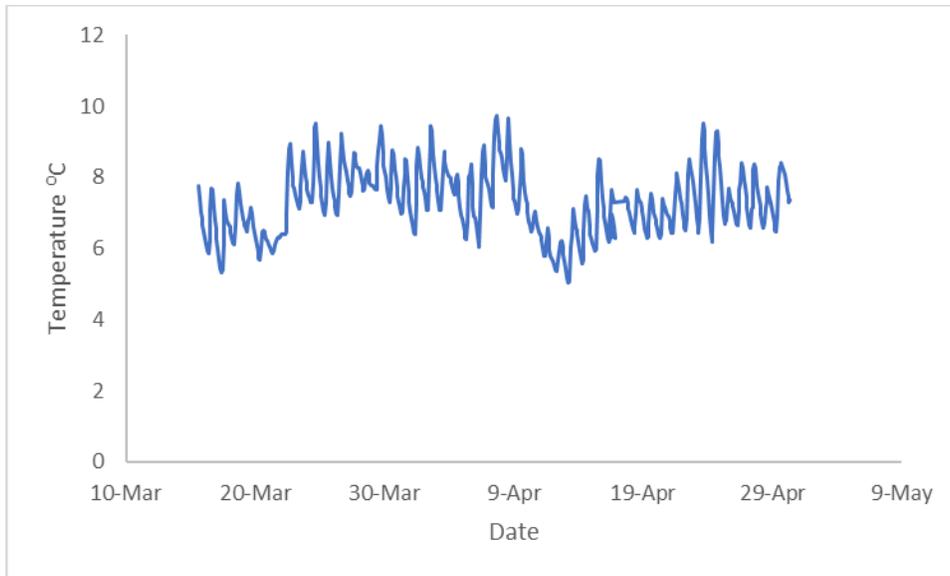


Figure 61. Temperature at RST (Lookout Point Head of Reservoir)

Middle Fork Willamette – Hills Creek Dam

Target Species

Sampling for this reporting period began on November 16, 2021 and ended February 28, 2022. On March 1, 2022 the Hills Creek Dam RST's were removed for the sampling season in conjunction with the end of RO spill and to prioritize the limited number of screw traps to other locations. There were 64 Chinook salmon (CHS) captured during the bi-annual reporting period (Figure 62). Sampling durations were 105 days for both the RO RST and Powerhouse RST. Table 46 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Hills Creek site during the reporting period and Figure 63 shows length frequency data for Chinook caught during this time.

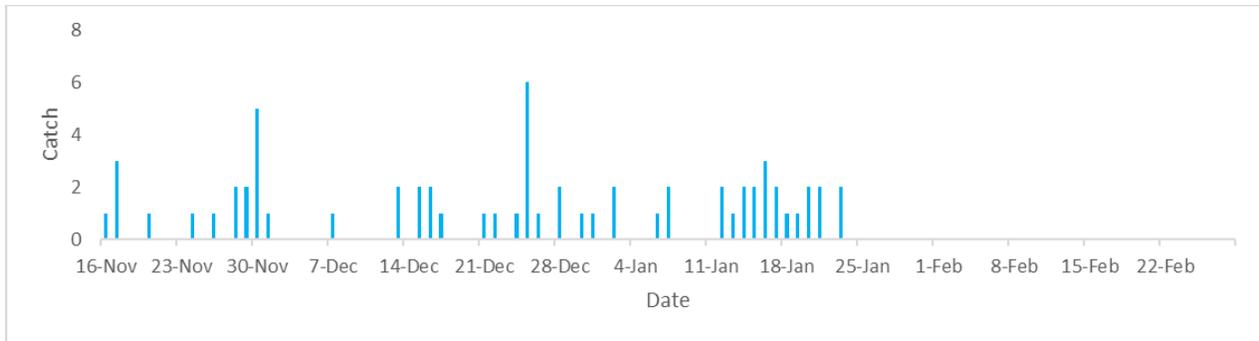
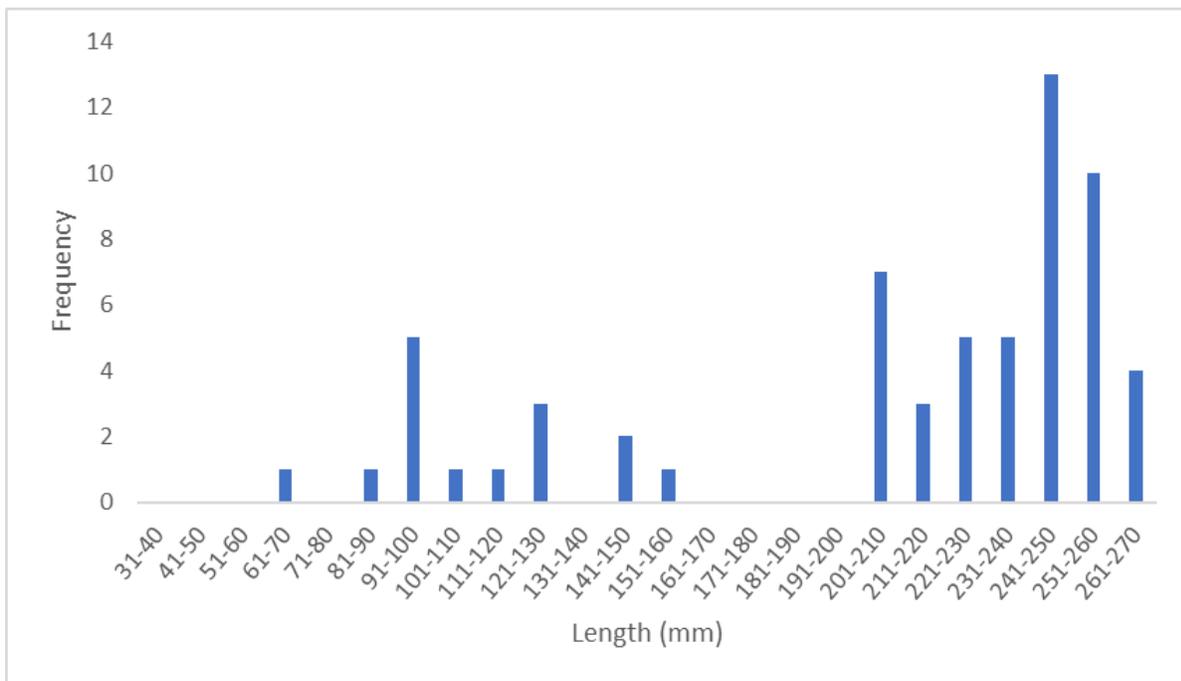


Figure 62. Total Catch of Chinook During Reporting Period



*Figure does not include fish without heads (2)

Figure 63. Length Frequency of Juvenile Chinook Sampled November 16, 2021 to February 28, 2022 (Hills Creek)

Trapping Efficiency

Three releases of marked hatchery fish occurred at Hills Creek Dam during this reporting period. Fish for trapping efficiency releases were bismark brown dyed, adipose clipped, left and right ventrally clipped and released in either the PH or RO to evaluate the efficiency of the screw traps at these locations. Fish that were dyed, ad clipped and ventral clipped were released in the PH channel while fish that were dyed and ad clipped were released in the RO channel. Trapping efficiency fish that were captured at the PH trap

were released at the trap so as to not bias the RO trap efficiencies. A summary of fish release numbers by route and date along with recapture statistics are summarized below.

Date	Route	Release #	Recapture #	Capture Efficiency
1/6/22	PH Route	596	20	3.36% (20/596)
	RO Route	RO Route - 605	13	2.15% (13/605)
		PH Route – 596	5	0.84% (5/596)
2/16/22	PH Route	600	12	2.00% (12/600)
	RO Route	RO Route - 593	19	3.20% (19/593)
		PH Route - 600	0	0% (0/600)
2/25/22	PH Route	604	5	0.83% (5/604)
	RO Route	RO Route – 625	6	0.96% (6/625)
		PH Route – 604	2	0.33% (2/604)

*Live fish captured at the PH trap are released just downstream of the PH trap, upstream of the RO trap and therefore retained in the capture efficiency estimates for the RO Trap.

*Dead fish captured at the PH trap are excluded from the RO trap capture efficiency estimate as they are not alive at time of re-release.

Table 46. Descriptive Statistics of Target Species Captured at Hills Creek Dam from November 16, 2021 to February 28, 2022

November 16, 2021 to February 28, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Hills Creek	RO	CHS	Parr	5	90.0	141.0	110.6	7.4	23.4	13.5
		CHS	Smolt	27	201.0	265.0	239.7	77.76	192.3	151.6
Hills Creek	PWR	CHS	Parr	7	69.0	127.0	98.1	3.7	24.5	11.2
		CHS	Smolt	25	128.0	265.0	224.3	26.2	188.7	130.6

*Fish that were missing heads are not included in length and weight calculations. One fish was a head only and could not be assigned a life stage

Injuries and Copepod Infection

A total of 32 Chinook were captured in the RO trap during the reporting period. Of the 32 Chinook, 16 displayed partial descaling <20% (50%), 12 displayed descaling >20% (37.5%), 1 had bodily injuries (3.1%), 1 with eye injuries (3.1%), 28 had copepods in the brachial cavity (87.5%) and 12 copepods on the fins (37.5%). There were 15 mortalities in the RO trap (46.9%). A total of 32 Chinook were captured in the PWR trap during the reporting period. Of the 32 Chinook, 18 displayed partial descaling <20% (56.3%), 11 displayed descaling >20% (34.4%), 2 had bodily injuries (6.3%), 6 with eye injuries (18.8%), 22 had copepods in the brachial cavity (68.8%) and 14 had copepods on the fins (43.8%). There were 18 mortalities in the PWR trap (56.3%). Injury data for the reporting period is summarized in Table 47. To date injury data can be found in Appendix A.

Table 47. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook November 16, 2021 to February 28, 2022. (Hills Creek)

Site	Route	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Hills Creek	RO	32	16	12	1	1	28	12	15
Hills Creek	PWR	32	18	11	2	6	22	14	18

*DSC=Descaled, COP=Copepods, B.C.=Branchial Cavity

Non-Target Species

A total of 179 non-target fish were captured at Hills Creek during the reporting period; the data is summarized below in Table 48.

Table 48. Summary of Non-target Species (Hills Creek).

Species	RO Capture	RO Mortality	PWR Capture	PWR Mortality	Season Total	Season Total Mortality
Bluegill	17	5	34	21	51	26
Brook Lamprey	0	0	0	0	0	0
Bullhead	0	0	0	0	0	0
Bull Trout	1	0	0	0	1	0
Crappie	24	20	8	1	32	21
Longnose Dace	1	0	0	0	1	0
Redside Shiner	2	1	3	0	5	1
Sculpin	4	0	23	0	27	0
Spotted Bass	6	1	0	0	6	1
Sucker	0	0	0	0	0	0
Whitefish	1	1	0	0	1	1
<i>O. mykiss</i>	31	15	24	5	55	20
Totals	87	43	92	27	179	70

Stream Statistics

Basic stream statistics at the Hills Creek site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14145110. Gage height (feet) is the only metric provided at this gage. During the reporting period, minimum and maximum values for instantaneous gage height ranged from 1,222.9 feet to 1,227.8 feet respectively (mean: 1,224.8 feet). Figure 64 shows instantaneous gage height.

Stream temperatures were recorded every 2 hours for the both the RO RST and the PWR RST (Figures 65 and 66). Temperature probes operated normally throughout this reporting period.

Flows through the PWR and RO during the reporting period averaged 335.2 and 92.8 cubic feet per second (cfs) respectively. Catch per unit of effort (CPUE) data are summarized in Table 49. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 49. Summary of Chinook CPUE, Hills Creek.

Description	Chinook	
	RO (5ft)	PWR(8ft)
Catch	32	32
Effort (hrs)	2548.3	2494.6
CPUE (fish/hr)	0.013	0.013

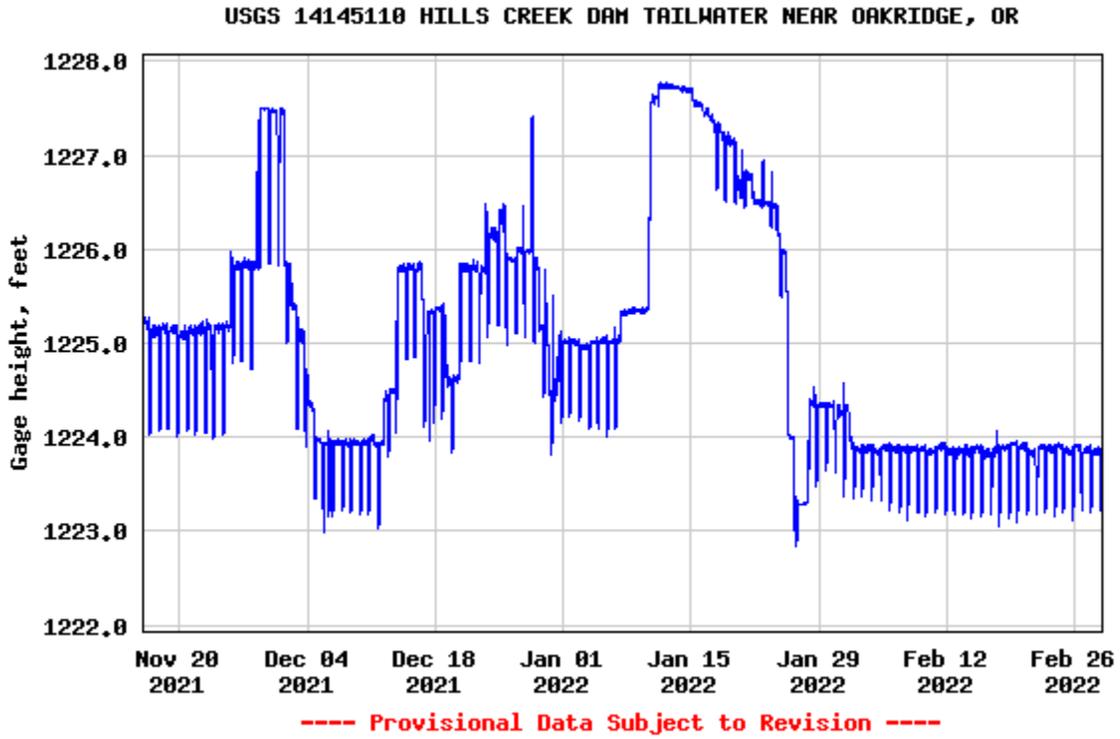


Figure 64. Gage Height (feet); below Hills Creek Dam, Middle Fork Willamette River

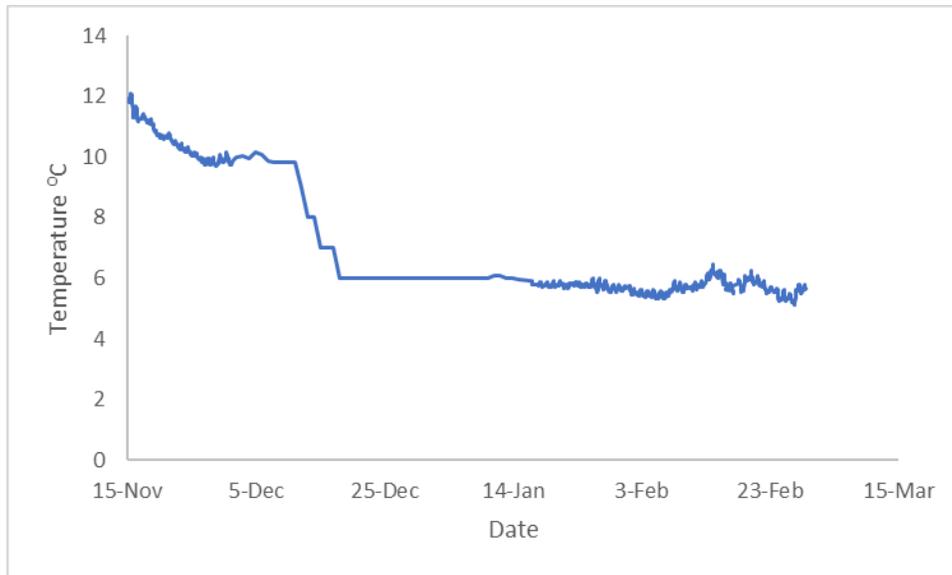


Figure 65. Temperature at RO RST (Hills Creek)

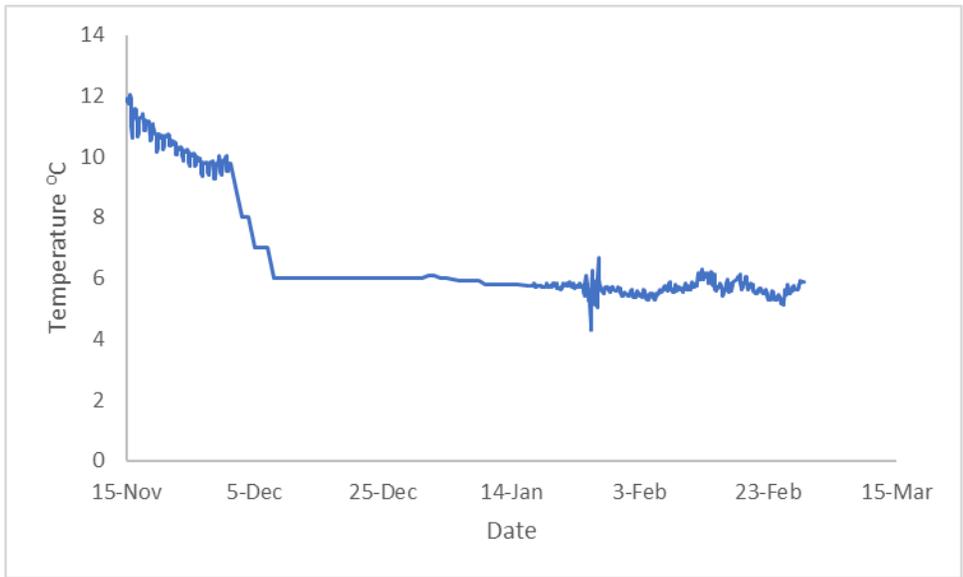


Figure 66. Temperature at Powerhouse RST (Hills Creek)

Appendix A

Chinook (CHS)

Injuries During Reporting Period (11-15-2021 to 5-15-2022)																								
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS<2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD	
Big Cliff Dam	401		219	1	54	2		346	115	1	216	5	9	2	20	5	35	13	53	38	15	7	11	
8 ft	401		219	1	54	2		346	115	1	216	5	9	2	20	5	35	13	53	38	15	7	11	
Parr	19		5			1		13	1		3					2			1					
Smolt	378		214	1	54	1		333	114	1	213	5	9		20	3	35	13	52	38	15	6	11	
Unknown	2														2							1		
Fry	2																							
Foster Dam HOR	61		6		1						1													
5 ft	61		6		1						1													
Parr	4		2																					
Smolt	3		3								1													
Fry	54		1		1																			
Cougar Dam	1080	3	435	2	78	5	3	453	113	3	242	2	4	2	17	2	30	20	63	36	20	6	22	
RO	354		199	2	57	2	3	235	73	3	142	2			6	2	18	9	40	22	9	3	20	
Parr	129		68		23			74	22		43				1		5	2	9	7			6	
Smolt	210		131	2	32	2	3	161	50	3	98	2			5	2	12	7	30	14	9	3	14	
Fry	15				2				1		1						1		1	1				
PH	726	3	236		21	3		218	40		100			4	2	11		12	11	23	14	11	3	2
Parr	224		123		11	1		91	17		50			1		5		3	3	9	5	5		
Smolt	169		112		6	2		127	19		46			3		5		7	4	11	6	6		2
Fry	331	3	1		4				4		4					1		2	4	3	3		3	
Unkown	2														2									
Cougar Dam HOR	350		22					3			10								4	3	1			
5 ft	350		22					3			10								4	3	1			
Parr	36		21					3			6											1		
Fry	314		1								4								4	3				
Fall Creek HOR	7		3					2			1													
8 ft	7		3					2			1													
Parr	2		2					1			1													
Smolt	5		1					1																
Dexter Dam Tailrace	16		12		3			2	4		11							3	1	1	2	2	3	
5 ft	16		12		3			2	4		11							3	1	1	2	2	3	
Smolt	16		12		3			2	4		11							3	1	1	2	2	3	
Lookout Dam Tailrace	21		5	1	5			6	11		12				2	1	5		3	1	2		3	
PH	11		1	1	4			5	8		8				2	1	4		3					
Parr	1																							
Smolt	10		1	1	4			5	8		8				2	1	4		3					
Spill	10		4		1			1	3		4						1				1	2	3	
Parr	1										1													
Smolt	9		4		1			1	2		4						1				1	2	3	
Lookout Point HOR	57		13					1			5							1						
5 ft	57		13					1			5							1						
Parr	26		13					1			5							1						
Fry	31																							
Hills Creek	65		35		7			49	23		15		3	1	16	5	2	2	3	2	3			
RO	33		17		1			28	12		8		1	10	3	1	1	2						
Parr	5		1					1									1							
Smolt	28		16		1			27	12		8		1	10	3			1	2					
PH	32		18		6			21	11		7		2	1	6	2	1	1	1	2	3			
Parr	7		4					1	1								1				1			
Smolt	25		14		6			20	10		7		2	1	6	1	1	1	1	1	3			

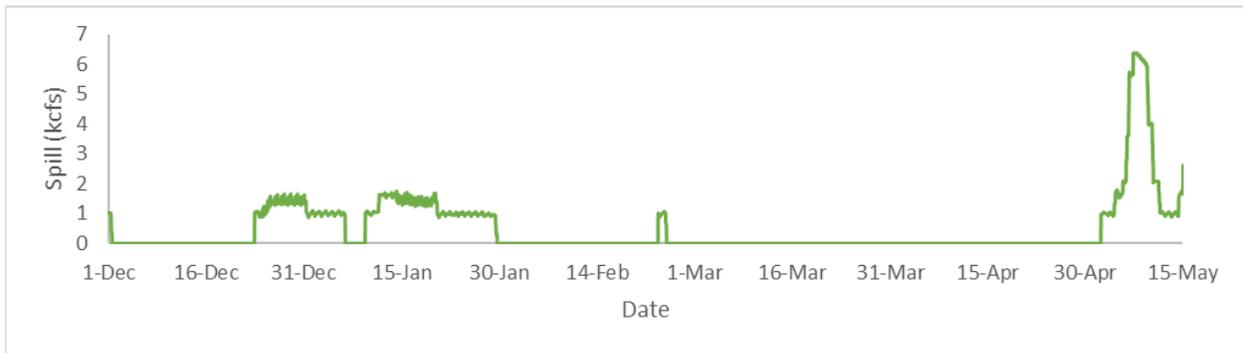
Steelhead (O. mykiss)

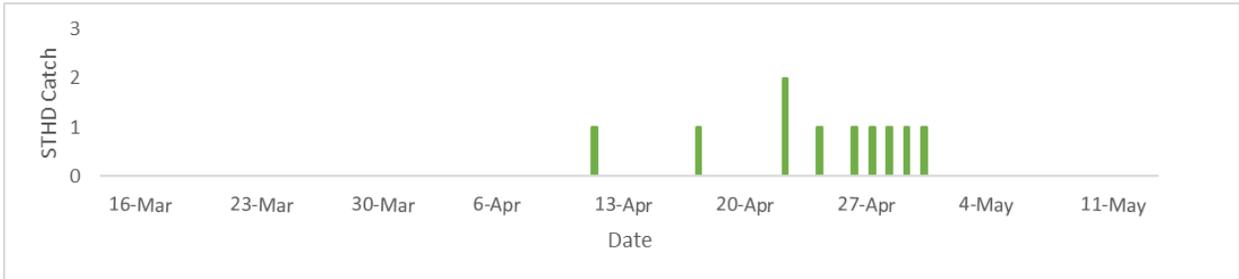
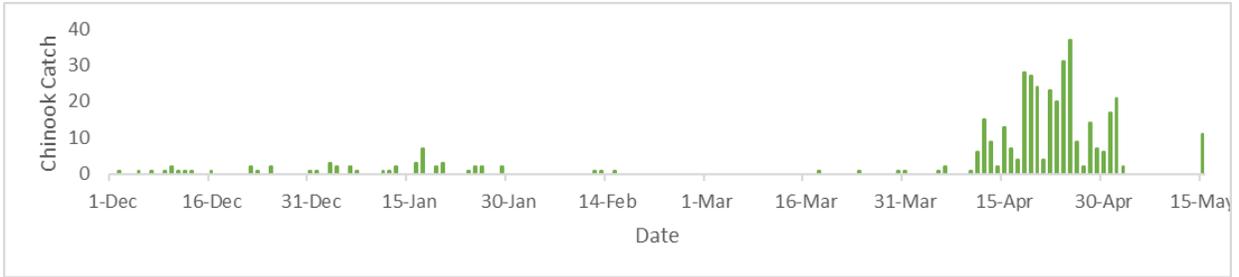
		Injuries During Reporting Period (11-15-2021 to 5/15/2022)																					
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Big Cliff Dam	10		6					7	2		4							2	2	2			
8 ft	10		6					7	2		4							2	2	2			
Parr	1																						
Smolt	9		6					7	2		4						2		2	2			
Green Peter Tailrace	6		3		1			1	2		4						4		1	1			5
8 ft	6		3		1			1	2		4						4		1	1			5
Smolt	6		3		1			1	2		4						4		1	1			5
Foster Dam HOR	84		23					1			10								1				
5 ft	84		23					1			10								1				
Adult	7		1								2												
Parr	13		5					1			1												
Smolt	35		17								7							1					
Fry	29																						

Injury Code	Description of Injury/Condition
NXI	Live fish with no external injuries
MUNK	Mortality with no external injuries
DS<2	Descaling <20%
BLO	Bloated
EYB	Bloody Eye (hemorrhage)
BVT	Bleeding from Vent
FVB	Fin Blood Vessels Broken
GBD	Gas Bubble Disease (fin ray/eye inclusions)
POP	Pop Eye (eye popping out of head)
HIN	Head Injury
OPD	Opercle Damage
TEA	Body Injury (tears, scrapes, mechanical damage)
BRU	Bruising (any part of the body)
HBP	Hole Behind Pectoral Fin
DS>2	Descaling > 20%
HO	Head Only
BO	Body Only
HBO	Head Barely Connected
FID	Fin Damage
PRD	Predation Marks (vert. claw or teeth marks)
COP	Copepods (on gills or fins)
BKD	BKD (distended abdomen)
FUN	Fungus

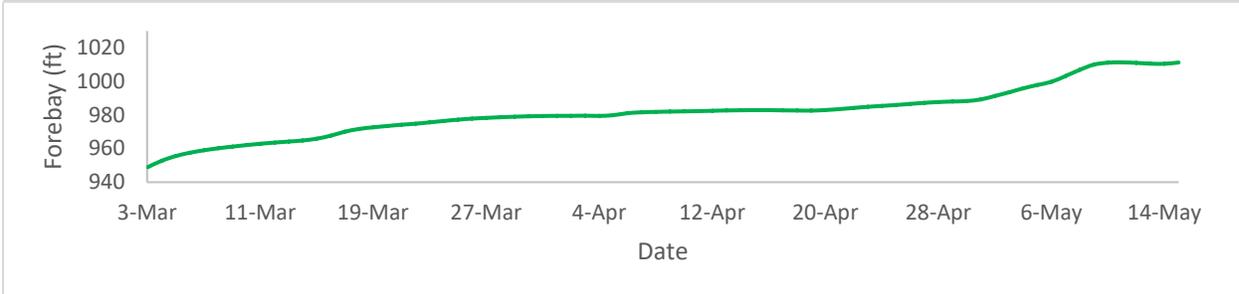
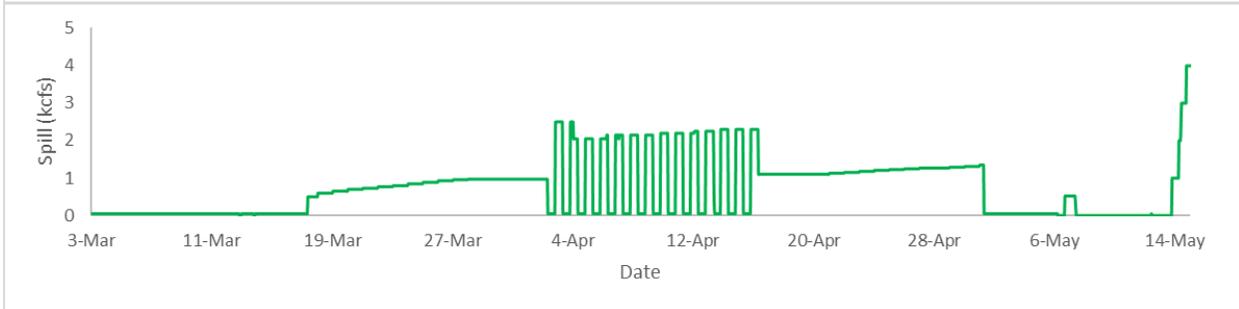
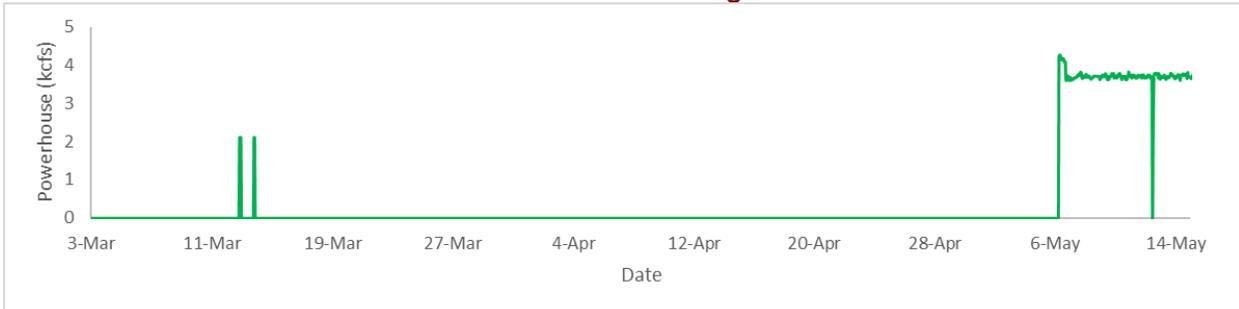
Appendix B

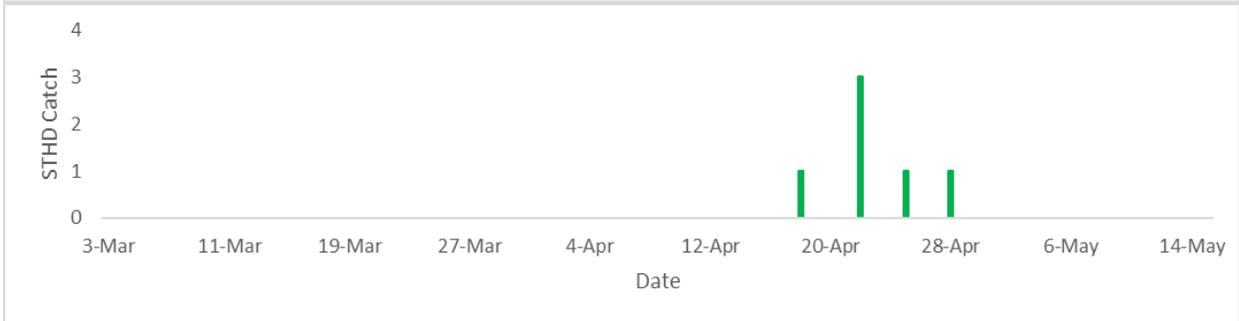
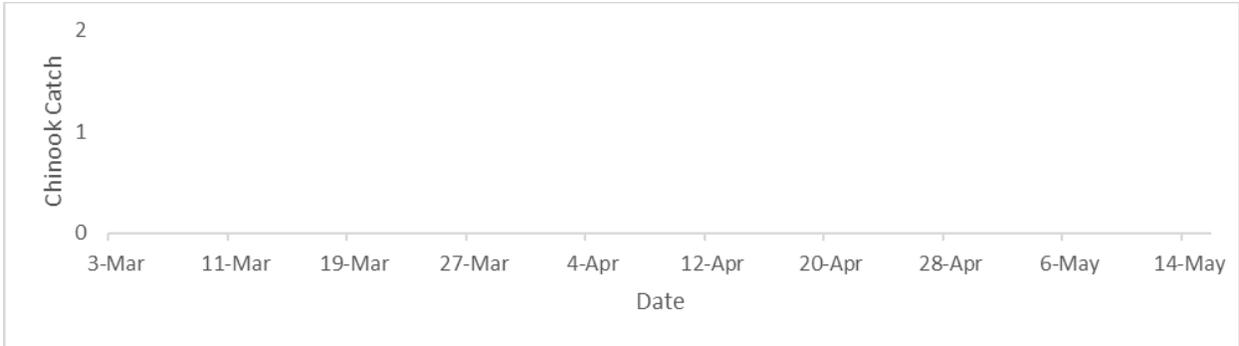
Big Cliff Dam Operational and Capture Data Since Start of Monitoring



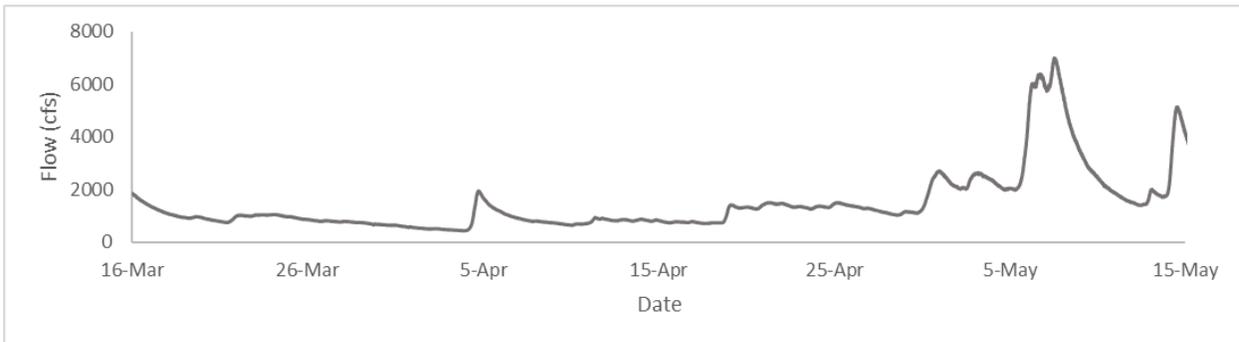


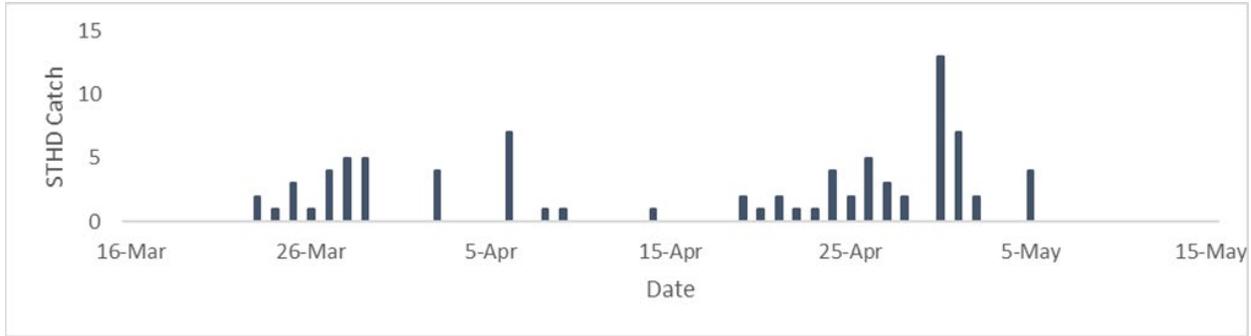
Green Peter Dam Operational and Green Peter Tailrace- Middle Santiam River Capture Data Since Start of Monitoring



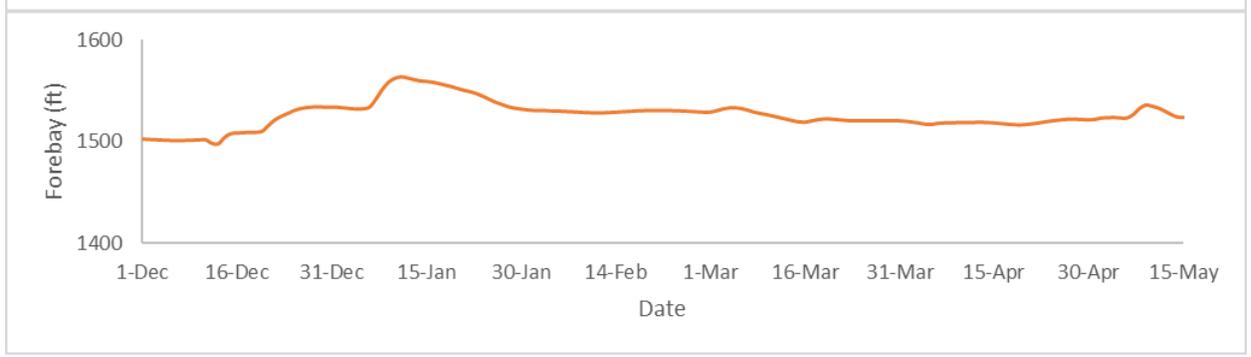
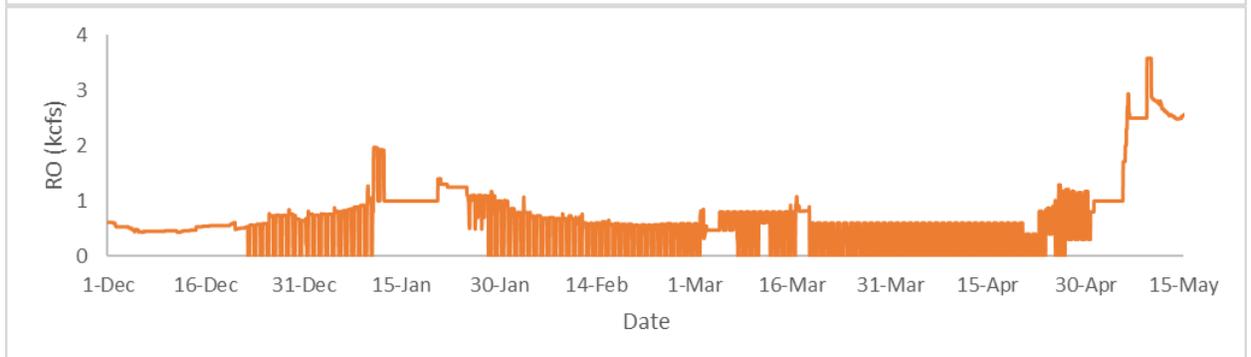
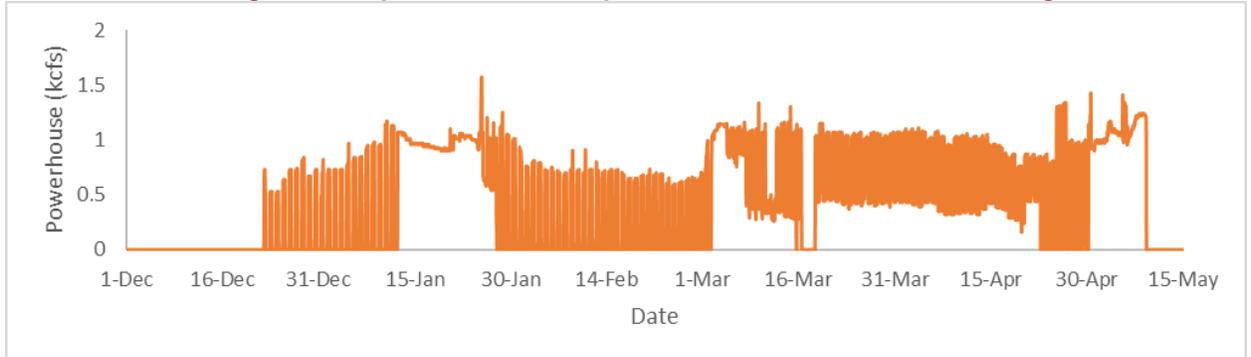


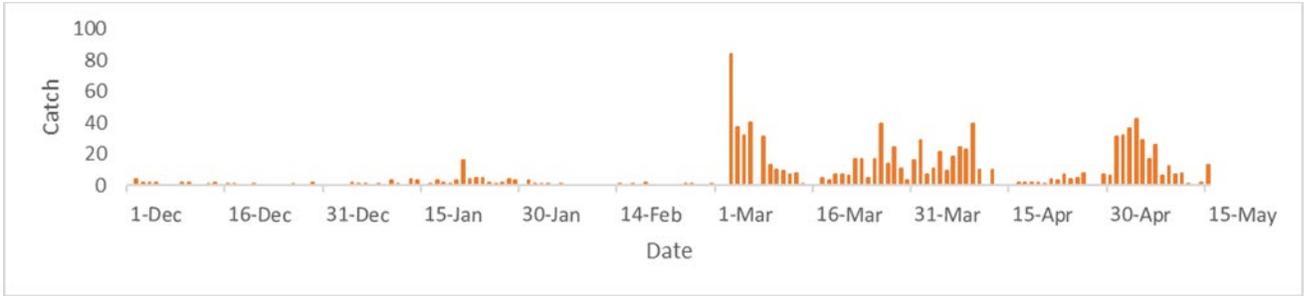
South Santiam River Above Foster Dam Discharge and Foster Dam Head of Reservoir Capture Data



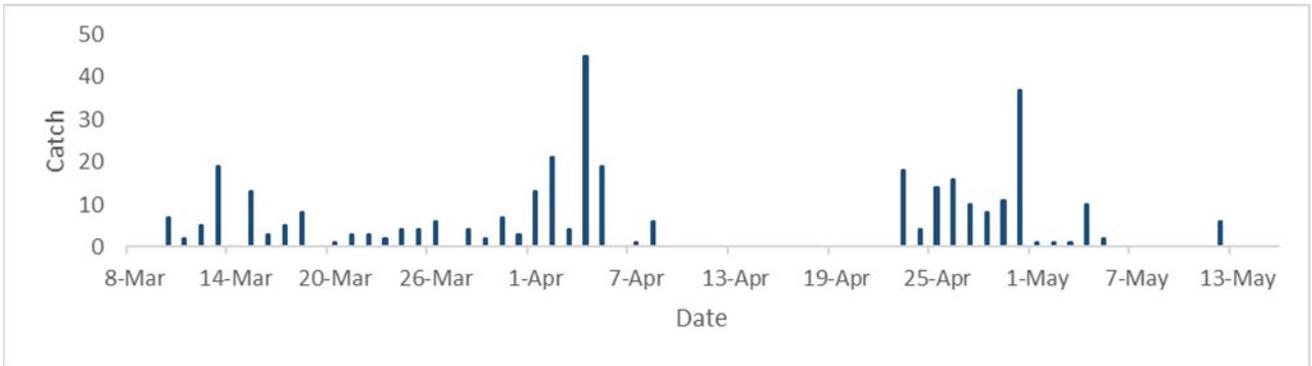
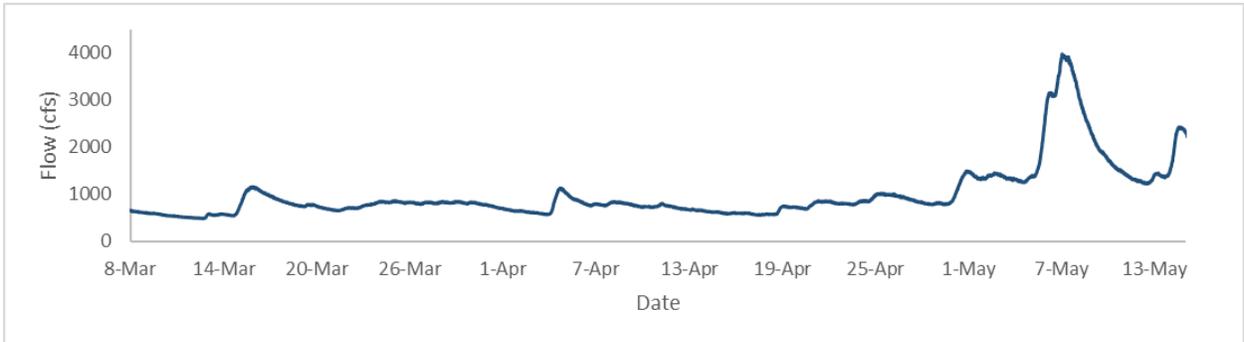


Cougar Dam Operational and Capture Data Since Start of Monitoring

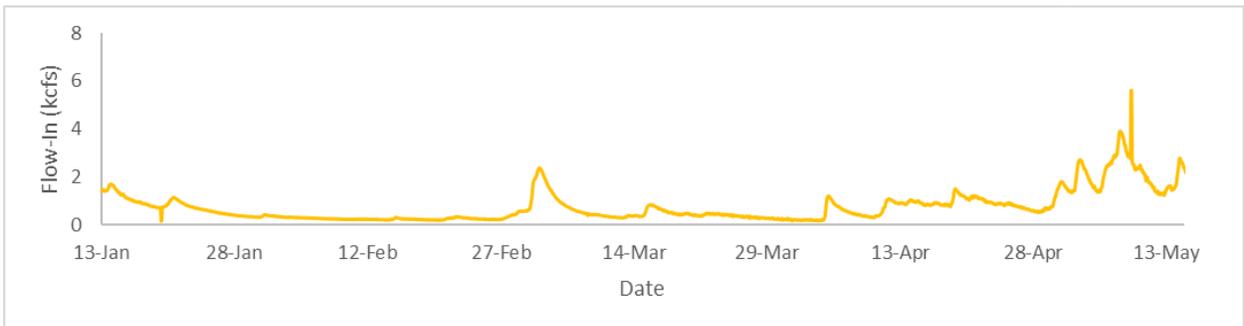


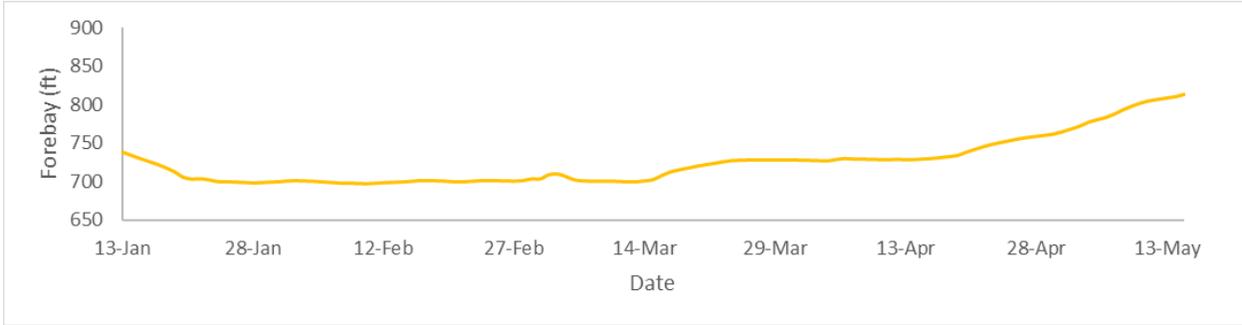
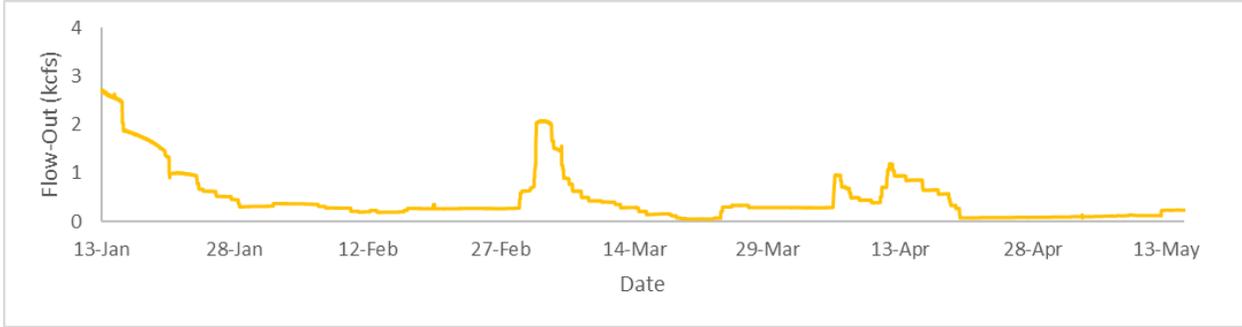


South Fork McKenzie above Cougar Dam Discharge and Cougar Dam Head of Reservoir Capture Data Since Start of Monitoring

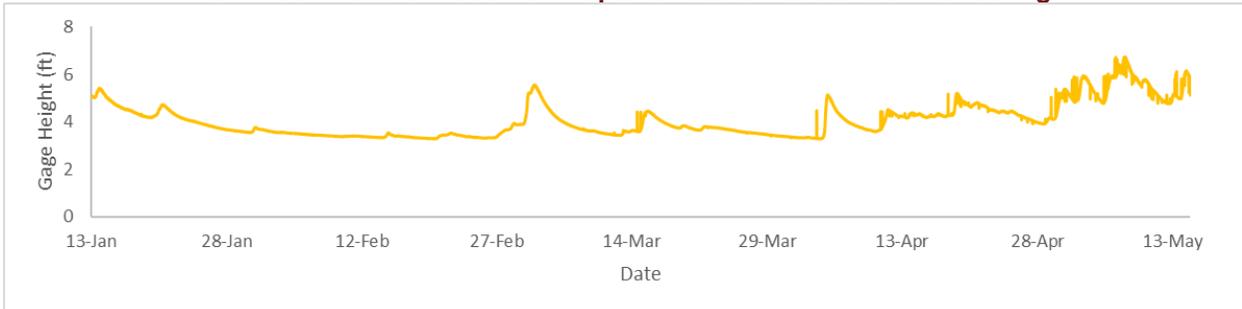


Fall Creek Dam Operational and Capture Data Since Start of Monitoring

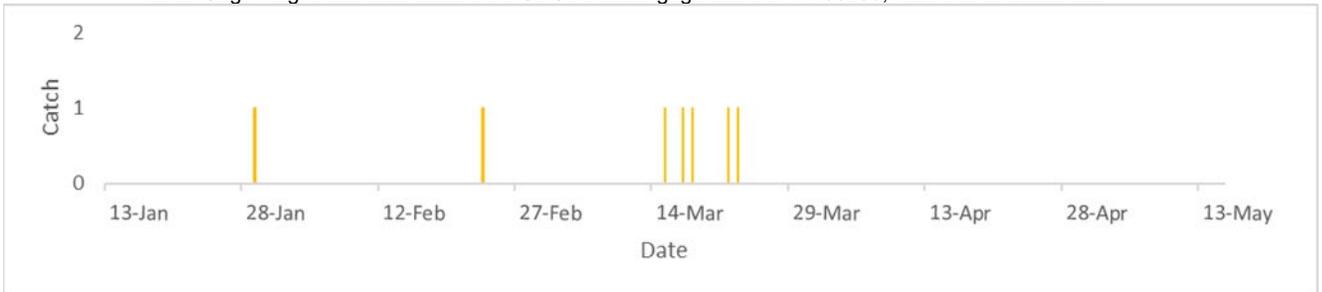




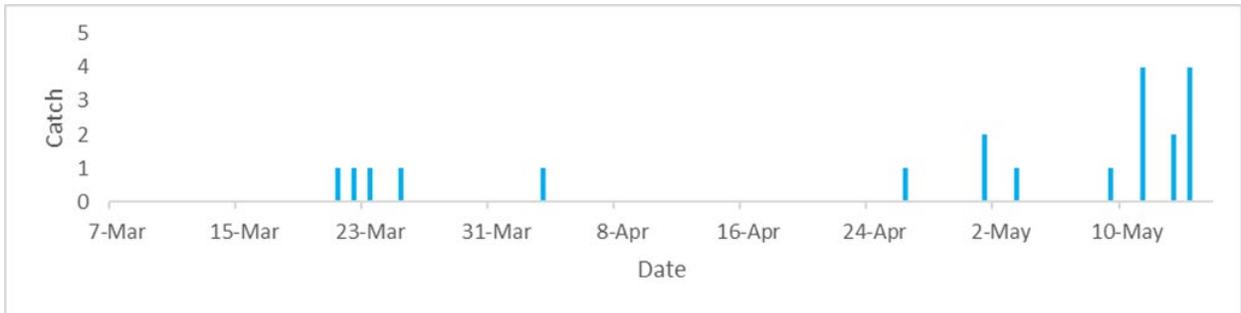
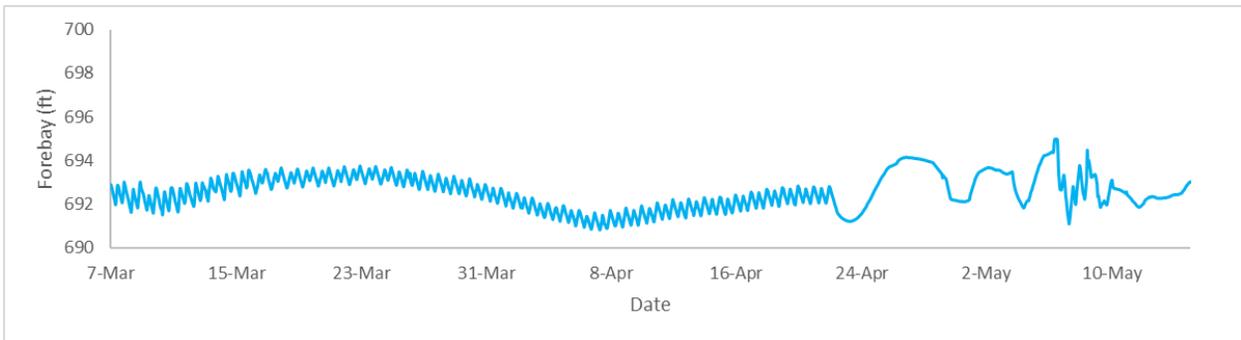
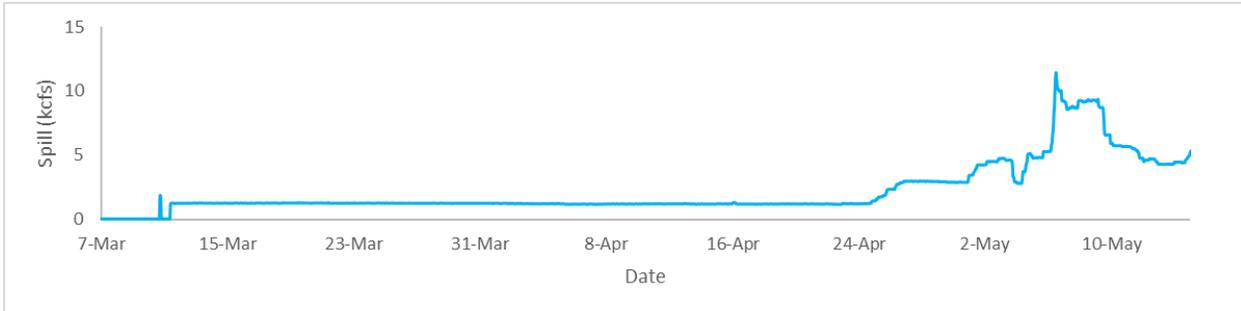
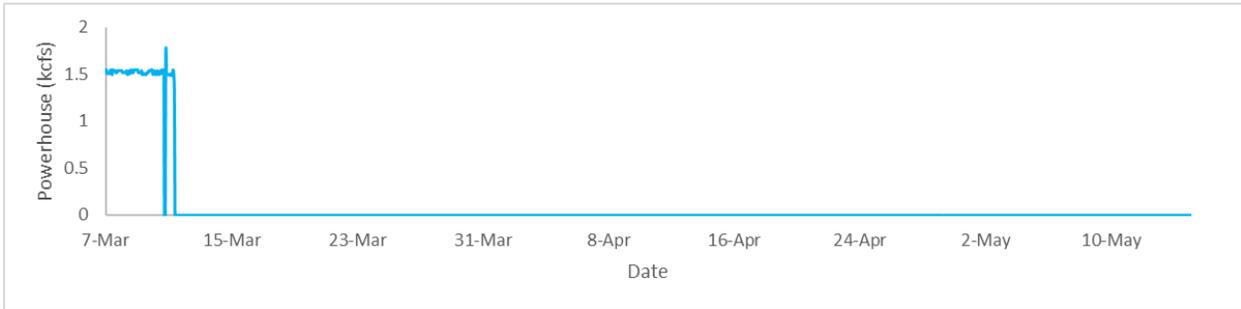
Fall Creek Head of Reservoir Capture Data Since Start of Monitoring



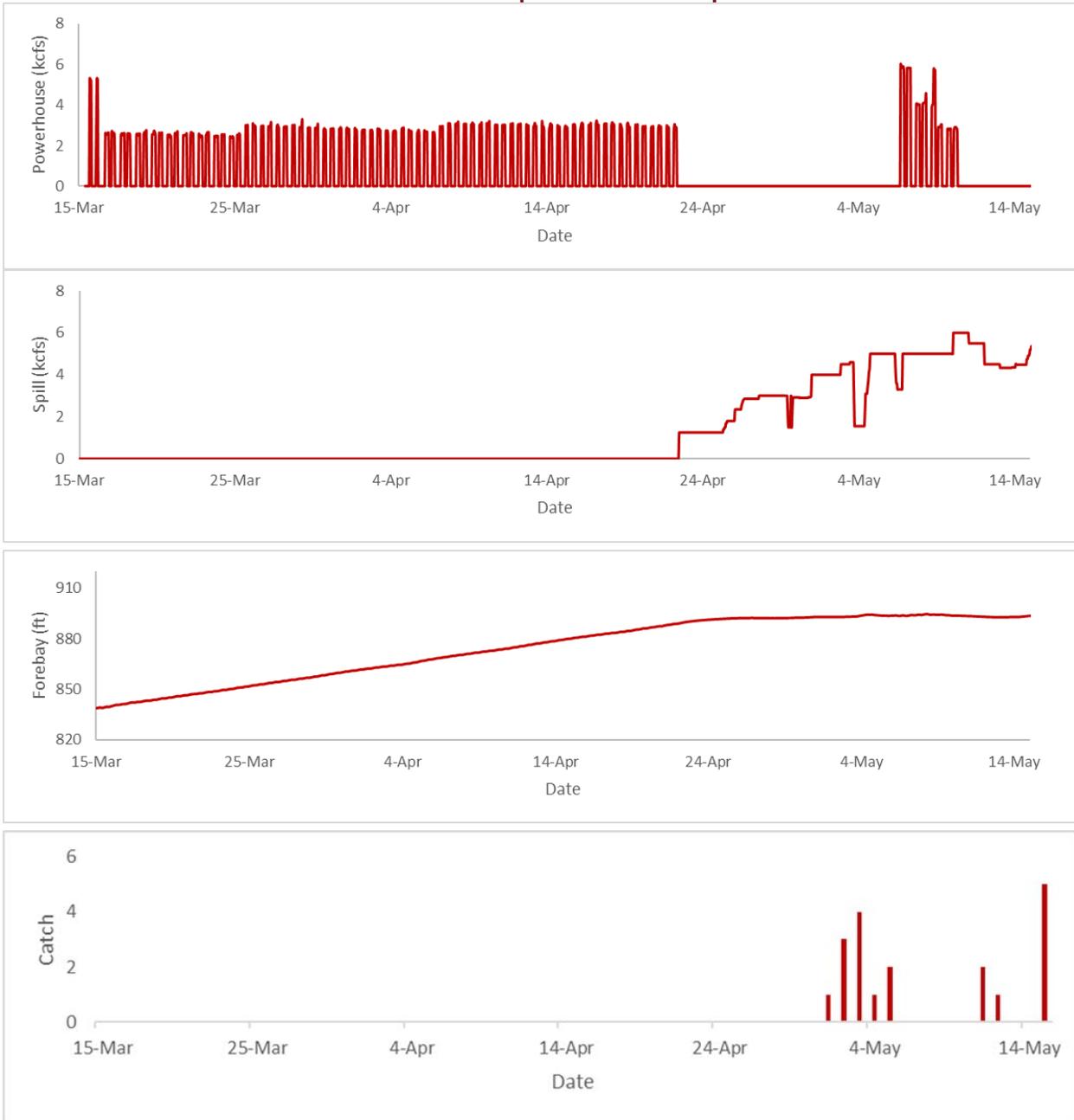
Note: Gage height data was taken from USGS stream gage number 14150290, 1.2 rkms downstream.



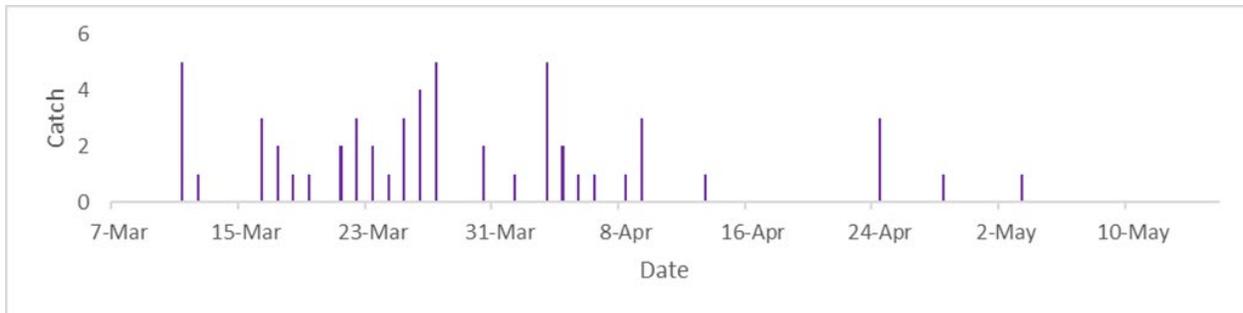
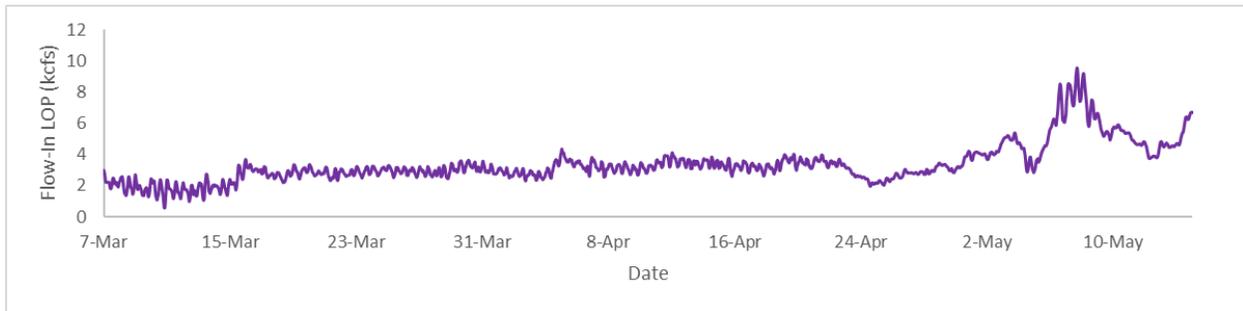
Dexter Dam Operational and Capture Data Since Start of Monitoring



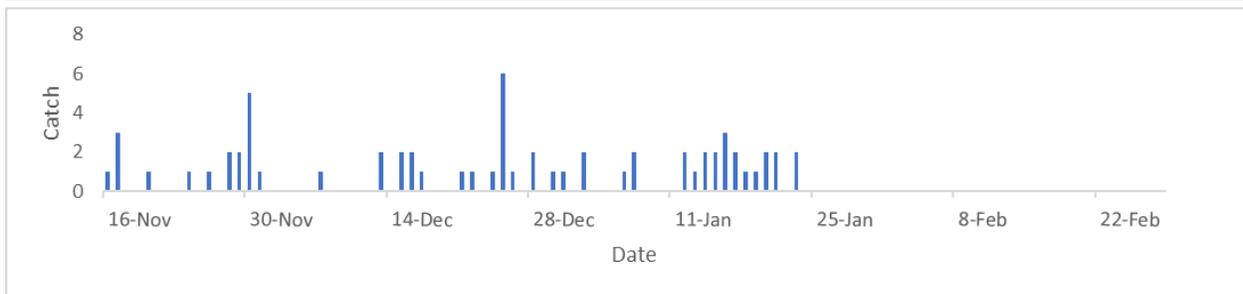
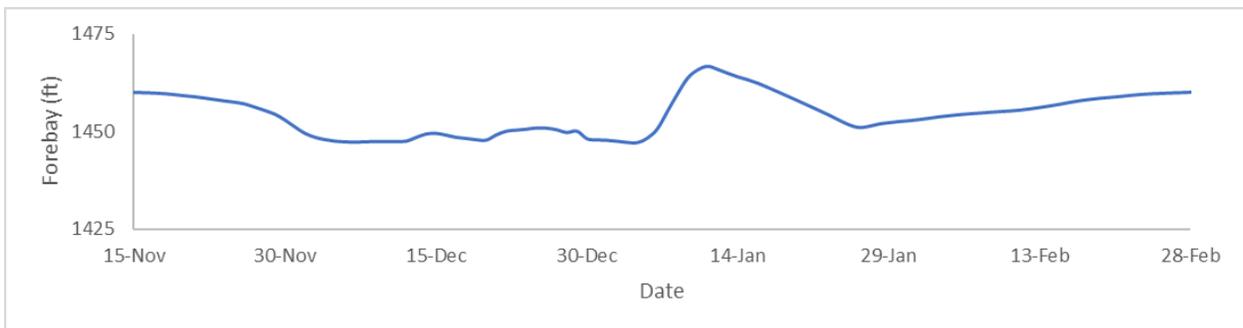
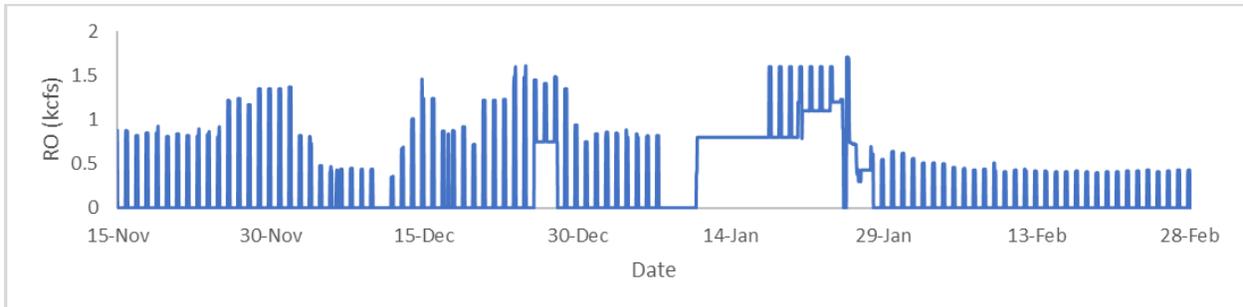
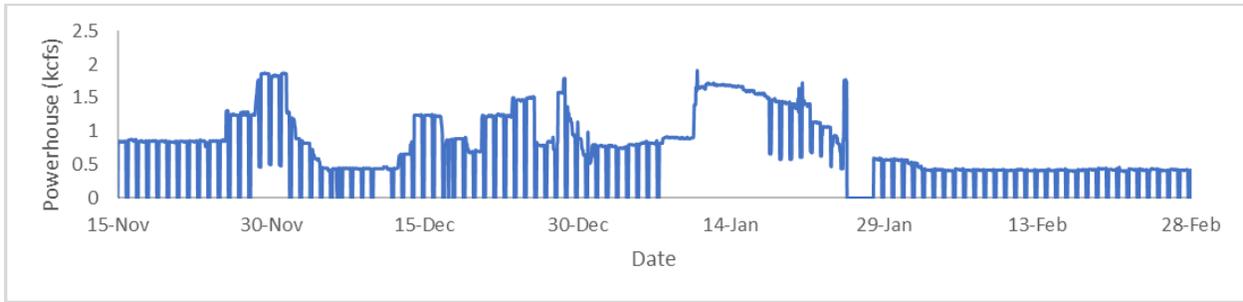
Lookout Dam Tailrace Operational and Capture Data



Lookout Point Head of Reservoir Operational and Capture Data Since Start of Monitoring



Hills Creek Dam Operational and Capture Data Since Start of Monitoring



Appendix C

Summary of Project PIT Tagged Fish for Reporting Period

Site	Trap	# of PIT Tagged Fish
Big Cliff Dam	8 ft	235
Foster Dam Head of Reservoir	5 ft	61
Cougar Dam	<u>PWR</u> (2) 8 ft	273
Cougar Dam	<u>RO</u> 5ft	254
Cougar Dam Head of Reservoir	5 ft	34
Green Peter Tailrace	8 ft	4
Fall Creek Tailrace	8 ft	1
Fall Creek Head of Reservoir	8 ft	5
Dexter Dam Tailrace	5 ft	1
Lookout Point Head of Reservoir	5 ft	23
Lookout Point Dam	<u>PWR</u> (2) 8 ft	3
Lookout Point Dam	<u>RO</u> 8 ft	5
Dexter Dam Tailrace	5 ft	11
Lookout Dam Tailrace	(2) 8 ft	3
TOTAL PIT tagged for report period		913

Summary of ODFW PIT Tagged fish Encountered to Date

Site	Date	Trap	Species	PIT Tag #
Cougar Dam	4/7/2022	RO	Chinook	3DD.003BD59645
Cougar Dam	3/3/2022	PH	Chinook	3DD.003DA4DC74
Cougar Dam	3/4/2022	PH	Chinook	3DD.003E14CA70
Cougar Dam	3/4/2022	PH	Chinook	384.36F2B2C5D2
Cougar Dam	3/5/2022	PH	Chinook	3DD.003E14CC20
Cougar Dam	3/8/2022	PH	Chinook	3DD.003E14CD8D
Cougar Dam	3/6/2022	RO	Chinook	3DD.003E14C9D6
Cougar Dam	1/8/2022	RO	Chinook	3DD.0077780789
Cougar Dam	1/14/2022	RO	Chinook	384.36F2B2C55F

Summary of PIT Tagged and Radio Tagged fish Encountered for Reporting Period

Site	Date	Trap	Species	Pit Tag #
Big Cliff Dam	4/23/2022	8 ft	Chinook	3DD.003E1BC85E
Green Peter Tailrace- Middle Santiam River	4/20/2022	8 ft	Chinook	3DD.003BD55AB7
Green Peter Tailrace- Middle Santiam River	4/20/2022	8 ft	Chinook	3DD.003BD55C54
Green Peter Tailrace- Middle Santiam River	4/22/2022	8 ft	Chinook	3DD.003BD55B02