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Report Period: October 16th to October 31st, 2023

Re: **CRAMER FISH SCIENCES - WILLAMETTE VALLEY FISH PASSAGE
MONITORING VIA ROTARY SCREW TRAPS**

Project Schedule

Table 1. Project Schedule

Site	Task	Start	End	Days
Breitenbush River RST	Trap Install	6/16/2023	6/16/2023	1
Breitenbush River RST	Operation	6/16/2023	11/30/2023	167
Breitenbush River RST	Trapping Efficiency (749 fish)	6/21/2023	6/21/2023	1
Breitenbush River RST	Trapping Efficiency (763 fish)	7/6/2023	7/6/2023	1
Breitenbush River RST	Trapping Efficiency (791 fish)	8/2/2023	8/2/2023	1
Breitenbush River RST	Trapping Efficiency (756 fish)	9/20/2023	9/20/2023	1
Breitenbush River RST	Trapping Efficiency (789 fish)	10/5/2023	10/5/2023	1
Breitenbush River RST	Trapping Efficiency (750 fish)	10/25/2023	10/25/2023	1
Big Cliff Dam RST	Operation	10/15/2023	12/31/2023	78
Big Cliff Dam Tailrace	Trapping Efficiency (633 fish)	10/25/2023	10/25/2023	1
Detroit Head of Reservoir- North Santiam River RST	Trap Install	4/19/2023	4/19/2023	1
Detroit Head of Reservoir- North Santiam River RST	Operation	5/4/2023	11/30/2023	210
Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (539 fish)	6/6/2023	6/6/2023	1
Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (750 fish)	6/20/2023	6/20/2023	1

Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (750 fish)	7/6/2023	7/6/2023	1
Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (750 fish)	8/2/2023	8/2/2023	1
Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (700 fish)	9/6/2023	9/6/2023	1
Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (750 fish)	10/5/2023	10/5/2023	1
Detroit Head of Reservoir- North Santiam River RST	Trapping Efficiency (757 fish)	10/25/2023	10/25/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Highline Install	4/25/2023	4/25/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Trap Install	4/26/2023	4/26/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Operation	5/4/2023	11/30/2023	210
Green Peter Head of Reservoir- Middle Santiam River RST	Trapping Efficiency (1000 dead, 750 alive)	6/7/2023	6/7/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Trapping Efficiency (750 fish)	7/28/2023	7/28/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Trapping Efficiency (749 fish)	8/30/2023	8/30/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Trapping Efficiency (741 fish)	9/27/2023	9/27/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Trapping Efficiency (750 fish)	10/11/2023	10/11/2023	1
Green Peter Head of Reservoir- Middle Santiam River RST	Trapping Efficiency (750 alive, 1,000 dead)	10/11/2023	10/11/2023	1
Fall Creek Dam Tailrace RST	Operation	10/1/2023	12/31/2023	92
Fall Creek Dam Tailrace RST	Trapping Efficiency (1,020 fish)	10/3/2023	10/3/2023	1
Fall Creek Dam Tailrace RST	Trapping Efficiency (1,011 fish)	10/17/2023	10/17/2023	1
Lookout Dam Tailrace RSTs	Operation	8/01/2023	12/31/2023	152
Lookout Dam Tailrace Spill	Trapping Efficiency (3,634 fish)	9/13/2023	9/13/2023	1

Lookout Dam Tailrace Spill	Trapping Efficiency (3,998 fish)	9/14/2023	9/14/2023	1
Lookout Dam Tailrace Spill	Trapping Efficiency (4,042 fish)	10/25/2023	10/25/2023	1
Hills Creek Dam RSTs	Operation	9/15/2023	12/31/2023	107
Hills Creek Dam Powerhouse	Trapping Efficiency (510 fish)	9/27/2023	9/27/2023	1
Hills Creek Dam Powerhouse	Trapping Efficiency (503 fish)	10/31/2023	10/31/2023	1
Hills Creek Head of Reservoir RST	Trap Install	5/9/2023	5/9/2023	1
Hills Creek Head of Reservoir RST	Operation	5/9/2023	6/30/2023	52
Hills Creek Head of Reservoir RST	Removal	6/30/2023	6/30/2023	1
Hills Creek Head of Reservoir RST	Trapping Efficiency (519 fish)	5/18/2023	5/18/2023	1
Hills Creek Head of Reservoir RST	Trapping Efficiency (760 fish)	6/19/2023	6/19/2023	1

Table 2. Sampling Dates for Reporting Period

Site	Total Sampling Period Start	Current Reporting Period Start	Current Reporting Period End	Days Sampled This Period	Total Days Sampled
Breitenbush River RST	6/16/2023	10/16/2023	10/31/2023	16	123
Big Cliff Dam	10/15/2023	10/16/2023	10/31/2023	16	16
Detroit Head of Reservoir- North Santiam River RST	5/4/2023	10/16/2023	10/31/2023	16	164
Green Peter Head of Reservoir- Middle Santiam River RST	5/4/2023	10/16/2023	10/31/2023	16	162
Fall Creek Dam Tailrace	10/1/2023	10/16/2023	10/31/2023	15	31
Lookout Point Dam PH	8/1/2023	10/16/2023	10/31/2023	16	73
Lookout Point Dam Spill	8/1/2023	10/16/2023	10/31/2023	16	73
Hills Creek Dam PH	9/15/2023	10/16/2023	10/31/2023	16	46
Hills Creek Dam RO	9/15/2023	10/16/2023	10/31/2023	16	46

Hills Creek Head of Reservoir RST	5/9/2023	N/A	N/A	N/A	52
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Table 3. Willamette Valley Rotary Screw Trap Monitoring Catch Summary

Site	Species	Catch (Reporting Period)	Recaptures (Reporting Period)	Total Catch
Breitenbush River RST	CHS	35	51	356
Breitenbush River RST	STW	2	0	350
Big Cliff Dam Tailrace	CHS	62	99	641
Big Cliff Dam Tailrace	STW	2	0	248
Detroit Head of Reservoir- North Santiam River RST	CHS	143	75	9877
Detroit Head of Reservoir- North Santiam River RST	STW	2	0	587
Green Peter Head of Reservoir- Middle Santiam River RST	CHS	0	0	21
Green Peter Head of Reservoir- Middle Santiam River RST	STW	0	0	0
Fall Creek Dam Tailrace	CHS	79	14	79
Lookout Point Dam	CHS	0	0	1
Hills Creek Dam	CHS	3	8	411
Hills Creek Head of Reservoir RST	CHS	0	0	93

Summary of Rotary Screw Trap Data

For this reporting period, traps were operated at the following 7 locations: Big Cliff Dam Tailrace, Detroit Head of Reservoir – North Santiam River, Breitenbush River, Green Peter Head of Reservoir – Middle Santiam River, Fall Creek Dam Tailrace, Lookout Dam Tailrace and Hills Creek Dam Tailrace.

The RST in Big Cliff Dam Tailrace began sampling under contract W9127N19D0009 on October 16th, 2023. Sampling at Big Cliff Dam Tailrace prior to October 16th, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting October 16th 2023 but will include season totals from January 1st, 2023 onward.

The Detroit Head of Reservoir – North Santiam RST and Green Peter Head of Reservoir – Middle Santiam RST were installed on April 19th and 26th, respectively. The RSTs at Detroit Head of Reservoir – North Santiam and Green Peter Head of Reservoir – Middle Santiam rivers started sampling on May 4th once permits were received. The Hills Creek Head of Reservoir RST on the upper Middle Fork Willamette River was installed and began sampling on May 9th. Sampling concluded at the Hills Creek Head of

Reservoir site on June 30th and was removed for the remainder of the year. The RST for the Breitenbush River was installed on June 16th and began sampling on the same day.

The RSTs in the Lookout Dam Tailrace began sampling under contract W9127N19D0009 on August 1, 2023. Sampling at Lookout Dam Tailrace prior to August 1st, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting August 1st, 2023 but will include season totals from January 1st, 2023 onward.

The RSTs in the Hills Creek Dam Tailrace began sampling under contract W9127N19D0009 on September 15th, 2023. Sampling at Hills Creek Dam Tailrace prior to September 15th, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting September 15th, 2023 but will include season totals from January 1st, 2023 onward.

The RST in the Fall Creek Dam Tailrace began sampling under contract W9127N19D0009 on September 30, 2023. Sampling at Fall Creek Dam Tailrace prior to September 30, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. Sampling results will be on the next report. This report reflects research conducted starting September 30th, 2023 but will include season totals from January 1st, 2023 onward. Winter Steelhead may be present at the Big Cliff Dam, Breitenbush River, Detroit Head of Reservoir – North Santiam River, and Green Peter Head of Reservoir – Middle Santiam River sites. All natural origin juvenile *O. mykiss* captured at these sites will be treated and reported as Winter Steelhead.

Sampling start dates are included in Table 2, and season total collection numbers are displayed in Table 3. The locations of the RSTs are depicted in Figures 1 through 8.



Imagery Source: 2021, ESRI.



FIGURE 1
Big Cliff Dam

● RST Locations

500 Feet



EAS ENVIRONMENTAL ASSESSMENT SERVICES

 Wholly Owned Subsidiary of Natives of Kodiak



Imagery Source: 2022, ESRI.



FIGURE 2
Breitenbush River

● RST Locations

500 Feet



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Imagery Source: 2022, ESRI.



FIGURE 3
North Santiam Above Detroit

● RST Locations

————— 500 Feet





Imagery Source: 2022, ESRI.



FIGURE 4
 Green Peter Head of Reservoir-
 Middle Santiam River

● RST Locations

500 Feet



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Imagery Source: 2021, ESRI.



FIGURE 5
Fall Creek Dam Tailrace

● RST Locations

500 Feet





Imagery Source: 2021, ESRI.



FIGURE 6
Lookout Dam Tailrace

● RST Locations

500 Feet





Imagery Source: 2019, ESRI.



FIGURE 7
Middle Fork Willamette Above Hills Creek

● RST Locations

———— 500 Feet





FIGURE 8
Hills Creek Dam

● RST Locations

500 Feet



North Santiam – Big Cliff Dam

The RST in the Big Cliff Dam Tailrace began sampling under contract W9127N19D0009 on October 16th, 2023. Sampling at Big Cliff Dam Tailrace prior to October 16th, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting October 16th, 2023 but will include season totals from January 1st, 2023 onward.

Target Species

This reporting period began on October 16th and ended on October 31st. There were a total of 62 Chinook Salmon (CHS) and 2 Winter Steelhead (STW) captured during the 16-day sampling period (Figure 9). Sampling duration was 100% for the RST. Table provides life stage, length, and weight data for all Chinook Salmon and Winter Steelhead that have been caught at the Big Cliff Dam site to-date and for the reporting period. Figure 10 shows length frequency data to-date.

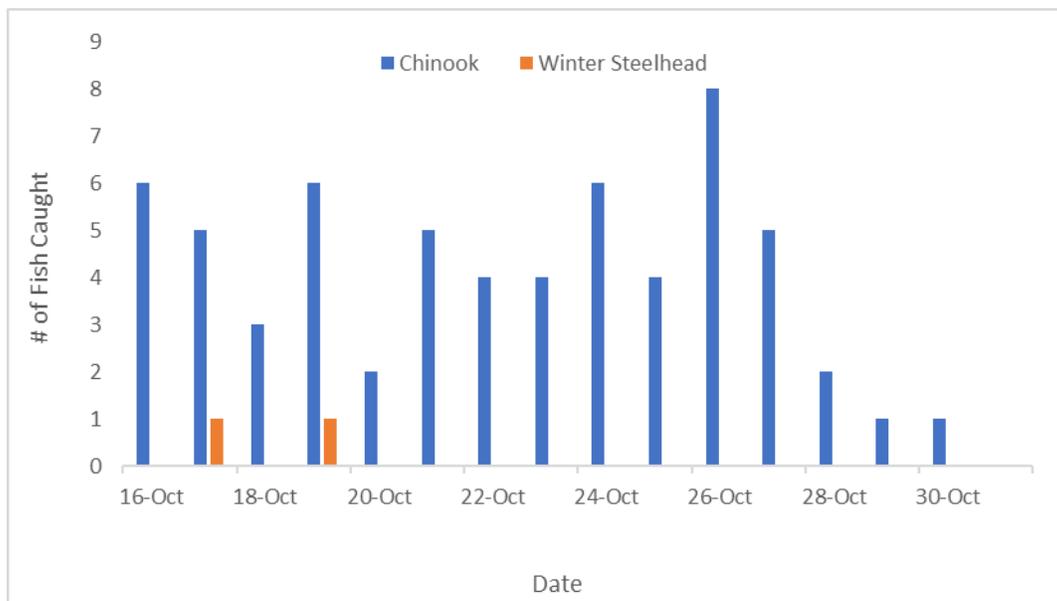
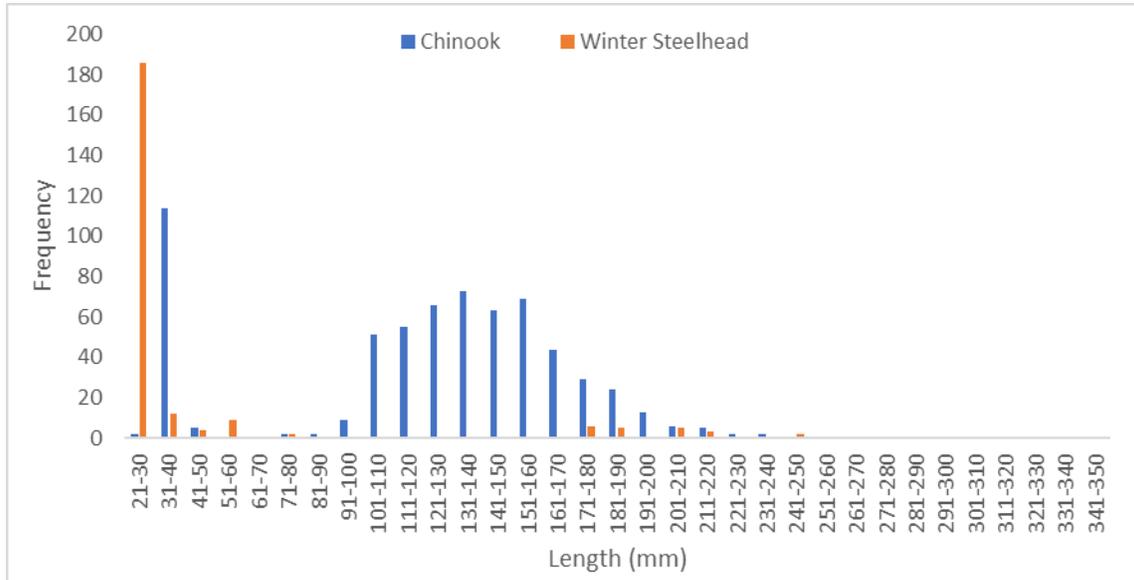


Figure 9. Chinook and Winter Steelhead Captured per day 10/16/2023 to 10/31/2023 (Big Cliff).



*Figure does not include fish without heads

Figure 10. Length Frequency of Juvenile Chinook and Winter Steelhead Sampled in 2023 (Big Cliff).

Table 1. Descriptive Statistics of Target Species Captured at Big Cliff Dam Season To-Date.

To-Date (Since Jan. 1, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm) [*]			Weight (g) [*]		
					Min	Max	Mean	Min	Max	Mean
Big Cliff	PWR	CHS	Fry	120	29	47	36.2	N/A	N/A	N/A
		CHS	Parr	13	49	112	92.5	1.1	15.8	9.4
		CHS	Smolt	508	85	340	145.2	7.4	328.5	36.8
		STW	Fry	202	24	56	28.7	N/A	N/A	N/A
		STW	Parr	14	47	119	65.8	1.3	18.6	4.0
		STW	Smolt	32	145	335	210.7	21.5	254.4	92.1

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

October 16-31, 2023										
Site	Route	Species	Life stage	Collected	Length (mm) [*]			Weight (g) [*]		
					Min	Max	Mean	Min	Max	Mean
Big Cliff	PWR	CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Smolt	62	119	176	149.6	16.9	65.5	35.4
		STW	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Parr	1	57	57	57	1.7	1.7	1.7
		STW	Smolt	1	145	145	145	36.0	36.0	36.0

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

Trapping Efficiency

A total of 633 bismarck brown dyed and adipose clipped juvenile hatchery chinook were released on 10/25/2023 below Big Cliff Dam. 99 fish were recaptured in the 8 ft trap for a trapping efficiency of 15.6%.

Big Cliff Dam	Release #	Recapture #	Capture Efficiency
8ft Trap	633	99	15.6% (99/633)

24-Hour Post Collection Holding Trial

59 Spring Chinook and 2 Winter Steelhead were captured during the current reporting period and held for 24 hours. 15 Chinook (25.4%) and 0 Winter Steelhead (0.0%) died in holding.

Injuries and Copepod Infection

Partial descaling <20% was observed in 48 of the 62 Chinook captured (77.4%), 14 displayed descaling >20% (22.6%), 56 displayed body injury (90.3%), 3 had eye injury (4.8%), 62 had copepods present in the branchial cavity (100%) and 28 had copepods on fins (45.2%). 3 Chinook displayed gas bubble disease (three level 1) (4.8%). There were 3 mortalities (4.8%).

Partial descaling <20% was observed on 1 of the 1 Winter Steelhead captured (50.0%) and 0 displayed descaling >20% (0.0%), 1 displayed body injury (50.0%), 0 had eye injury (0.0%), 0 had copepods present in the branchial cavity (0.0%) and 1 had copepods on fins (50.0%). 0 Winter Steelhead displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%). Injury data is summarized in Table .

Table 2. 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	62	48	14	56	3	62	28	3
	Winter Steelhead	2	1	0	1	0	0	1	0

Collected DNA and Scale Samples

DNA was collected from 62 Spring Chinook and 2 Winter Steelhead for the reporting period. Scales were collected from 61 Spring Chinook and 2 Winter Steelhead. The other targets captured did not meet length criteria for DNA sampling or were too descaled/damaged to collect samples.

PIT Tags

0 Spring Chinook and 0 Winter Steelhead were PIT tagged during this reporting period. The first 60 target fish per week are prioritized for the 24-Hour Post Collection Holding Study. These fish are not tagged to not bias the results of the holding study. More information regarding PIT tagged fish can be found in Appendix D.

Non-Target Species

25 non-targets were captured during this sampling period. A summary of non-target species catch and mortality numbers for 2023 are listed in Table .

Table 3. Summary of Non-target Species (Big Cliff Dam).

Species	PWR Capture	PWR Mortality	Season Total	Season Total Mortality
Bluegill	18	7	44	16
Brown Bullhead	0	0	6	2
Dace	0	0	1	0
Chinook (Adult)	0	0	3	1
Chinook (clipped)	4	0	47	0
Cutthroat Trout	0	0	0	0
Kokanee	2	1	172	29
Kokanee (clipped)	0	0	11	3
<i>O. mykiss</i> (clipped)	0	0	6	2
Pumpkinseed	1	1	54	8
Unknown	0	0	1	1
Mountain Whitefish	0	0	6	1
Sculpin	0	0	0	0
Totals	25	9	351	63

Stream Statistics

Basic stream statistics at the Big Cliff Dam site were calculated from data downloaded from U.S. Geological Survey stream gauge numbers 14181410 and 14181500. Gauge height (feet) is the only metric provided at gauge 14181410. Total dissolved gas (TDG) saturation data was received from gauge 14181500, 1 rkm downstream of the trap. During the reporting period, daily maximum values for instantaneous gauge height ranged from 1,109.7 to 1,110.0 feet (mean: 1,109.7 feet) during the reporting period. Figure 11 shows instantaneous gauge height.

Total dissolved gas saturation ranged from 109 to 121% during the reporting period (mean: 112.6%). Figure 12 shows total dissolved gas saturation.

Stream temperatures were recorded every 2 hours for the length of the reporting period at the RST (Figure 13). The temperature probe for the trap operated normally throughout this reporting period.

Flows through the Powerhouse and Spill during the reporting period averaged 1,613.0 and 6.4 cubic feet per second (cfs), respectively (Figure 14). Catch per unit of effort (CPUE) data are summarized in Table , Detroit and Big Cliff forebay elevations and TDG at Niagara are shown in appendix B. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 4. Summary of salmonid CPUE, Big Cliff Dam.

Description	Chinook	Winter Steelhead
Catch	62	2
Effort (hrs)	386.7	386.7
CPUE (fish/hr)	0.160	0.005

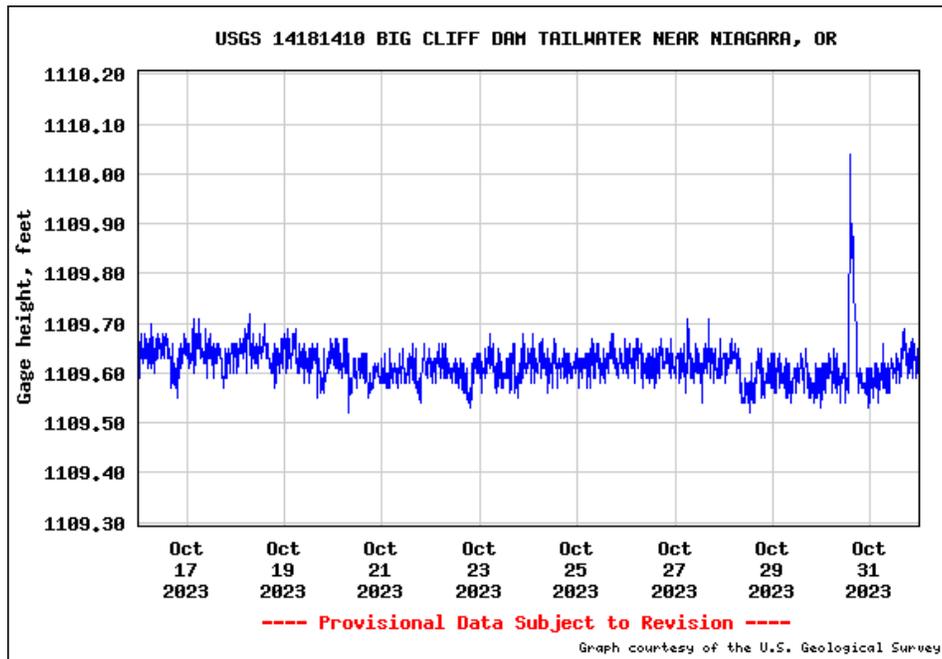


Figure 11. Gauge height (ft); below Big Cliff Dam.

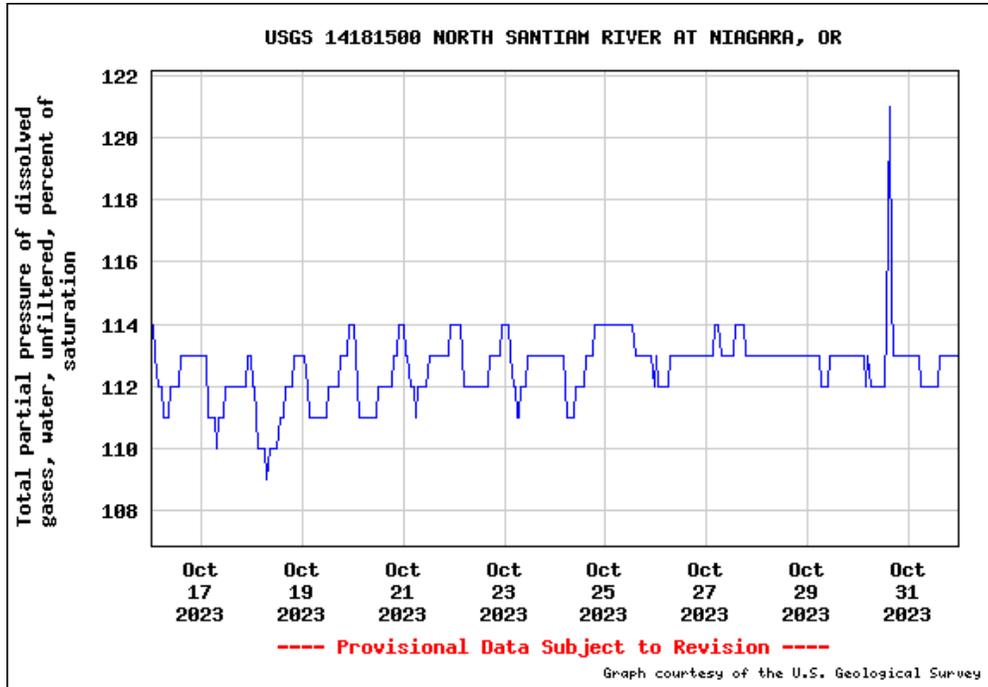


Figure 12. Total Dissolved Gas Saturation (%); below Big Cliff Dam.

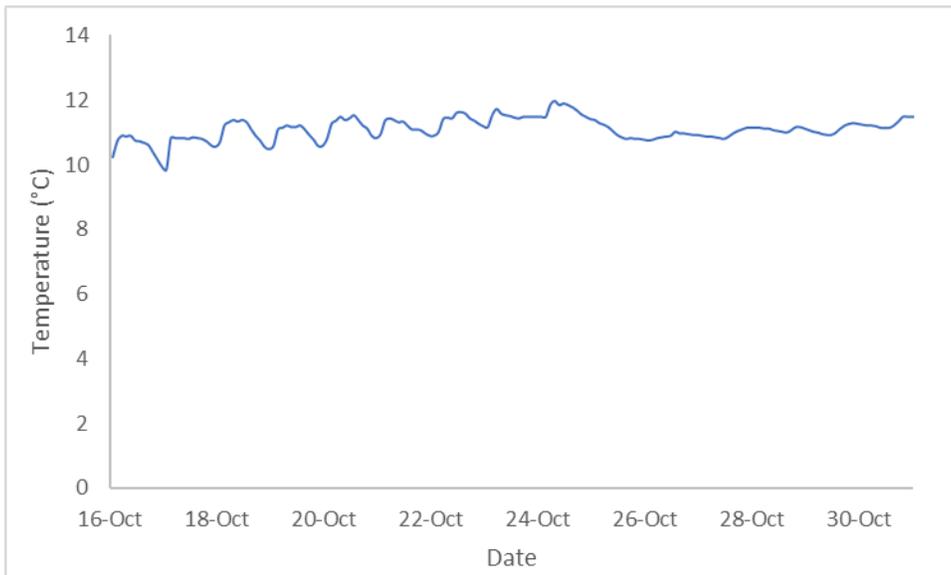


Figure 13. Temperature at RST (Big Cliff Dam).

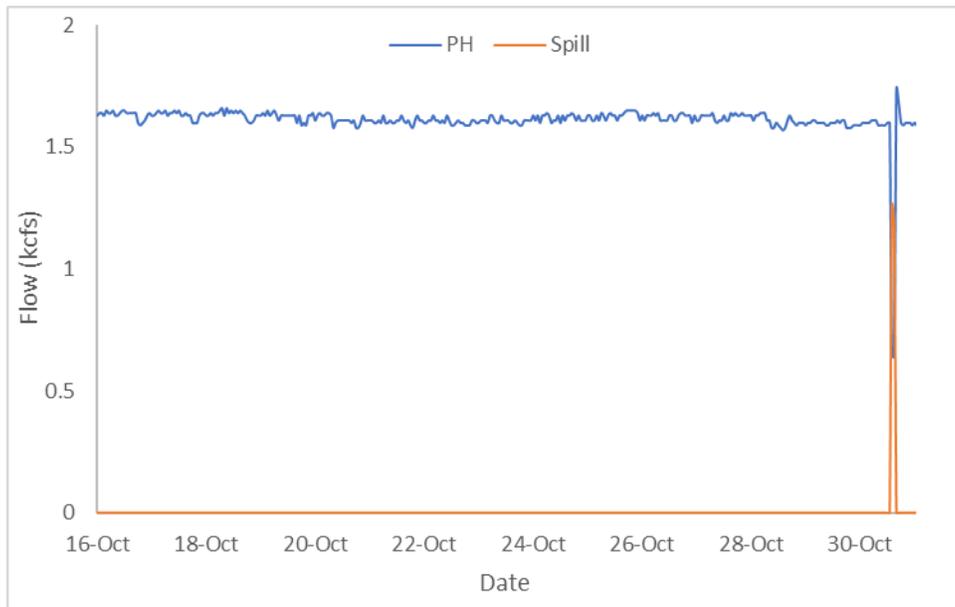


Figure 14. Hourly Flows PWR vs. Spill (Big Cliff Dam).

Breitenbush River

The Breitenbush River RST was installed on June 16th, 2023 and began sampling the same day. All natural origin *O. mykiss* captured at this site will be reported as Winter Steelhead.

Target Species

This reporting period began on October 16th and ended on October 31st. There were a total of 35 Chinook Salmon (CHS) and 2 Winter Steelhead (STW) captured during the 16-day sampling period (Figure 15). Sampling duration was 100% of the reporting period for the RST. Figure 16 shows length frequency data to-date. Table 8 provides life stage, length, and weight data for all Chinook Salmon and Winter Steelhead that have been caught at the Breitenbush River site to-date and for the reporting period.

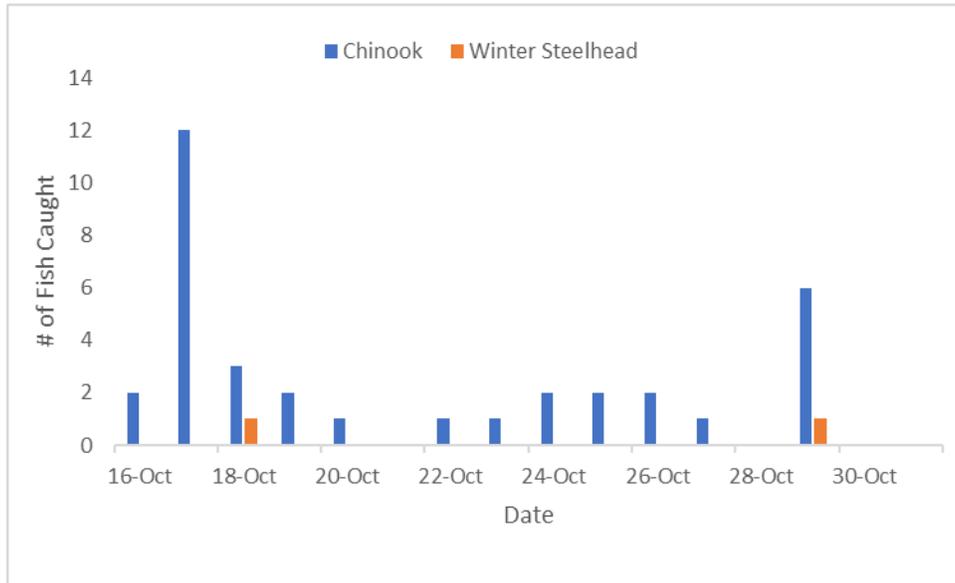


Figure 15. Chinook and Winter Steelhead Captured per day 10/16/2023 to 10/31/2023 (Breitenbush River).

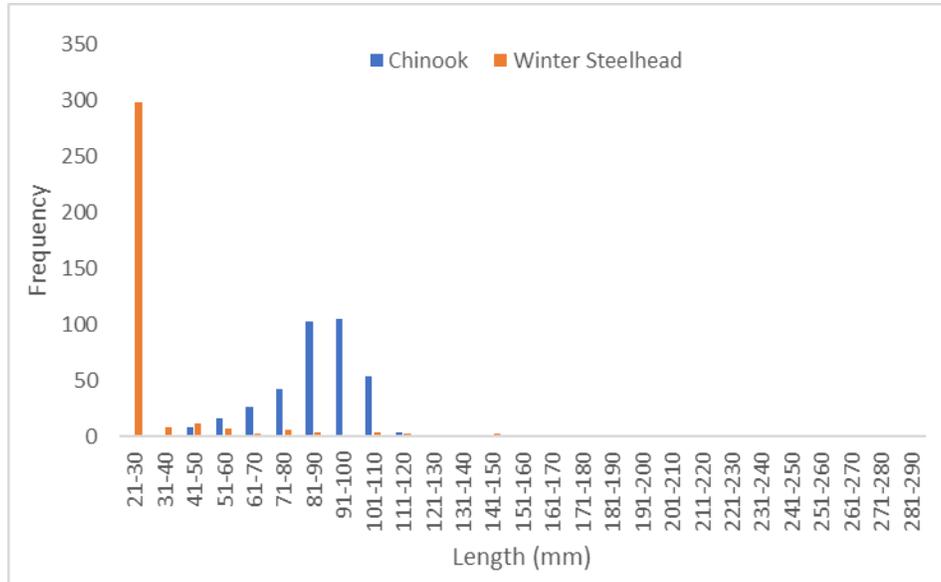


Figure 16. Length Frequency of Juvenile Chinook Sampled Season To-Date (Breitenbush River).

Table 8. Descriptive Statistics of Target Species Captured at the Breitenbush River To-Date

To-Date (Since June 16, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Breitenbush River	5ft	CHS	Fry	10	44	57	48.8	<1.0	1.9	1.2
		CHS	Parr	215	46	110	81.8	<1.0	16.1	6.6
		CHS	Smolt	131	74	114	96.8	4.3	15.5	9.8
		STW	Fry	312	21	47	27.1	N/A	N/A	N/A
		STW	Parr	31	43	125	71.2	1.1	21.5	6.0
		STW	Smolt	7	118	199	148.6	15.2	92	36.8

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

October 16-31, 2023										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Breitenbush River	5ft	CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	22	70	103	84.7	2.4	10.6	6.7
		CHS	Smolt	13	87	114	98.1	6.9	13.4	9.6
		STW	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Parr	2	54	125	75.7	<1.0	21.5	11.3
		STW	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A

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

Trapping Efficiency

On 10/25/2023 750 adipose and right ventral fin clipped fish were released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 51 fish were recaptured for an efficiency of 6.8%

Breitenbush River	Release #	Recapture #	Capture Efficiency
5ft Trap	750	51	6.8% (51/750)

Run of River Trapping Efficiency

Run of river fish captured in the RST have been caudal clipped, PIT tagged or VIE tagged, and released upstream to perform run of river trapping efficiency trials. Only fish large enough to be safely caudal clipped have been used for run of river efficiency trials. This year, 138 Spring Chinook and 2 Winter Steelhead have been caudal clipped and released upstream for the purpose of conducting run of river trapping efficiency trials. Release numbers and recaptures for this reporting period are summarized below.

Breitenbush River	Release (Current Reporting Period) #	Recapture (Current Reporting Period) #
Chinook	0	0
Winter Steelhead	0	0

Injuries and Copepod Infection

Partial descaling <20% was observed in 34 of the 35 Chinook captured (97.1%), 1 displayed descaling >20% (2.9%), 15 displayed body injury (42.9%), 0 had eye injuries (0.0%), 1 had copepods present in the

branchial cavity (2.9%) and 5 had copepods on fins (14.3%). 0 Chinook displayed gas bubble disease (0.0%). There was 1 mortality (2.9%).

Partial descaling <20% was observed on 0 of the 2 Winter Steelhead captured (0.0%) and 0 displayed descaling >20% (0.0%), 0 displayed body injury (0.0%), 0 had eye injury (0.0%), 0 had copepods present in the branchial cavity (0.0%) and 0 had copepods on fins (0.0%). 0 Winter Steelhead displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%). Injury data is summarized in table 9.

Table 9. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon and Winter Steelhead for Sampling Period (Breitenbush River).

Site	Species	# Fish Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Breitenbush River	Chinook	35	34	1	15	0	1	5	1
	Winter Steelhead	2	0	0	0	0	0	0	0

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

Collected DNA and Scale Samples

DNA was collected from 35 Spring Chinook and 2 Winter Steelhead. Scale samples were collected from 35 Spring Chinook and 2 Winter Steelhead.

PIT Tags

35 fish were PIT tagged during this reporting period, 34 Chinook and 1 Winter Steelhead. More information regarding PIT tagged fish can be found in Appendix D.

VIE Marking

Visible Implant Elastomer (VIE) trials commenced on 6/16/2023. VIE tag color is changed every month to distinctly mark groups of fish by capture date. Since then, 34 Spring Chinook and 17 Winter Steelhead have been marked with fluorescent elastomer. No fish have been recaptured at downstream sites to date.

Date Tagged	Species	Tag Location	VIE Color	# Tagged	# Recaptured to Date
6/16/2023-6/30/2023	Chinook	Head	Pink	23	0
7/1/2023-7/15/2023	Chinook	Head	Green	2	0
7/16/2023-7/31/2023	Chinook	Head	Green	2	0
7/16/2023-7/31/2023	<i>O. mykiss</i>	Head	Green	7	0
8/1/2023-8/15/2023	Chinook	Head	Yellow (2x)	1	0
8/1/2023-8/15/2023	<i>O. mykiss</i>	Head	Yellow (2x)	3	0
8/16/2023-8/31/2023	Chinook	Head	Yellow (2x)	2	0
8/16/2023-8/31/2023	<i>O. mykiss</i>	Head	Yellow (2x)	5	0
9/1/2023-9/15/2023	<i>O. mykiss</i>	Head	Red (2x)	2	0

9/16/2023-9/30-2023	Chinook	Head	Red (2x)	4	0
10/16/2023-10/31/2023	<i>O. mykiss</i>	Head	Blue (2x)	1	0

Non-Target Species

3 non-target species were captured during this reporting period. A summary of non-target fish capture is provided in table 10.

Table 10. Summary of Non-target Species (Breitenbush River).

Species	5 ft Capture	5 ft Mortality	Season Total	Season Total Mortality
Kokanee	0	0	0	0
Chinook (clipped)	0	0	2	0
Cutthroat Trout	1	0	2	0
<i>O. mykiss</i> (clipped)	0	0	11	5
Sculpin	1	0	12	2
Dace	1	0	1	0
Totals	3	0	28	7

Stream Statistics

Basic stream statistics at the Breitenbush River RST site were calculated from data downloaded from the U.S. Geological Survey stream gauge number 14179000. Instantaneous discharge (cfs) and Gauge height (feet) flow metrics are available at this gauge. During the reporting period, daily maximum values for instantaneous discharge ranged from 171.0 cfs to 352.0 (mean: 237.6 cfs). Figure 17 shows instantaneous discharge.

Stream temperatures will be recorded every 2 hours for the length of the reporting period for the RST (Figure 18).

Catch per unit of effort (CPUE) data are summarized in **Error! Reference source not found. 11**. Gage height and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 11. Summary of salmonid CPUE, Breitenbush River.

	Chinook	Winter Steelhead
Description	(5 ft)	(5 ft)
Catch	35	2

Effort (hrs)	384.6	384.6
CPUE (fish/hr)	0.091	0.005

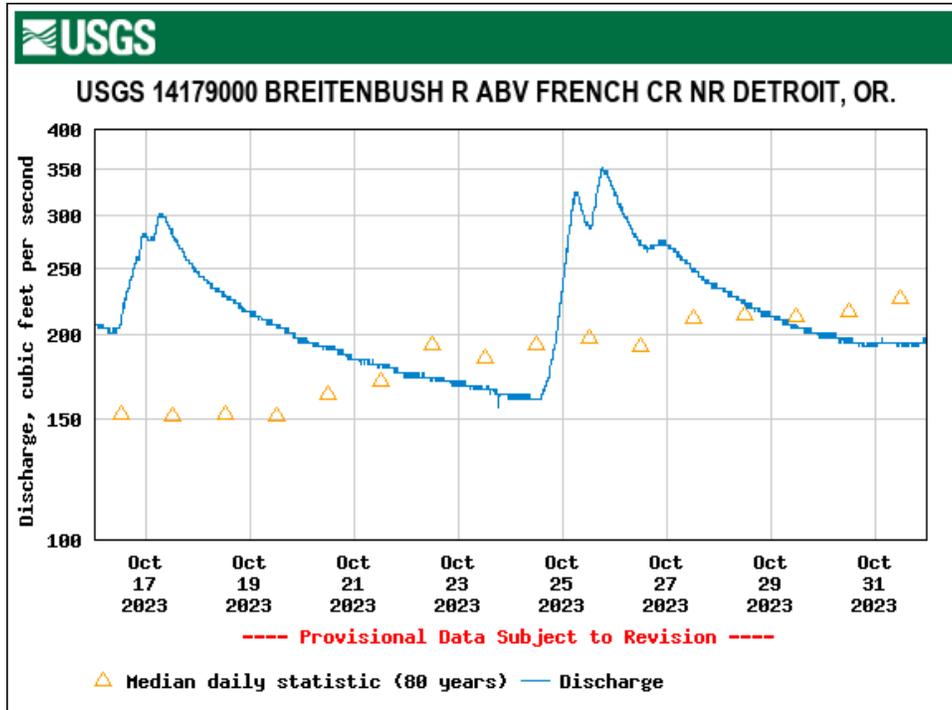


Figure 17. Discharge (cfs); Breitenbush River.

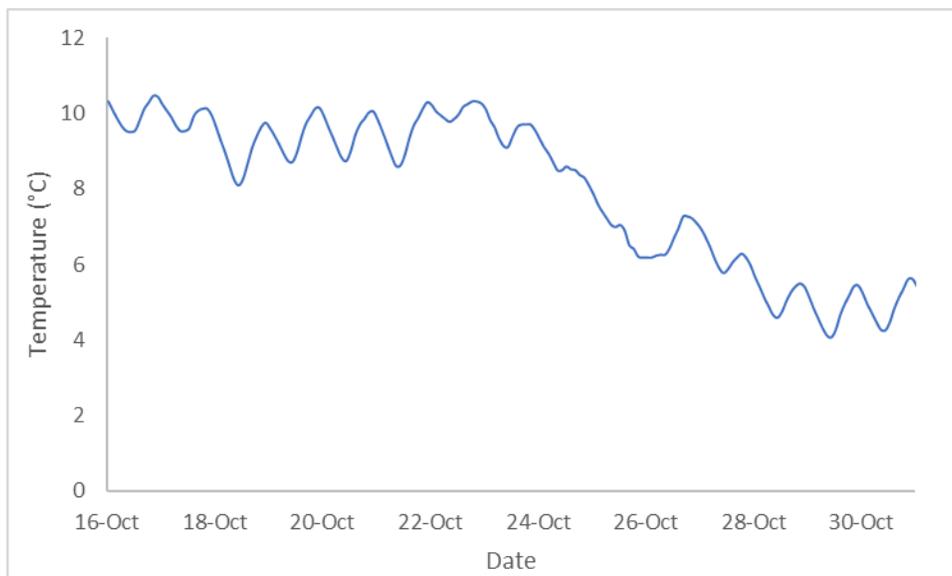


Figure 18. Temperature at RST (Breitenbush River).

North Santiam River – Detroit Head of Reservoir

The Detroit Head of Reservoir- North Santiam River RST was installed on April 19th, 2023. This site started sampling on May 4, 2023. All natural origin *O. mykiss* captured at this site will be reported as Winter Steelhead.

Target Species

This reporting period began on October 16th and ended on October 31st. There were a total of 143 Chinook Salmon (CHS) and 2 Winter Steelhead (STW) captured during the 16-day sampling period (Figure 19). Sampling duration was 100% of the reporting period for the RST. Figure 20 shows length frequency data to-date. Table 12 provides life stage, length, and weight data for all Chinook Salmon and Winter Steelhead that have been caught at the Detroit Head of Reservoir site to-date and for the reporting period.

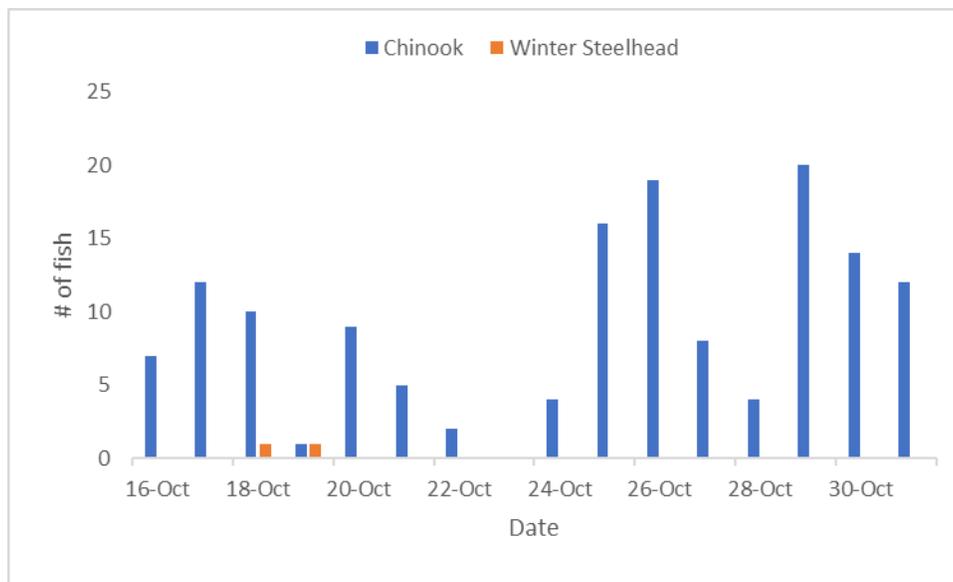


Figure 19. Chinook and Winter Steelhead Captured per day 10/16/2023 to 10/31/2023 (Detroit Head of Reservoir).

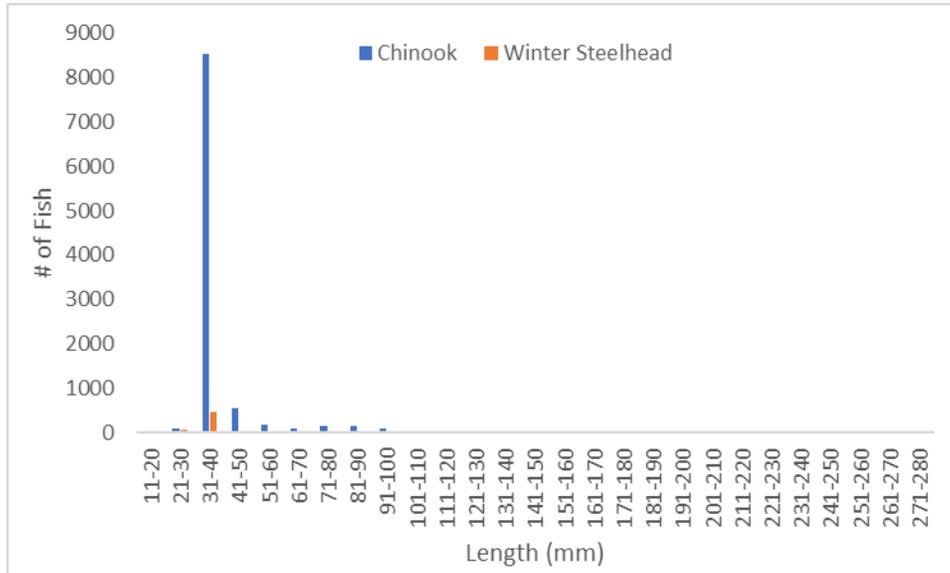


Figure 20. Length Frequency of Juvenile Chinook and Winter Steelhead Sampled Season To-Date (Detroit Head of Reservoir).

Table 12. Descriptive Statistics of Target Species Captured at Detroit Head of Reservoir Season To-Date.

To-Date (Since May 04, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Detroit HOR	5ft	CHS	Fry	9118	28	60	35.5	N/A	N/A	N/A
		CHS	Parr	622	41	110	69.0	<1.0	12.8	4.2
		CHS	Smolt	137	61	117	93.3	2.4	18.2	9.0
		STW	Fry	550	17	54	34.4	N/A	N/A	N/A
		STW	Parr	34	45	112	65.4	1.0	15.4	4.0
		STW	Smolt	3	169	408	255.0	53.4	66.5	60.0

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

October 16-31, 2023

Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Detroit HOR	5ft	CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	75	59	96	81.0	2.2	10.6	5.8
		CHS	Smolt	68	77	115	95.4	2.7	18.2	9.4
		STW	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Parr	2	53	60	56.5	2.6	3.0	2.8
		STW	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A

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

Trapping Efficiency

On 10/25/2023 757 adipose and left ventral fin clipped fish were released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 72 fish were recaptured for an efficiency of 9.6%

Detroit Head of Reservoir	Release #	Recapture #	Capture Efficiency
5ft Trap	757	72	9.6% (72/757)

Run of River Trapping Efficiency

Run of river fish captured in the RST have been caudal clipped, PIT tagged or VIE tagged, and released upstream to perform run of river trapping efficiency trials. Only fish large enough to be safely caudal clipped have been used for run of river efficiency trials. This year, 155 Spring Chinook and 2 Winter Steelhead have been caudal clipped and released upstream for the purpose of conducting run of river trapping efficiency trials. Release numbers and recaptures for this reporting period are summarized below.

Detroit Head of Reservoir	Release (Current Reporting Period) #	Recapture (Current Reporting Period) #
Chinook	102	3
Winter Steelhead	1	0

Injuries and Copepod Infection

Partial descaling <20% was observed in 130 of the 143 Chinook captured (90.9%), 2 displayed descaling >20% (1.4%), 77 displayed body injury (53.8%), 1 had eye injuries (0.7%), 7 had copepods present in the

branchial cavity (4.9%) and 6 had copepods on fins (4.2%). 0 Chinook displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%).

Partial descaling <20% was observed on 0 of the 2 Winter Steelhead captured (0.0%) and 0 displayed descaling >20% (0.0%), 0 displayed body injury (0.0%), 0 had eye injuries (0.0%), 0 had copepods present in the branchial cavity (0.0%) and 0 had copepods on fins (0.0%). 0 Winter Steelhead displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%). Injury data is summarized in table 13.

Table 13. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon and Winter Steelhead for Sampling Period (Detroit Head of Reservoir).

Site	Species	# Fish Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Detroit HOR	Chinook	143	130	2	77	1	7	6	0
	Winter Steelhead	2	0	0	0	0	0	0	0

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

Collected DNA and Scale Samples

For the reporting period, DNA was collected from 142 Spring Chinook and 2 Winter Steelhead. Scale samples were collected from 143 Spring Chinook and 2 Winter Steelhead. The other targets captured did not meet length criteria for DNA sampling or were too descaled/damaged to collect samples.

PIT Tags

141 Spring Chinook and 0 Winter Steelhead were PIT tagged during this reporting period. More information regarding PIT tagged fish can be found in Appendix D.

VIE Marking

Visible Implant Elastomer (VIE) trials commenced at the Detroit Head of Reservoir – North Santiam River site on 5/5/2023. VIE tag color is changed every month to distinctly mark groups of fish by capture date. Since then, 5,431 Chinook and 331 Winter Steelhead have been VIE marked with fluorescent elastomer. No fish with VIE marks have been detected at downstream RST sites to date. Fish still showing an egg sac are not VIE marked.

Date Tagged	Species	Tag Location	VIE Color	# Tagged	# Recaptured to Date
5/01/2023-5/15/2023	Chinook	Right Dorsal	Orange	889	0
5/01/2023-5/15/2023	<i>O. mykiss</i>	Right Dorsal	Orange	60	0
5/16/2023- 5/31/2023	Chinook	Right Dorsal	Orange	2,700	0
5/16/2023- 5/31/2023	<i>O. mykiss</i>	Right Dorsal	Orange	237	0
6/1/2023-6/15/2023	Chinook	Right Dorsal	Pink	1048	0
6/1/2023-6/15/2023	<i>O. mykiss</i>	Right Dorsal	Pink	21	0
6/16/2023-6/30/2023	Chinook	Right Dorsal	Pink	539	0

7/1/2023-7/15/2023	Chinook	Right Dorsal	Green	110	0
7/16/2023-7/31/2023	Chinook	Right Dorsal	Green	74	0
7/16/2023-7/31/2023	<i>O. mykiss</i>	Right Dorsal	Green	1	0
8/1/2023-8/15/2023	Chinook	Right Dorsal	Yellow (2x)	25	0
8/1/2023-8/15/2023	<i>O. mykiss</i>	Right Dorsal	Yellow (2x)	7	0
8/16/2023-8/31/2023	Chinook	Right Dorsal	Yellow (2x)	21	0
8/16/2023-8/31/2023	<i>O. mykiss</i>	Right Dorsal	Yellow (2x)	3	0
9/1/2023-9/15/2023	Chinook	Right Dorsal	Red (2x)	20	0
9/16/2023-9/30/2023	Chinook	Right Dorsal	Red (2x)	4	0
9/16/2023-9/30/2023	<i>O. mykiss</i>	Right Dorsal	Red (2x)	2	0
10/1/2023-10/15/2023	Chinook	Right Dorsal	Blue (2x)	1	0
10/16/2023-10/31/2023	<i>O. mykiss</i>	Right Dorsal	Blue (2x)	2	0
10/16/2023-10/31/2023	Chinook	Right Dorsal	Blue (2x)	2	0

Non-Target Species

5 non-target species fish were captured during the reporting period; the data is summarized below in table 14.

Table 14. Summary of Non-target Species (Detroit Head of Reservoir).

Species	5 ft Capture	5 ft Mortality	Season Total	Season Total Mortality
Kokanee	0	0	81	1
Chinook (clipped)	3	0	10	0
Cutthroat Trout	1	0	3	0
Sculpin	0	0	15	2
Mountain Whitefish	0	0	4	0
<i>O. mykiss</i> (clipped)	1	1	8	1
Dace	0	0	3	0
Unknown	0	0	2	1
Totals	5	1	126	6

Stream Statistics

Basic stream statistics at the Detroit Head of Reservoir site were calculated from data downloaded from U.S. Geological Survey stream gauge number 14178000. Gauge height (feet) and Discharge (cfs) metrics are provided at gauge 14178000. During the reporting period, daily maximum values for instantaneous discharge ranged from 375.0 cfs to 618.0 cfs (mean: 237.6 cfs) during the reporting period. Figure 21 shows instantaneous discharge.

Stream temperatures were recorded every 2 hours for the length of the reporting period at the Detroit Head of Reservoir RST site. Figure 22 shows temperature during the reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 15. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 15. Summary of salmonid CPUE, Detroit Head of Reservoir – North Santiam River.

	Chinook	Winter Steelhead
Description	(5 ft)	(5 ft)
Catch	143	2
Effort (hrs)	381.6	381.6
CPUE (fish/hr)	0.449	0.005

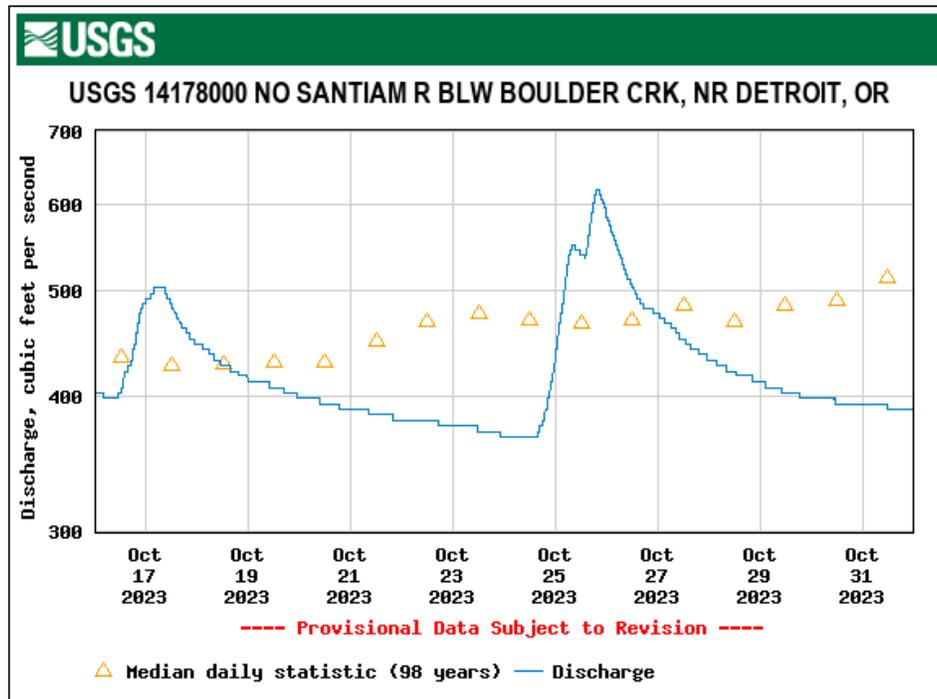


Figure 21. Discharge (cfs); Detroit Head of Reservoir – North Santiam River.

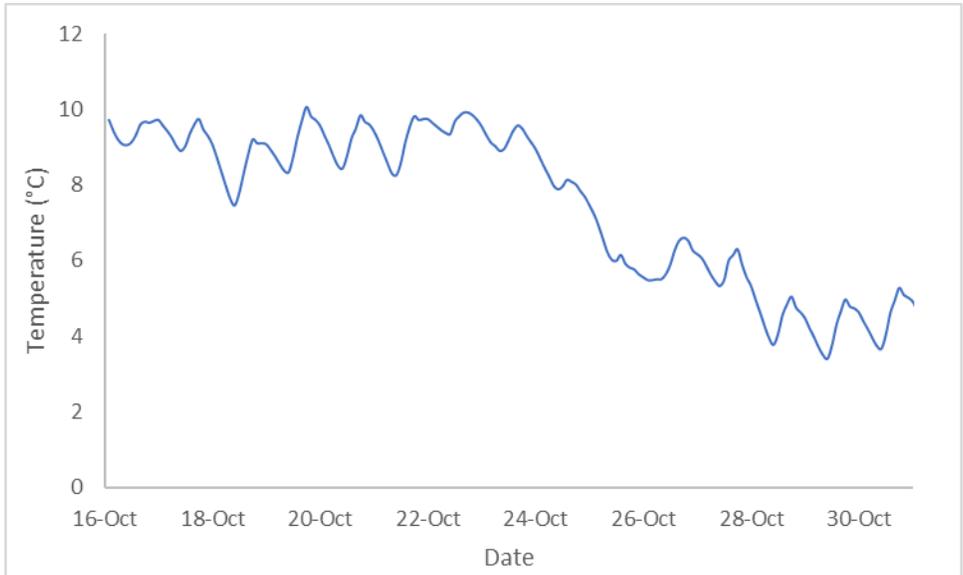


Figure 22. Temperature at RST (Detroit Head of Reservoir – North Santiam River).

Middle Santiam River– Green Peter Head of Reservoir

The Green Peter Head of Reservoir- Middle Santiam River RST was installed on April 26th, 2023. This site started sampling on May 4th, 2023. All natural origin *O. mykiss* captured at this site will be reported as Winter Steelhead.

Target Species

This reporting period began on October 16th and ended on October 31st. There were a total of 0 Chinook Salmon (CHS) and 0 Winter Steelhead (STW) captured during the 16-day sampling period (Figure 23). Sampling duration was 100% of the reporting period for the RST. Figure 24 shows length frequency data to-date. Table 16 provides life stage, length, and weight data for all Chinook Salmon and Winter Steelhead that have been caught at the Middle Santiam River- Green Peter Head of Reservoir site to-date and for the reporting period.

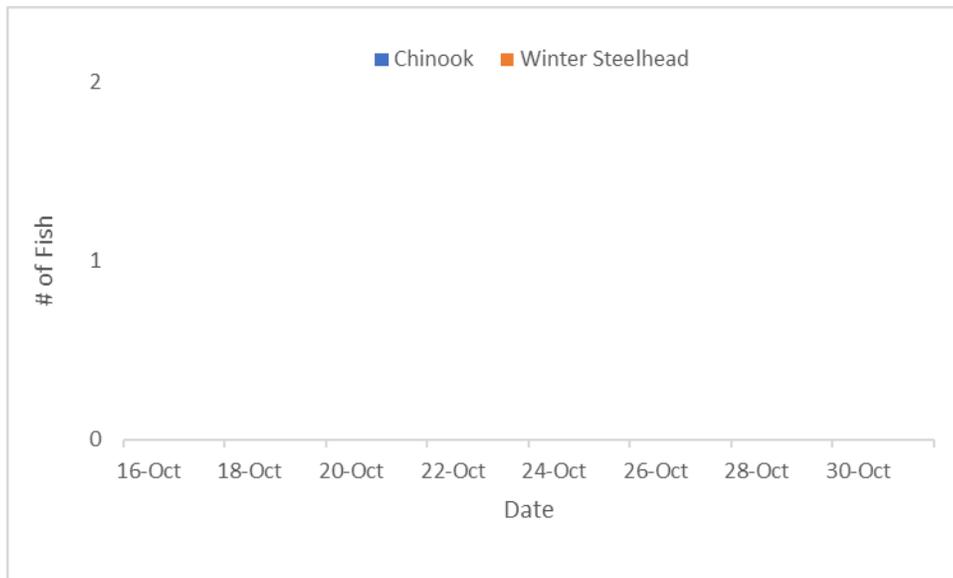


Figure 23. Chinook Captured per day 10/16/2023 to 10/31/2023 (Green Peter Head of Reservoir – Middle Santiam River).

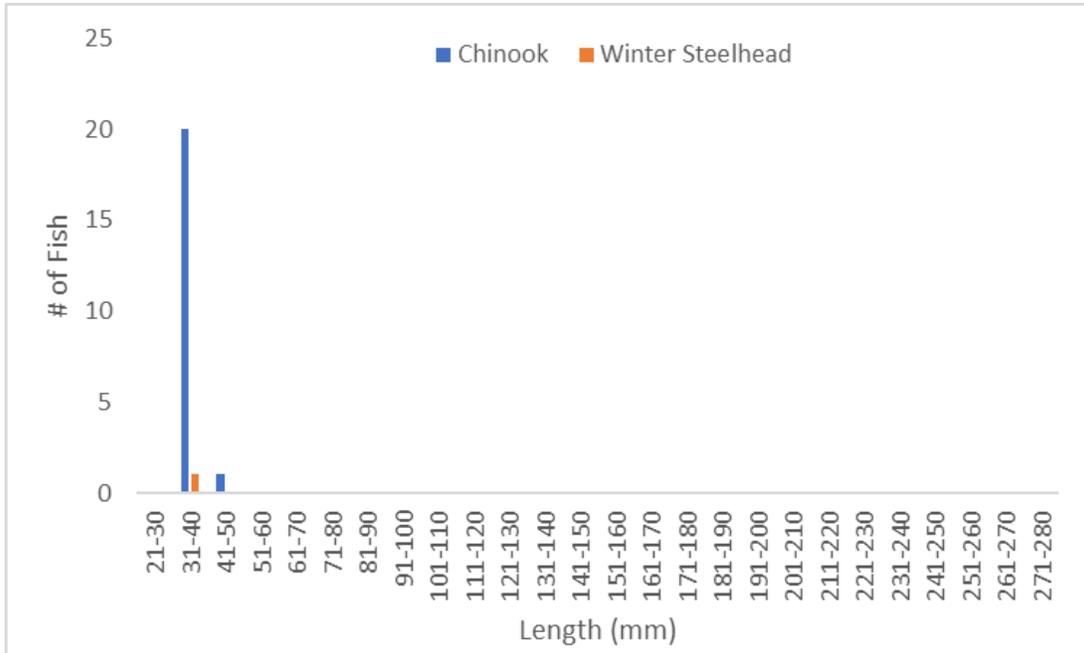


Figure 24. Length Frequency of Juvenile Chinook Sampled Season To-Date (Green Peter Head of Reservoir – Middle Santiam River).

Table 16. Descriptive Statistics of Target Species Captured at Green Peter Head of Reservoir – Middle Santiam River Season To-Date.

To-date (since May 04, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Green Peter Head of Reservoir -Middle Santiam	5ft	CHS	Fry	21	33	45	36.4	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Fry	1	36	36	36	N/A	N/A	N/A
		STW	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A

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

October 16-31, 2023										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Green Peter Head of Reservoir -Middle Santiam	5ft	CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A

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

Trapping Efficiency

On 10/31/2023 750 adipose and left ventral clipped fish as well as 1,000 adipose clipped, Bismarck brown dyed, and euthanized fish were released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 0 fish was recaptured for an efficiency of 0.0%.

Green Peter Head of Reservoir- Middle Santiam River	Release #	Recapture #	Capture Efficiency
5ft Trap	Alive (750)	0	0.0% (0/750)
	Dead (1,000)	0	0.0% (0/1000)

Injuries and Copepod Infection

Partial descaling <20% was observed in 0 of the 0 Chinook captured (0.0%), 0 displayed descaling >20% (0.0%), 0 displayed body injury (0.0%), 0 had eye injuries (0.0%), 0 had copepods present in the branchial cavity (0.0%) and 0 had copepods on fins (0.0%). 0 Chinook displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%).

Partial descaling <20% was observed on 0 of the 0 Winter Steelhead captured (0.0%) and 0 displayed descaling >20% (0.0%), 0 displayed body injury (0.0%), 0 had eye injuries (0.0%), 0 had copepods present in the branchial cavity (0.0%) and 0 had copepods on fins (0.0%). 0 Winter Steelhead displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%). Injury data is summarized in Table

Table 17. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon and Winter Steelhead for Sampling Period (Green Peter Head of Reservoir-Middle Santiam River).

Site	Species	# Fish Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Green Peter Head of Reservoir-Middle Santiam	Chinook	0	0	0	0	0	0	0	0
	Winter Steelhead	0	0	0	0	0	0	0	0

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

Collected DNA and Scale Samples

For the reporting period, DNA was collected from 0 Spring Chinook and 0 Winter Steelhead. Scale samples were collected from 0 Spring Chinook and 0 Winter Steelhead. The other targets captured did not meet length criteria for DNA sampling or were too descaled/damaged to collect samples.

PIT Tags

0 Spring Chinook and 0 Winter Steelhead were PIT tagged during this reporting period. All fish captured did not meet the size criteria for PIT tagging. More information regarding PIT tagged fish can be found in Appendix D.

VIE Marking

Visible Implant Elastomer (VIE) trials commenced at the Green Peter Head of Reservoir – Middle Santiam River site on 5/5/2023. VIE tag color and locations are changed every month to distinctly mark groups of fish by capture date. Since then, 15 Chinook and 1 Winter Steelhead have been VIE marked with fluorescent elastomer. No fish with VIE marks have been detected at downstream RST sites to date. Fish still showing an egg sac are not VIE marked.

Date Tagged	Species	Tag Location	VIE Color	# Tagged	# Recaptured to Date
5/01/2023-5/15/2023	Chinook	Right Dorsal	Orange	14	0
5/01/2023-5/15/2023	<i>O. mykiss</i>	Right Dorsal	Orange	1	0
5/16/2023-5/31/2023	Chinook	Right Dorsal	Orange	1	0

Non-Target Species

1 non-target fish was collected during the reporting period; the data is summarized below in Table 18.

Table 18. Summary of Non-target Species (Green Peter Head of Reservoir – Middle Santiam River).

Species	5 ft Capture	5 ft Mortality	Season Total	Season Total Mortality
Kokanee	0	0	5	0
Cutthroat Trout	0	0	0	0
Dace	0	0	21	0
Largescale Sucker	0	0	1	0
Sculpin	1	0	10	0
Totals	1	0	37	0

Stream Statistics

Basic stream statistics at the Green Peter Head of Reservoir – Middle Santiam River site were calculated from data downloaded from the U.S. Geological Survey stream gauge number 14185800. Gauge height (feet) is the only flow metric available at this gauge. During the reporting period, daily maximum values for gage height ranged from 1.3 ft to 2.4 ft (mean: 1.7 ft). Figure 25 shows gage height.

Stream temperatures were recorded every 2 hours for the length of the report period for the RST (Figure 26). Temperature probes for the trap operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in **Error! Reference source not found. 19**. Gage height and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 19. Summary of salmonid CPUE, Green Peter Head of Reservoir – Middle Santiam River.

	Chinook	Winter Steelhead
Description	(5 ft)	(5 ft)
Catch	0	0
Effort (hrs)	383.5	383.5
CPUE (fish/hr)	0	0

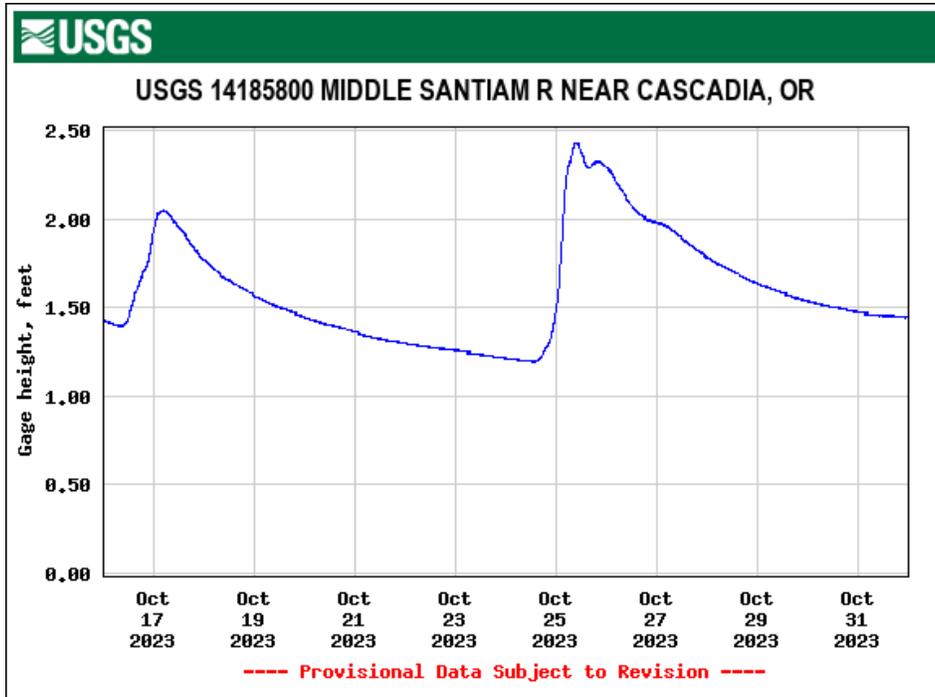


Figure 25. Gage Height (feet); Green Peter Head of Reservoir – Middle Santiam River.

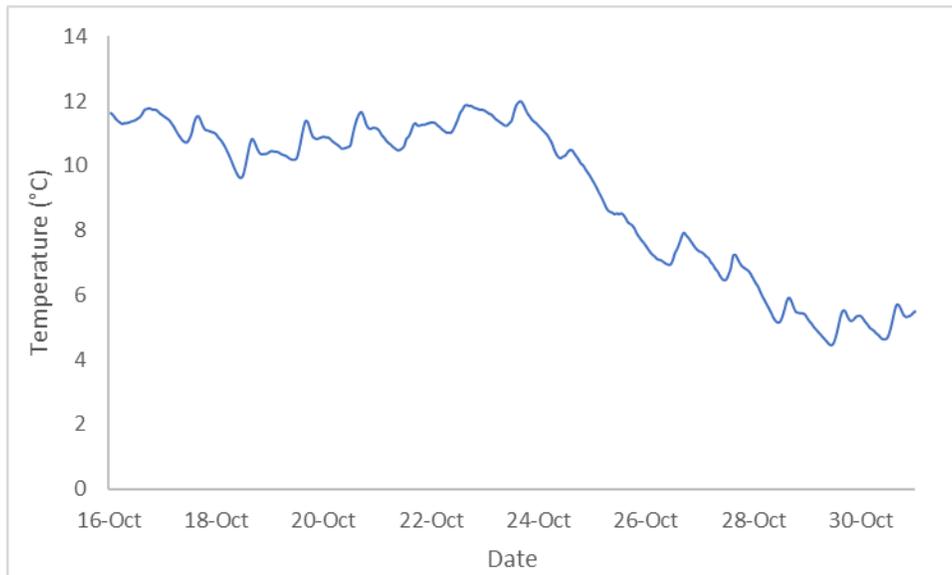


Figure 26. Temperature at RST (Green Peter Head of Reservoir – Middle Santiam River).

Fall Creek Dam Tailrace

The RST in the Fall Creek Dam Tailrace began sampling under contract W9127N19D0009 on September 30th, 2023. Sampling at Fall Creek Dam Tailrace prior to September 30th, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting October 1st, 2023 but will include season totals from January 1st, 2023 onward.

Target Species

The reporting period began October 16th and ended October 31st. 79 Chinook salmon were captured during the 16-day sampling period (Figure 27). The trap was raised to the non-sampling position on October 16th for a debris flush. It was lowered the next day. The trap sampled 93.8% of the days during this reporting period. Table 20 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Fall Creek Dam Tailrace site to-date and Figure 28 shows length frequency data to-date.

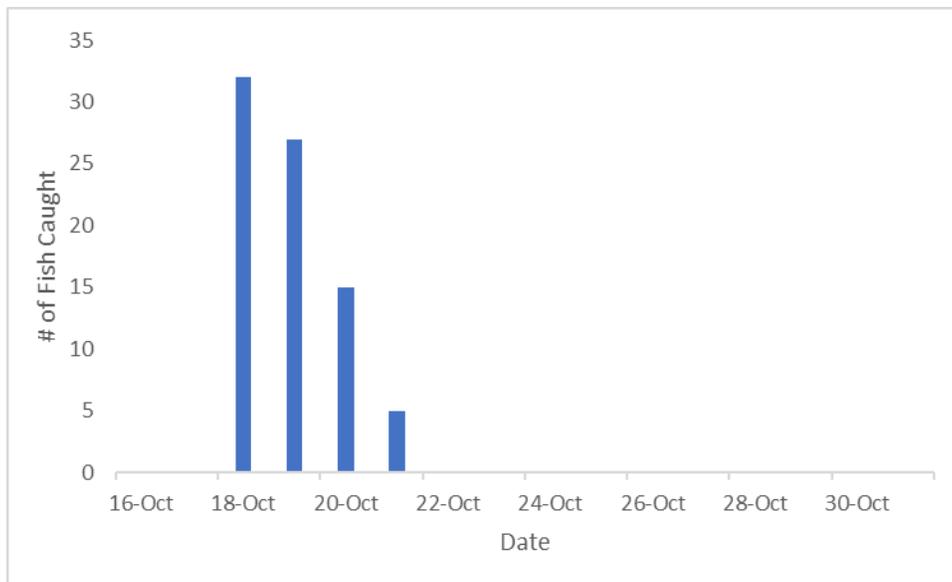


Figure 27. Chinook captured per day 10/16/2023 to 10/31/2023.

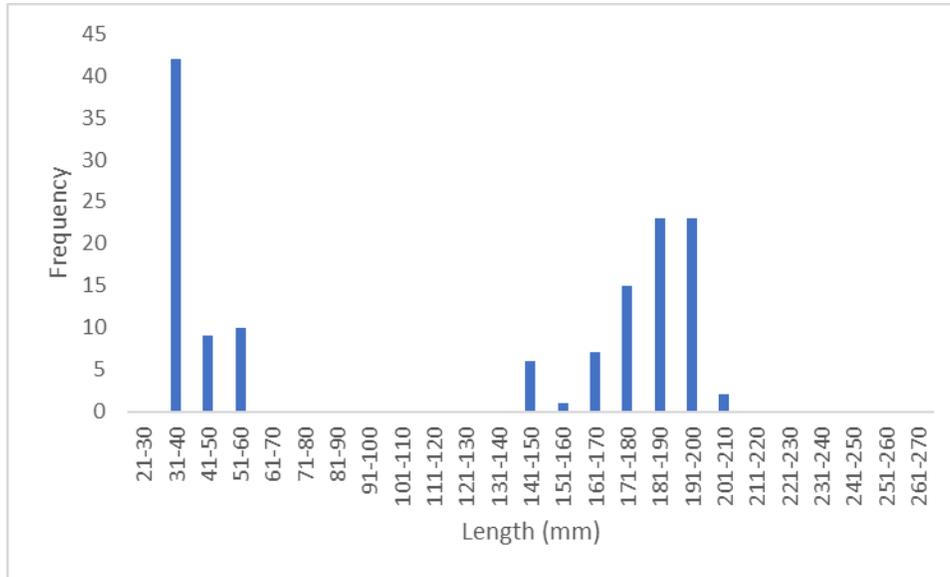


Figure 28. Length Frequency of Juvenile Chinook Sampled Season To-Date (Fall Creek Dam Tailrace).

Table 20. Descriptive Statistics of Target Species Captured at Fall Creek Dam Tailrace, Season To-Date and for the Reporting Period.

To-Date										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Fall Creek Dam	RO	CHS	Smolt	79	142	203	182.1	33.8	109.3	74.5
		CHS	Parr	7	40	60	53.9	2.1	4.5	3.3
		CHS	Fry	54	33	55	39.2	1.2	3.2	1.8
October 16-31, 2023										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Fall Creek Dam	RO	CHS	Smolt	79	142	203	182.1	33.8	109.3	74.5
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A

Trapping Efficiency

A total of 1,011 juvenile hatchery Chinook (sub yearlings) were adipose clipped, upper caudal clipped, and released on 10/17/2023 upstream of the Fall Creek Dam Tailrace RO channel trap site. A total of 14 fish were recaptured in the 8 ft trap. Trapping efficiency was 1.4%.

Fall Creek Dam	Release #	Recapture #	Capture Efficiency
RO	1011	14	1.4% (14/1011)

24-Hour Post Collection Holding Trial

47 Spring Chinook was captured during the current reporting period and held for 24 hours. 11 Chinook (23.4%) died in holding.

Injuries and Copepod Infection

Partial descaling <20% was observed in 29 of the 79 Chinook captured (36.70%), 50 displayed descaling >20% (63.30%), 50 displayed body injury (63.30%), 3 displayed eye injuries (3.80%), 57 had copepods present in the branchial cavity (72.20%) and 6 fish had copepods on fins (7.6%). 7 Chinook displayed gas bubble disease (8.86%). There were 32 mortalities (40.51%). The data is summarized in Table 21. To date injury data is listed in Appendix A.

Table 21. 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	79	29	50	79	3	57	7	32

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

Collected DNA and Scale Samples

Scales were collected from 78 Spring Chinook and DNA was collected from 77 Spring Chinook this reporting period.

PIT Tags

No Spring Chinook were PIT tagged during this reporting period. The first 60 target fish per week are prioritized for the 24-Hour Post Collection Holding Study. These fish are not tagged to not bias the results of the holding study. More information regarding PIT tagged fish can be found in Appendix D.

VIE Marking

No VIE marked Spring Chinook have been detected at this site to date.

Non-Target Species

593 non-target fish were captured at the Fall Creek Dam Tailrace site during the reporting period; the data is summarized below in Table 22.

Table 22. Summary of Non-target Species (Fall Creek Dam Tailrace).

Species	Capture	Mortality	Season Total*	Season Total Mortality*
Bluegill	0	0	0	0
Brook Lamprey	1	0	16	0
Brown Bullhead	7	4	40	15
Cutthroat Trout	0	0	26	0
Dace	52	2	138	5
Largescale Sucker	356	34	367	37
Mosquitofish	0	0	0	0
Peamouth	4	2	4	2
Redsided Shiner	9	0	9	0
Northern Pikeminnow	17	1	1	0
Chinook (clipped)	129	42	128	42
<i>O. mykiss</i>	28	10	66	3
<i>O. mykiss</i> (clipped)	4	4	16	3
Pacific Lamprey	0	0	1	0
Sculpin	1	0	6	0
Totals	593	99	906	124

*Season totals include sampling completed on the RST project in 2023.

Stream Statistics

Basic stream statistics at the site were calculated from data downloaded from U.S. Geological Survey stream gage numbers 14151000 and 1415000. Instantaneous discharge (cfs) data was collected from gage 1415100. Dissolved oxygen (mg/L) concentration data was received from gage 1415000, 1.2 rkms downstream of the trap. During the reporting period, daily maximum values for instantaneous discharge ranged from 50.5 cfs to 2,640.0 cfs (mean: 775.9 cfs). Figure 29 shows instantaneous discharge.

Dissolved oxygen concentrations ranged from 9.6 mg/L to 12.1 mg/L (mean: 10.64 mg/L). Figure 30 shows Dissolved Oxygen.

Stream temperatures were recorded every 2 hours using temperature probes for the Fall Creek Dam Tailrace RST site during this reporting period. The temperature probe operated normally during this period. (Figure 31).

Flows In and Out of reservoir during the reporting period averaged 131.7 cfs and 611.1 cfs respectively (Figure 32).

Catch per unit of effort (CPUE) data are summarized in Table 23. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B

Table 23. Summary of Chinook CPUE, Fall Creek Dam Tailrace.

Description	Chinook
Catch	79
Effort (hrs)	357.0
CPUE (fish/hr)	0.221

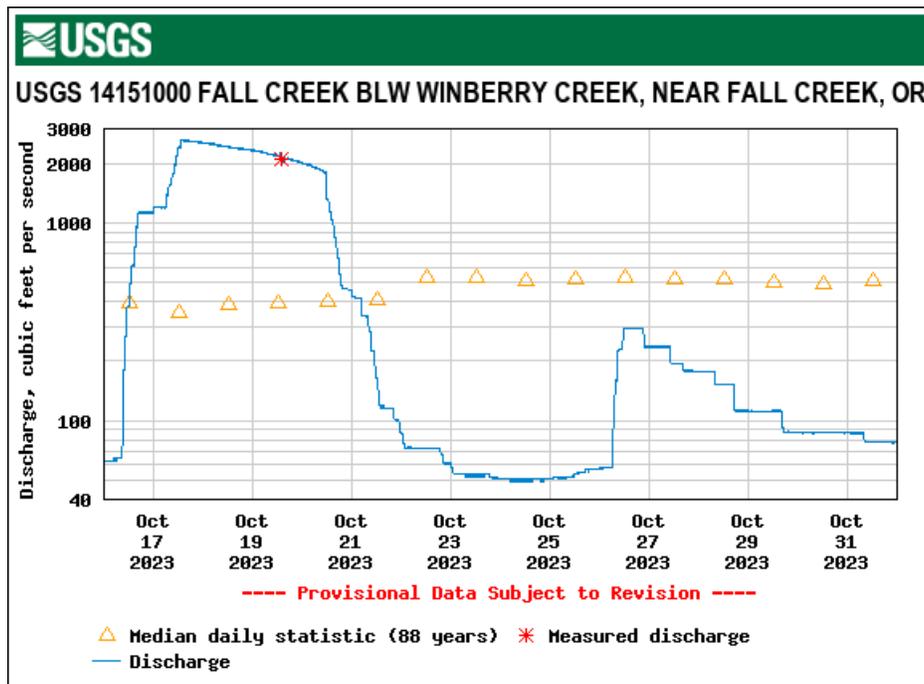


Figure 29. Discharge (cfs); Fall Creek Below Winberry Creek, Near Fall Creek, OR

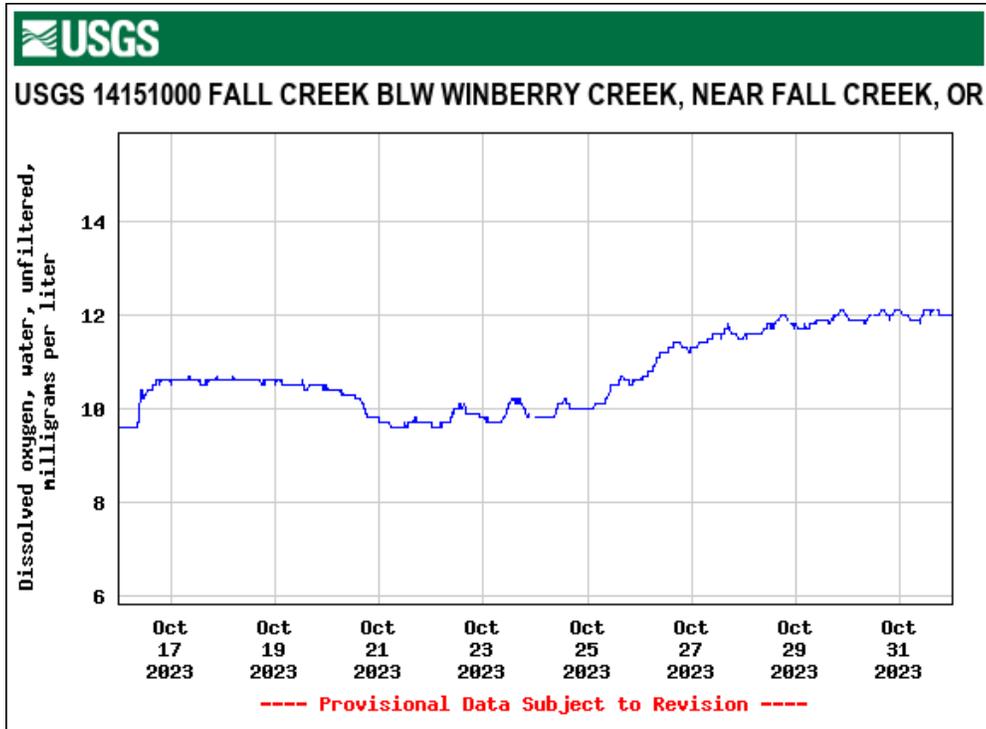


Figure 30. Dissolved Oxygen (mg/L), Fall Creek below Winberry Creek, Near fall Creek, OR

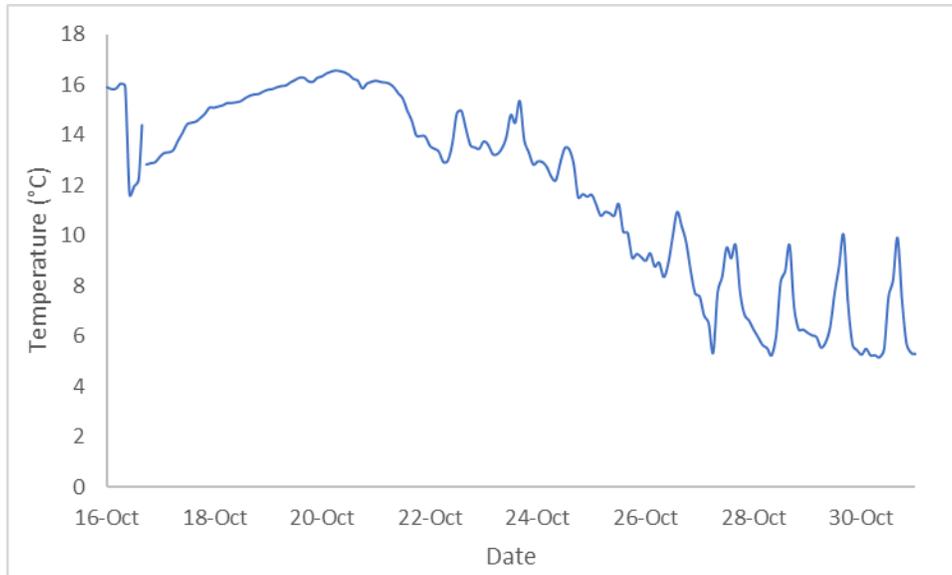


Figure 31. Temperature at RST (Fall Creek Dam Tailrace).

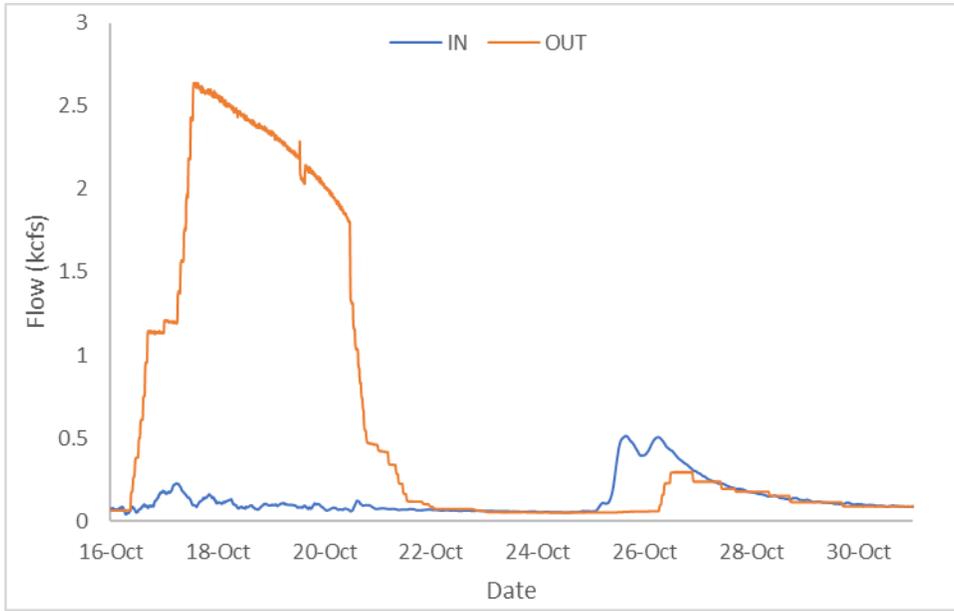


Figure 32. Hourly Flows Inflow vs. Outflow (RO) (Fall Creek Tailrace)

Middle Fork Willamette – Lookout Dam Tailrace

The RSTs in the Lookout Dam Tailrace began sampling under contract W9127N19D0009 on August 1, 2023. Sampling at Lookout Dam Tailrace prior to August 1, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting August 1st, 2023 but will include season totals from January 1st, 2023 onward.

Target Species

The reporting period began October 16th and ended on October 31st. There were a total of 0 Chinook salmon captured during the 16-day sampling period (Figure 33). The traps were operated 100% of the reporting period. Table 24 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Lookout Point Dam Tailrace site to-date and Figure 34 shows length frequency data to-date.

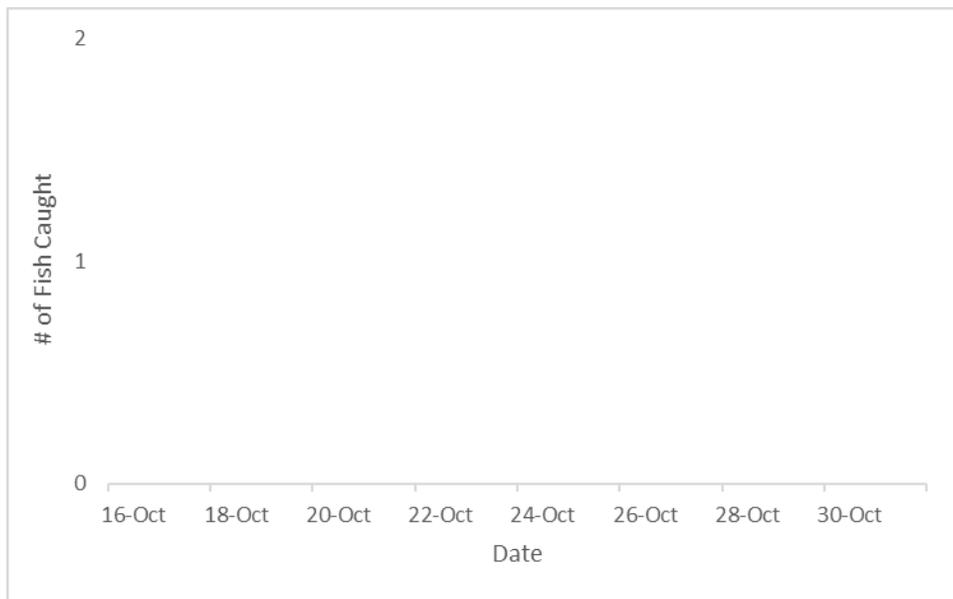


Figure 33. Chinook Captured Per Day 10/16/2023 to 10/31/2023 (Lookout Point Dam Tailrace).

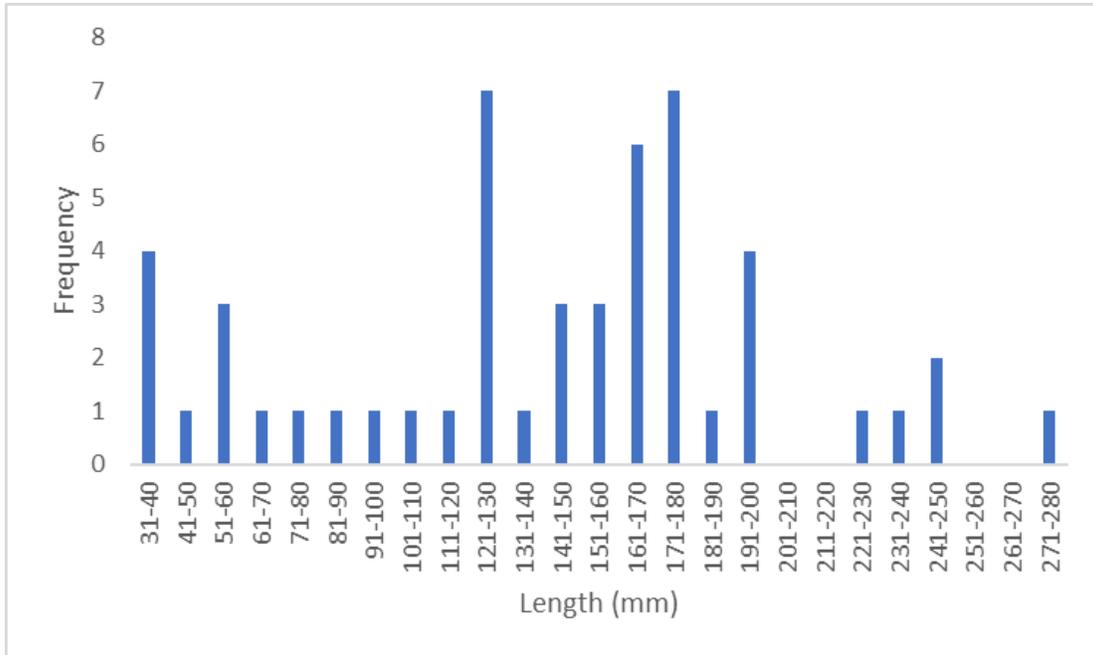


Figure 34. Length Frequency of Juvenile Chinook Sampled in 2023 (Lookout Point Dam Tailrace).

Table 24. Descriptive Statistics of Target Species Captured at Lookout Point Dam Tailrace, Season To-Date and for the Reporting Period.

To-Date (Since Jan. 1, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Lookout Point Dam	PH 1	CHS	Smolt	15	100	275	163.3	12.1	269.0	62.9
		CHS	Parr	1	96	96	96	9.4	9.4	9.4
		CHS	Fry	1	52	52	52	3.0	3.0	3.0
	PH 2	CHS	Smolt	4	113	250	160.3	16.5	194.6	69.9
		CHS	Parr	4	57	86	71.0	1.8	7.6	5.3
		CHS	Fry	4	33	37	34.8	N/A	N/A	N/A
	Spill	CHS	Smolt	21	122	247	172.2	19.7	161.4	60.7
		CHS	Parr	1	125	125	125	17.6	17.6	17.6
		CHS	Fry	2	44	55	49.5	1.0	1.6	1.3

October 16-31, 2023										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Lookout Point Dam	PH 1	CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
	PH 2	CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
	Spill	CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A

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

**Season totals include sampling completed on the RST project in 2023.

Trapping Efficiency

A total of 4,042 juvenile hatchery Chinook (parr) were adipose clipped and released in the spillway this reporting period.

Fish were released in small groups directly into spillway flow. A total of 0 fish were recaptured in the traps for an efficiency of 0.0%. Trap specific efficiencies are as follows: 0 recaptured at the PH 1 RST for an efficiency of 0%, 0 recaptured at PH 2 for an efficiency of 0%, and 0 recaptured at the Spill RST for an efficiency of 0.0%.

Lookout Dam Spillway	Release #	Recapture #	Capture Efficiency
10/25/2023	4042	0	0.0% (0/4042)

24-Hour Post Collection Holding Trial

0 Spring Chinook were captured during the current reporting period and held for 24 hours. 0 fish were held from the PWR RST and 0 fish were held from the Spill RST. 0 hold fish died from the PWR RSTs (0.0%). 0 of the fish from Spill RST died during holding (0.0%).

Injuries and Copepod Infection

There were 0 Chinook captured in the Spill Channel RST. Partial descaling <20% was observed on 0 of 0 Chinook collected at the Spill RST (0.0%), and descaling >20% was observed on 0 of the Chinook collected (0.0%). 0 displayed body injuries (0.0%) and 0 had eye injuries (0.0%). 0 of the Spill RST Chinook had copepods present in the branchial cavity (0.0%) and 0 had copepods present on fins (0.0%). 0 of the fish captured in the Spill RST displayed Gas Bubble Disease (0.0%).

There were 0 Chinook captured in the Powerhouse channel RSTs. Partial descaling <20% was observed on 0 of the 0 Chinook collected at the PWR RSTs (0.0%). Descaling >20% was observed on 0 of the Chinook collected (0.0%). 0 PWR RST fish had bodily injury (0.0%) and 0 had eye injuries (0.0%). 0 of the fish had copepods present in the branchial cavity (0.0%) and 0 had copepods present on fins (0.0%). 0 fish displayed Gas Bubble Disease (0.0%).

There were no chinook mortalities collected in the Spill RST (0.0%) and 0 in the PWR RSTs (0.0%). Injuries are displayed in Table 25. To date injury data can be found in Appendix A.

Table 25. 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	0	0	0	0	0	0	0	0
	Spill	0	0	0	0	0	0	0	0

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

Collected DNA and Scale Samples

DNA was collected from 0 Spring Chinook for the reporting period. Scales were collected from 0 Spring Chinook.

PIT Tags

No Spring Chinook were PIT tagged during this reporting period. The first 60 target fish per week are prioritized for the 24-Hour Post Collection Holding Study. These fish are not tagged to not bias the results of the holding study. More information regarding PIT tagged fish can be found in Appendix D.

VIE Marking

No VIE marked Spring Chinook have been detected at this site to date.

Non-Target Species

7,922 non-target species were captured during the reporting period; the data is summarized below in Table 26.

Table 26. Summary of Non-target Species (Lookout Point Dam Tailrace).

Species	PWR Capture	PWR Mortality	Spill Capture	Spill Mortality	Season Total*	Season Total Mortality*
Bass Unknown	1299	525	665	134	25574	23753
Bluegill	2	0	0	0	71	16
Brown Bullhead	0	0	0	0	4	1
Chinook (clipped)	0	0	0	0	14	2
Crappie	3763	2025	2160	540	165369	114931
Largemouth Bass	0	0	0	0	23	23
Mountain Whitefish	0	0	0	0	1	0

Largescale Sucker	0	0	0	0	6	4
Northern Pikeminnow	2	0	18	0	54	5
<i>O. mykiss</i>	0	0	0	0	8	1
<i>O. mykiss</i> (clipped)	0	0	0	0	1	1
Pumpkinseed	0	0	0	0	1	0
Redside Shiner	0	0	0	0	1	0
Sculpin	0	0	0	0	144	10
Smallmouth Bass	0	0	0	0	142	134
Spotted Bass	0	0	0	0	2	0
Unknown	0	0	0	0	7	0
Walleye	11	9	2	1	71	32
Totals	5077	2783	2845	675	192792	139137

*Season totals include sampling completed on the RST project in 2023.

Stream Statistics

Basic stream statistics at Lookout Dam Tailrace site were calculated from data downloaded from the U.S. Geological Survey stream gauge number 14149010. Total dissolved gas saturation or dissolved oxygen concentration measurements are not available at this stream gauge site, or any nearby stream gauges. Gauge height (feet) is the only metric provided at this gauge. During the reporting period, daily maximum values for instantaneous gauge height ranged from 691.6 feet to 692.4 feet (mean: 691.8 feet). Figure 35 shows instantaneous gauge height.

Stream temperatures were recorded every 2 hours using temperature probes at the PWR and Spill Lookout Dam RST's during this reporting period. Temperature probes operated normally, and the data is shown below in (Figure 36 and Figure 37).

Flows through the Powerhouse and Spill during the reporting period averaged 0 to 1,727.9 cubic feet per second (cfs) respectively (**Error! Reference source not found.38**). Catch per unit of effort (CPUE) data are summarized in Table 27. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 27. Summary of Chinook CPUE at Lookout Point Dam Tailrace.

Description	Chinook		
	PH 1	PH 2	Spill
Catch	0	0	0
Effort (hrs)	380.8	380.8	381.2
CPUE (fish/hr)	0	0	0

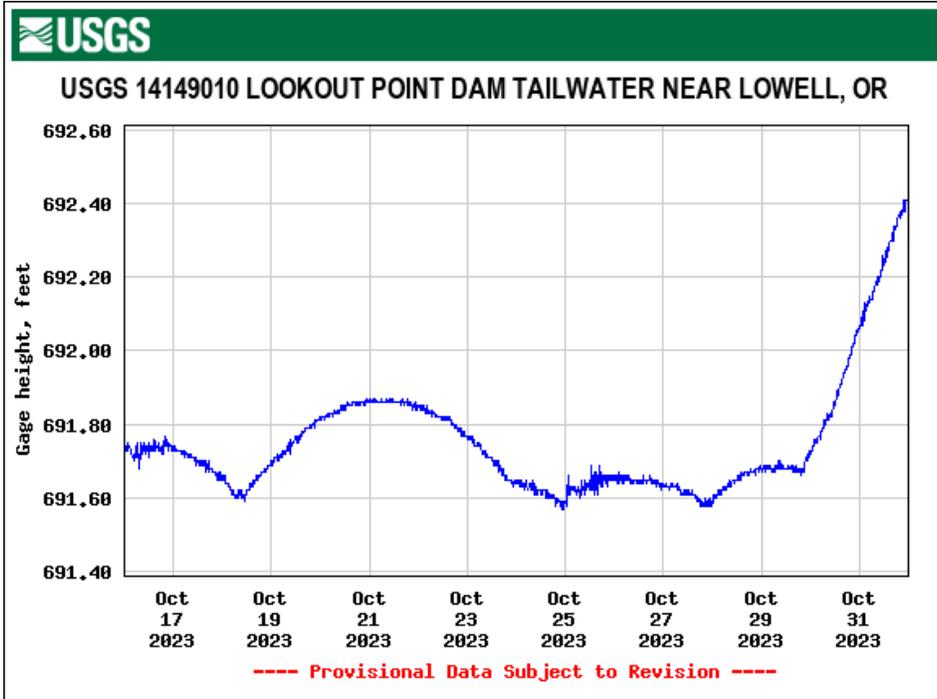


Figure 35. Gauge Height (feet); below Lookout Dam.

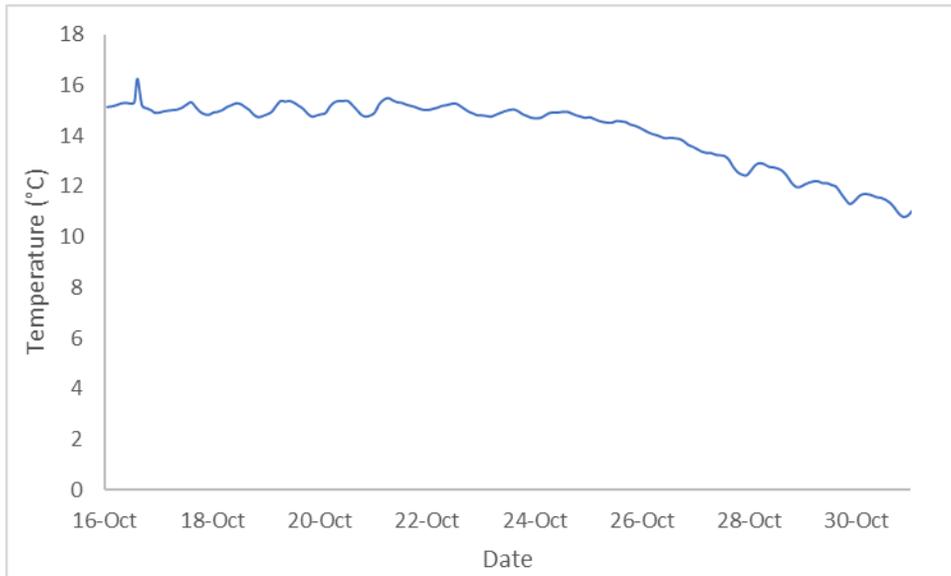


Figure 36. Temperature at RST (Lookout Dam PWR).

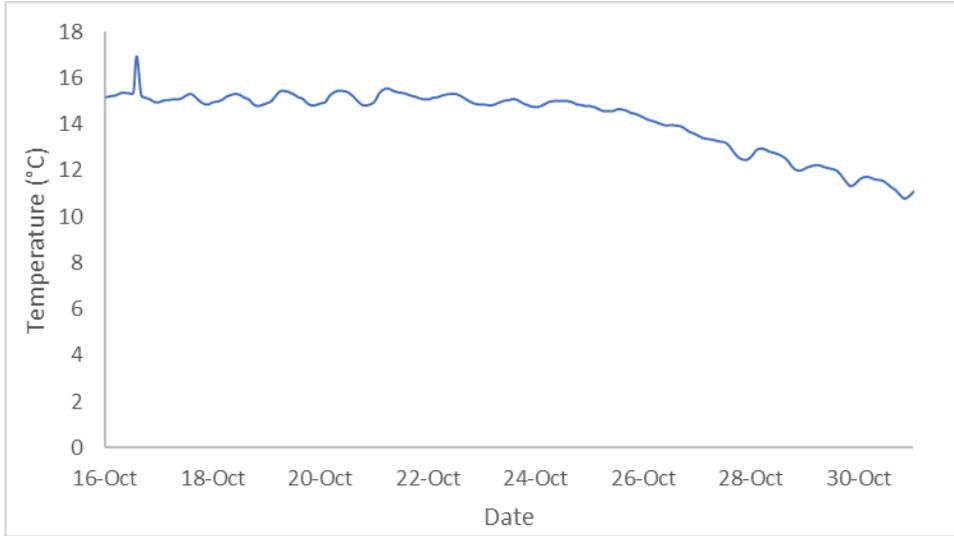


Figure 37. Temperature at RST (Lookout Dam Spill).

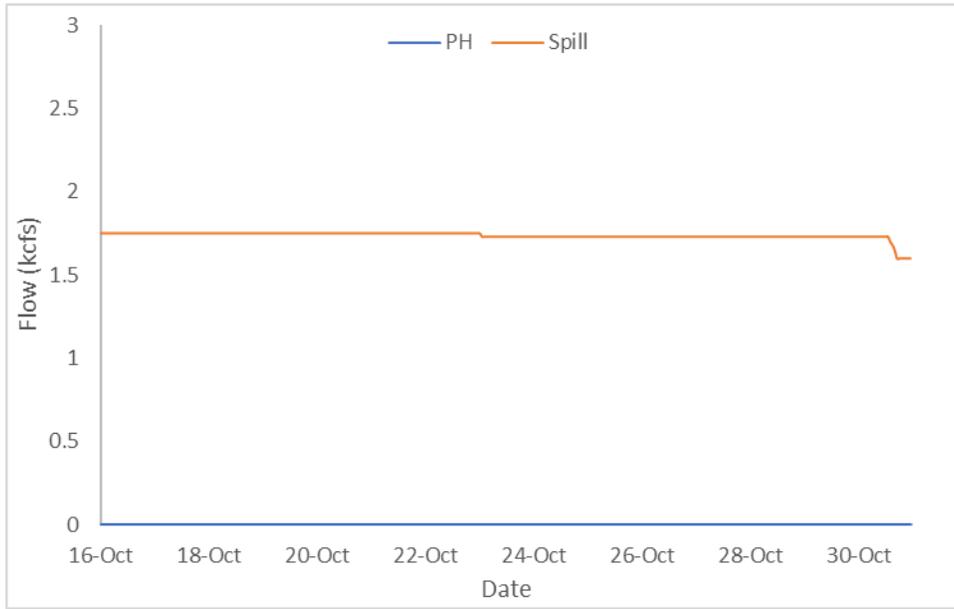


Figure 38. Hourly Flows PWR vs. Spill (Lookout Dam Tailrace).

Middle Fork Willamette – Hills Creek Dam

The RSTs in the Hills Creek Dam Tailrace began sampling under contract W9127N19D0009 on September 15, 2023. Sampling at Hills Creek Dam Tailrace prior to September 15, 2023 was conducted by EAS for the USACE under contract W9127N19D0007. This report reflects research conducted starting September 15th, 2023 but will include season totals from January 1st, 2023 onward.

Target Species

The reporting period began October 16th and ended on October 31st. There were a total of 3 Chinook salmon captured during the 16-day sampling period (Figure 39). Sampling duration was 100% of the reporting period for the RSTs. Table 28 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Hills Creek Dam site to-date and Figure 40 shows length frequency data to-date.

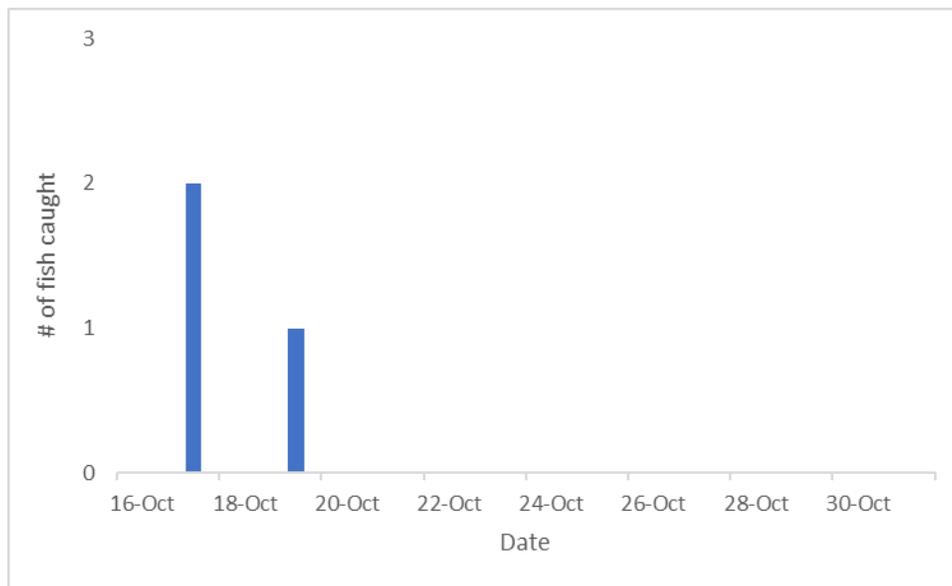
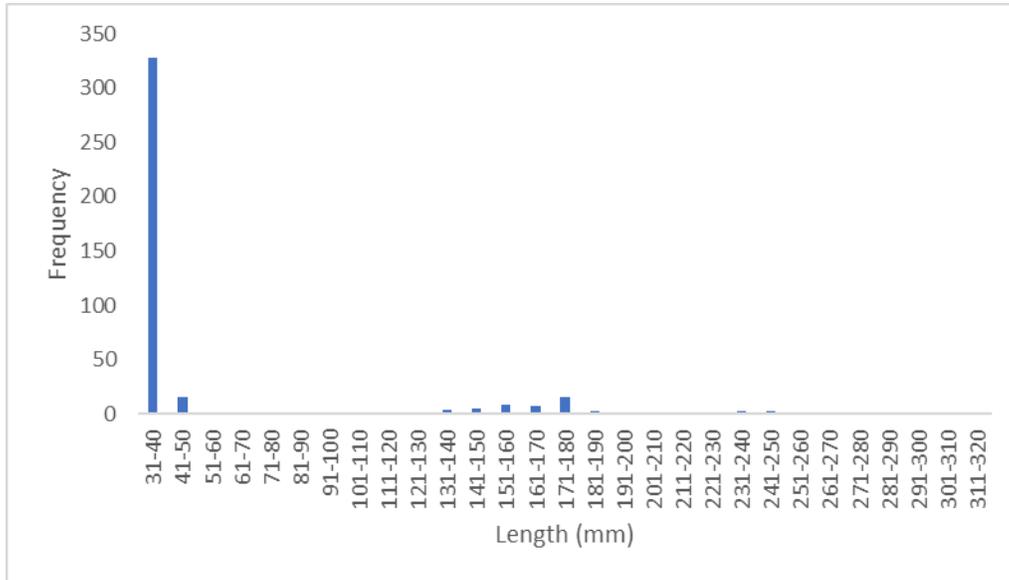


Figure 39. Chinook Captured Per Day 10/16/2023 to 10/31/2023 (Hills Creek Dam Tailrace).



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

Figure 40. Length Frequency of Juvenile Chinook Sampled in 2023 (Hills Creek Dam).

Table 28. Descriptive Statistics of Target Species Captured at Hills Creek Dam Season To-Date and for the Reporting Period.

To-Date (Since Jan. 1, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Hills Creek	RO	CHS	Fry	126	31	55	35.6	N/A	N/A	N/A
		CHS	Parr	1	61	61	61	2.5	2.5	2.5
		CHS	Smolt	10	142	273	232.1	34.5	196.3	144.0
Hills Creek	PWR	CHS	Fry	220	31	48	36.1	N/A	N/A	N/A
		CHS	Parr	1	69	69	69	4.7	4.7	4.7
		CHS	Smolt	53	122	314	174.5	19.6	290.2	68.6
October 16-31, 2023										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Hills Creek	RO	CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Smolt	1	162	162	162	56.8	56.8	56.8
Hills Creek	PWR	CHS	Fry	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Smolt	2	137	162	149.5	30.0	54.6	42.3

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

Trapping Efficiency

A total of 503 juvenile Chinook were adipose clipped, left vent clipped and upper caudal clipped and released on 10/31/23 below Hills Creek PWR to evaluate the efficiency of the screw trap. A total of 8 fish were recaptured in the traps for an efficiency of 1.6%. 8 fish were recaptured at the 8 ft PWR trap for a trapping efficiency of 1.6% and 0 were captured in the RO trap for an efficiency of 0.0%.

Hills Creek Dam	Release #	Recapture #	Capture Efficiency
PWR Trap	503	8	1.6% (8/503)
RO Trap	503 (PWR Release)	0	0.0% (0/510)

24-Hour Post Collection Holding Trial

2 Chinook captured in the RSTs were held during this reporting period. 1 fish was held from the PWR RST and 1 fish was held from the RO RST. 0 hold fish died from the PWR RST (0.0%). 0 of the fish from RO RST died during holding (0.0%).

Injuries and Copepod Infection

There was 1 Chinook captured in the RO RST. Partial descaling <20% was observed on 1 of 1 Chinook collected at the RO RST (100.0%), and descaling >20% was observed on 0 of 1 Chinook collected (0.0%). 1 displayed body injuries (100.0%) and 0 had eye injuries (0.0%). 1 of the RO RST Chinook had copepods present in the branchial cavity (100.0%) and 0 had copepods present on fins (0.0%). There were 0 mortalities (0.0%). 0 of the fish captured in the RO RST displayed Gas Bubble Disease (0.0%).

There were 2 Chinook captured in the Powerhouse channel RST. Partial descaling <20% was observed on 1 of the 2 Chinook collected at the PWR RSTs (50.0%). Descaling >20% was observed on 1 of the Chinook collected (50.0%). 1 PWR RST fish had bodily injury (50.0%) and 0 had eye injuries (0.0%). 1 of the fish had copepods present in the branchial cavity (50.0%) and 0 had copepods present on fins (0.0%). 1 fish displayed Gas Bubble Disease (50.0%). There were 2 chinook mortalities collected in the PWR RST (100.0%).

Injuries are displayed in Table 29. To date injury data can be found in Appendix A.

Table 29. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Hills Creek 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
Hills Creek	RO	1	1	0	1	0	1	0	0
Hills Creek	PWR	2	1	1	1	0	1	0	2

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

Collected DNA and Scale Samples

For the reporting period, scales and DNA were collected from 3 Spring Chinook. The other targets captured did not meet length criteria for DNA sampling or did not have a body.

PIT Tags

0 Spring Chinook were PIT tagged during this reporting period. The first 60 target fish per week are prioritized for the 24-Hour Post Collection Holding Study. These fish are not tagged to not bias the results of the holding study. More information regarding PIT tagged fish can be found in Appendix D.

VIE Marking

VIE tag color and locations are changed every month to distinctly mark groups of fish by capture date. The first 60 target fish per week are prioritized for the 24-Hour Post Collection Holding Study. These fish are not tagged to not bias the results of the holding study. 39 Chinook have been VIE marked with fluorescent elastomer. More information regarding VIE marked fish can be found in Appendix D.

Fish still showing an egg sac are not VIE marked.

Date Tagged	Tag Location	VIE Color	# Tagged	# Recaptured to Date
3/16/2023-3/31/2023	Head	Red	39	0

Non-Target Species

403 non-target fish were captured at Hills Creek during the reporting period; the data is summarized below in Table 30.

Table 30. Summary of Non-target Species (Hills Creek Dam).

Species	RO Capture	RO Mortality	PWR Capture	PWR Mortality	Season Total*	Season Total Mortality*
Bass Unknown	1	1	2	2	14	10
Bluegill	4	3	32	22	206	101
Brook Lamprey	0	0	0	0	1	0
Brown Bullhead	0	0	0	0	7	1
Crappie	55	47	246	197	1052	753
Dace	0	0	0	0	36	2
Redside Shiner	0	0	0	0	3	1
Sculpin	0	0	0	0	240	0
Largemouth Bass	0	0	0	0	7	23
Northern Pikeminnow	0	0	0	0	1	0
Sculpin	7	0	12	0	23	0
Pumpkinseed	0	0	0	0	2	2
Spotted Bass	0	0	8	5	103	52
Smallmouth Bass	0	0	1	0	10	7
Largescale Sucker	0	0	0	0	35	4
<i>O. mykiss</i>	1	0	5	0	66	20
<i>O. mykiss (clipped)</i>	0	0	0	0	19	45
Chinook (clipped)	1	0	26	12	329	218
Cutthroat	1	0	1	0	2	0
Walleye	0	0	0	0	1	1
Unknown	0	0	0	0	1	1
Totals	70	51	333	238	2158	1241

*Season totals include sampling completed on the RST project in 2023.

Stream Statistics

Basic stream statistics at the Hills Creek site were calculated from data downloaded from the U.S. Geological Survey stream gauge numbers 14145110 and 14145500. Gauge height (feet) is the only metric provided at this gauge. Total dissolved gas saturation data was received from gauge 14145500, 1.4 rkms downstream of the trap. During the reporting period, daily maximum values for instantaneous gauge height ranged from 1,223.9 feet to 1,224.2 feet (mean: 1,223.9 feet). Figure 41 shows instantaneous gauge height.

Total dissolved gas saturation ranged from 96 to 101% (mean: 98.3%) during the reporting period. Figure 42 shows total dissolved gas saturation.

Stream temperatures were recorded every two hours using temperature probes at the Hills Creek Dam RST's during this reporting period (Figure 43 and 44).

Flows through the PWR and RO during the reporting period averaged 456.5 and 0 cfs respectively (Figure 45). Catch per unit of effort (CPUE) data are summarized in Table 31. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 31. Summary of Chinook CPUE, Hills Creek Dam.

	Chinook	
Description	RO (5ft)	PWR (8ft)
Catch	1	2
Effort (hrs)	383.4	382.7
CPUE (fish/hr)	0.003	0.005

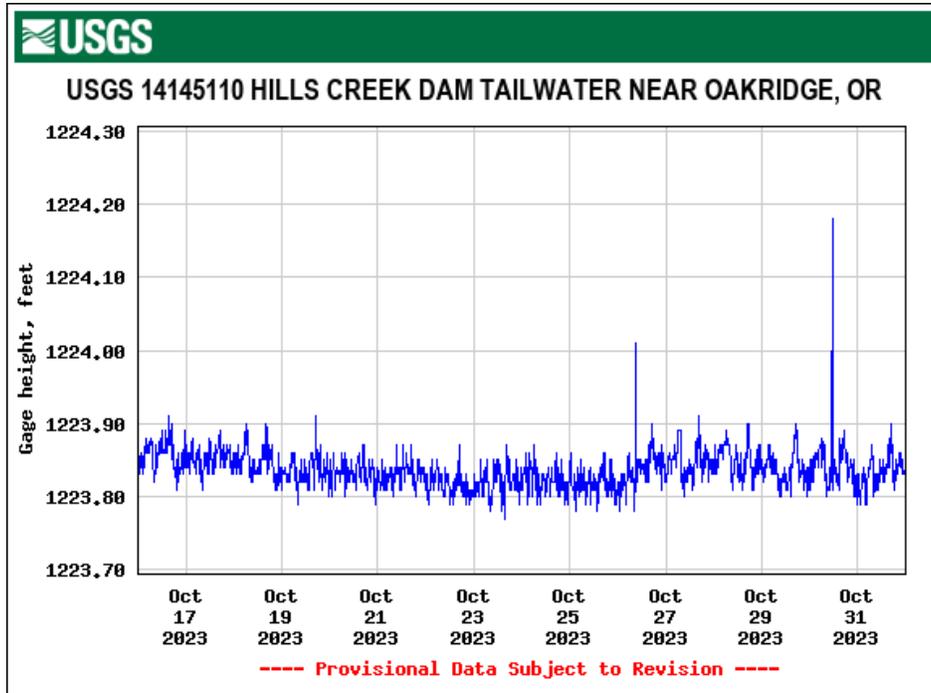


Figure 41. Gauge Height (feet); below Hills Creek Dam PWR - Middle Fork Willamette River.

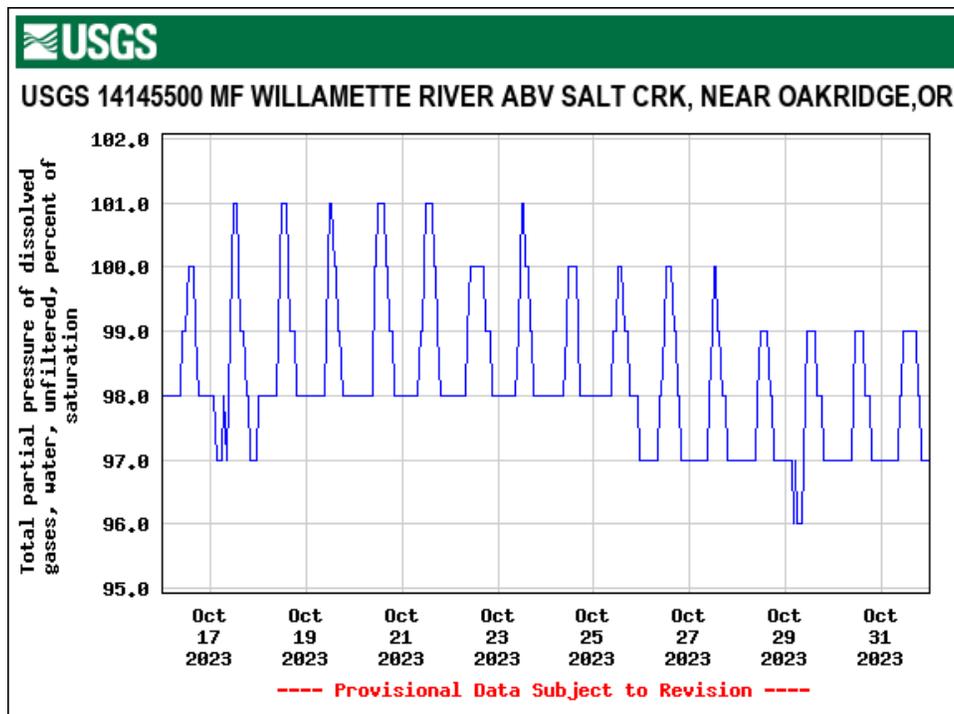


Figure 42. Total Dissolved Gas Saturation (%); below Hills Creek Dam – Middle Fork Willamette River.

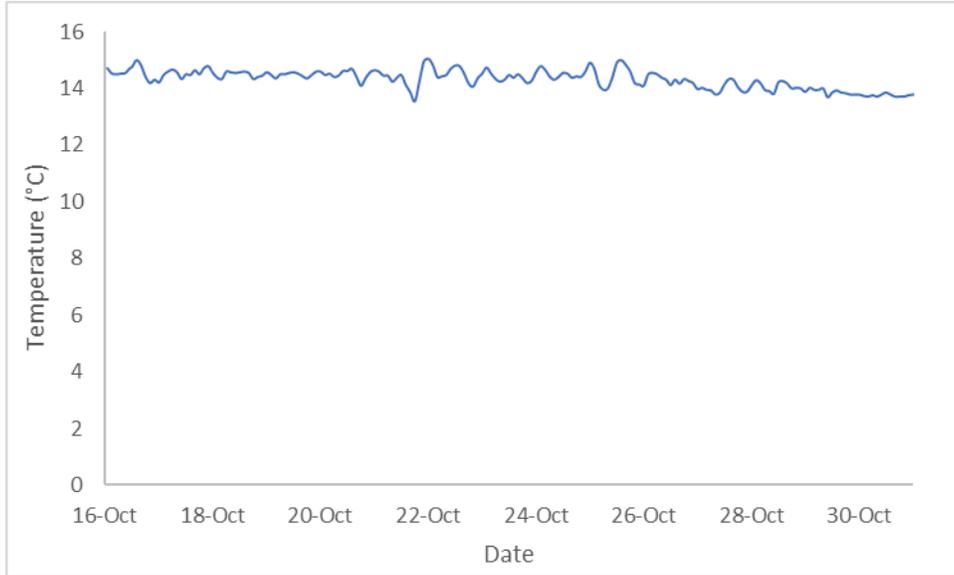


Figure 43. Temperature at Hills Creek RST PWR (Hills Creek Dam).

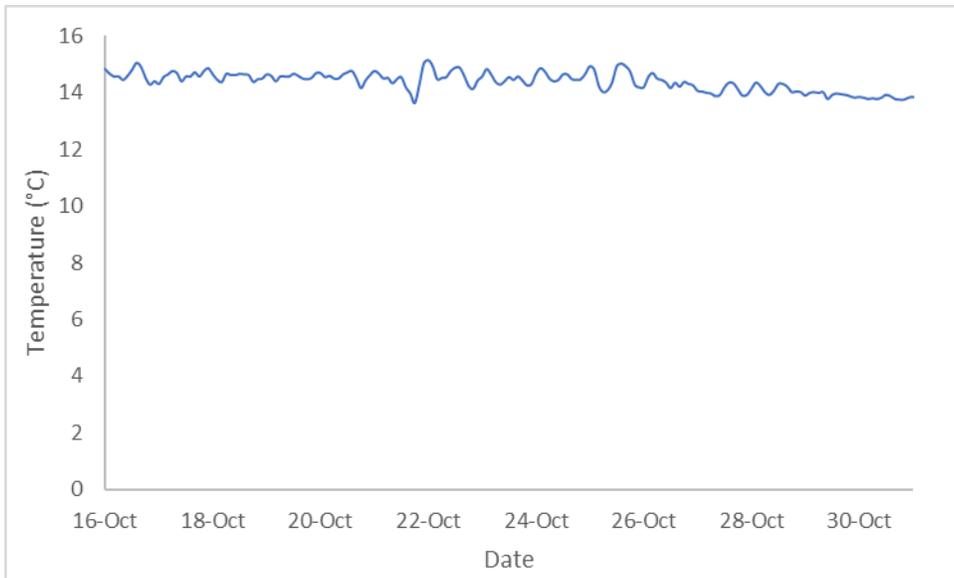


Figure 44. Temperature at Hills Creek RO RST (Hills Creek Dam).

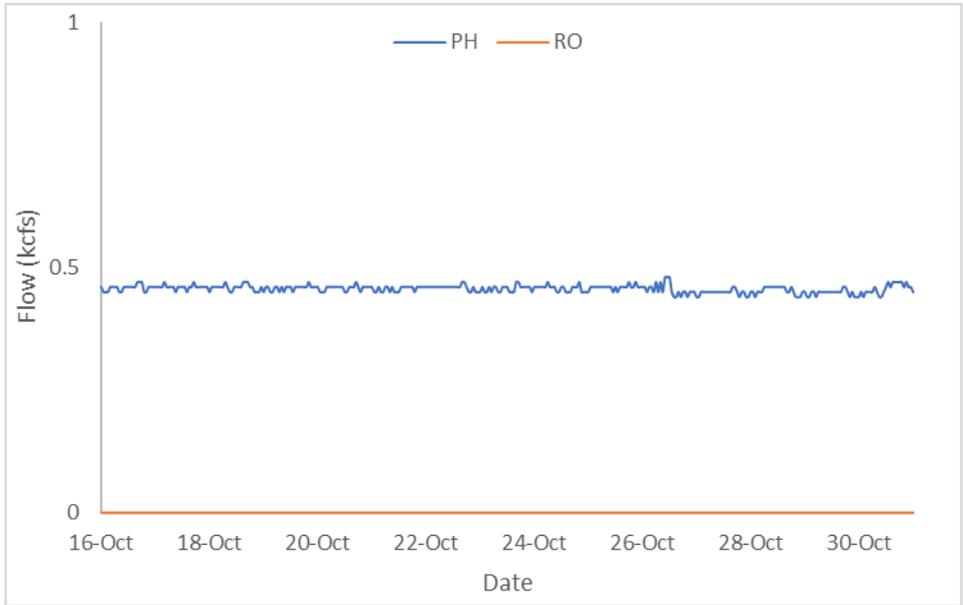


Figure 45. Hourly Flows PWR vs. RO (Hills Creek Dam).

Middle Fork Willamette River– Hills Creek Head of Reservoir

The Hills Creek Head of Reservoir RST was installed and began sampling on May 9th, 2023. Sampling concluded at this site on June 30, 2023 and the RST was removed.

Target Species

A total of 93 Spring Chinook were captured during sampling in 2023. Figure 46 shows length frequency data of captured Chinook for sampling in 2023. Table 32 provides life stage, length, and weight data for all Chinook Salmon that have been caught at the Middle Fork Willamette River- Hills Creek Head of Reservoir site to-date and for the reporting period.

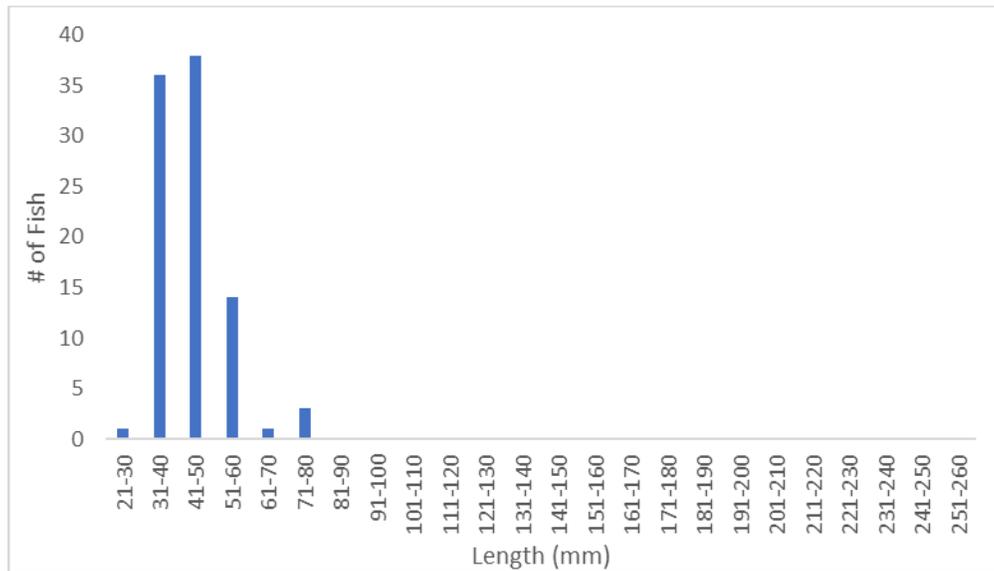


Figure 46. Length Frequency of Juvenile Chinook Sampled Season To-Date (Hills Creek Head of Reservoir).

Table 32. Descriptive Statistics of Target Species Captured at Hills Creek Head of Reservoir Season To-Date.

To-Date (Since May 09, 2023)										
Site	Route	Species	Life stage	Collected	Length (mm)			Weight (g)		
					Min	Max	Mean	Min	Max	Mean
Hills Creek Head of Reservoir	5 ft	CHS	Fry	60	30	50	38.9	<1	2.5	1.4
		CHS	Parr	33	38	76	52.6	1.0	6.0	2.1
		CHS	Smolt	0	N/A	N/A	N/A	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

On May 18th, 519 adipose clipped and PIT Tagged fish were released for a trapping efficiency trial at the Hills Creek Head of Reservoir site. 44 fish were recaptured in the RST for a trapping efficiency of 8.5%

Hills Creek Head of Reservoir	Release #	Recapture #	Capture Efficiency
5ft Trap	519	44	8.5% (44/519)

On June 19th, 760 adipose clipped and PIT Tagged fish were released for a trapping efficiency trial at the Hills Creek Head of Reservoir site. 6 fish were recaptured in the RST for a trapping efficiency of 0.79%.

Hills Creek Head of Reservoir	Release #	Recapture #	Capture Efficiency
5ft Trap	760	6	0.8% (6/760)

PIT Tags and VIE Marking

A total of 3 fish were PIT tagged and 71 fish were VIE marked at the Hills Creek Head of Reservoir- Middle Fork Willamette site in 2023. No tagged or VIE marked fish were redetected downstream. Table 33 provides a summary of VIE marked fish at the Hills Creek Head of Reservoir- Middle Fork Willamette River site.

Table 33. Summary of VIE marked Chinook at the Hills Creek Head of Reservoir- Middle Fork Willamette site in 2023.

Date Tagged	Species	Tag Location	VIE Color	# Tagged	# Recaptured to Date
5/1/2023-5/30/2023	Chinook	Left Dorsal	Orange	19	0
5/1/2023-5/30/2023	Chinook	Right Dorsal	Orange	11	0
6/1/2023-6/30/2023	Chinook	Left Dorsal	Pink	37	0
6/1/2023-6/30/2023	Chinook	Right Dorsal	Pink	4	0

Non-Target Species

A total of 232 non-target species fish were captured during sampling in 2023; the data is summarized below in Table 34.

Table 34. Summary of Non-target Species (Hills Creek Head of Reservoir).

Species	Season Total	Season Total Mortality
Dace	87	1
Cutthroat Trout	2	0
<i>O. mykiss</i>	26	0
Bull Trout	1	0
Brook Lamprey	18	2
Sculpin	20	1
Largescale Sucker	64	1
Mountain Whitefish	2	0
Redside Shiner	12	0
Totals	232	5

Issues Encountered

None.

Upcoming USACE Support Services

None at this time.

Appendix A Chinook (CHS) To-Date

		Chinook Injuries to-date																					
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
Breitenbush River		356	286	1	1	9		58	8	3	162						9	10		2	2	1	
5 ft		356	286	1	1	9		58	8	3	162						9	10		2	2	1	
Parr		215	167	1		7		37	6	2	93						7	8			1	1	
Smolt		131	119		1	2		21	2	1	66						2	2		2	1		
Fry		10									3												
Detroit HOR		9766	1	409		12	7		25	14	11	281			1	17	61	36	39	26	44	9	
5 ft		9766	1	409		12	7		25	14	11	281			1	17	61	36	39	26	44	9	
Parr		527		274		1	6		14	3	2	170					5	9				1	
Smolt		120		108			1		11	3		62					1			1	1		
Fry		9119	1	27		11				8	9	49		1	17	55	27	38	25	43	9		
Green Peter HOR		21										1									1		
5 ft		21										1									1		
Fry		21										1									1		
Fall Creek Dam Tail.		141		33	1	5		60	51		78		1	13	1	10	6	11	10	16		9	
8 ft		141		33	1	5		60	51		78		1	13	1	10	6	11	10	16		9	
Parr		7		1		1					1			1		1	1	1	1			2	
Smolt		80		29	1	3		60	51		74		1	12	1	9	5	9	7	16		7	
Fry		54		3		1					3					1		1	2				
Lookout Dam Tail.		132		63	1	21	2	5	33	51		87			7	2	14	9	22	19	23	3	16
PH 1		45		19	1	8	1	1	15	20		33			5	2	9	4	9	7	5	5	
Parr		4		1		1				2		2				1	1		1				
Smolt		40		18	1	7	1	1	15	18		31			5	1	8	4	8	7	5	5	
Fry		1																					
PH 2		25		14		6		1	3	7		16			1		2	3	2	5	3		
Parr		8		6		4				2		6					1	1	1	3			
Smolt		13		8		2		1	3	4		10			1		1		1	1	2		
Fry		4								1									2	1	1		
Spill		62		30		7	1	3	15	24		38			1		3	2	11	7	15	3	11
Parr		7		2						3		2											
Smolt		53		27		6	1	3	15	21		35			1		3	2	11	7	15	3	11
Fry		2		1		1						1											
Hills Creek Dam		551	2	100	1	32		172	97		126	2	12	3	72	11	39	12	42	24	34	8	27
RO		221	2	50		9		79	38		45	7	29	6	12	2	18	10	8	4	8		
Parr		7		2				1									1						
Smolt		88	1	46		8		78	38		43	7	29	6	8	2	16	7	7	2	8		
Fry		126	1	2		1					2				3		2	3	1	2			
PH		330		50	1	23		93	59		81	2	5	3	43	5	27	10	24	14	26	4	19
Parr		8		5				2	1		1				1					1	1		
Smolt		102		40	1	19		91	58		75	2	5	3	38	4	21	5	20	11	25	1	19
Fry		220		5		4					5				5		6	5	4	2		3	
Hills Creek HOR		93		6							1	2											
5 ft		93		6							1	2											
Parr		33		4							1	2											
Fry		60		2																			

Chinook (CHS) During Reporting Period

Chinook Injuries During Reporting Period 10-16-2023 to 10-31-2023																							
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
Breitenbush River	35		34			3		5	1		14						2					1	
5 ft	35		34			3		5	1		14						2					1	
Parr	22		21			2		3	1		8						2					1	
Smolt	13		13			1		2			6												
Detroit HOR	143		130		1	4		12	2		75							3	1	1			
5 ft	143		130		1	4		12	2		75							3	1	1			
Parr	75		69		1	3		3			34							3					
Smolt	68		61			1		9	2		41									1	1		
Fall Creek Dam Tailrace	79		29	1	3			60	50		73		1		12	1	8	5	9	7	16		7
8 ft	79		29	1	3			60	50		73		1		12	1	8	5	9	7	16		7
Smolt	79		29	1	3			60	50		73		1		12	1	8	5	9	7	16		7
Hills Creek Dam	3		2					2	1		3					1							1
PH	2		1					1	1		2					1							1
Smolt	2		1					1	1		2				1								1
RO	1		1					1			1												
Smolt	1		1					1			1												

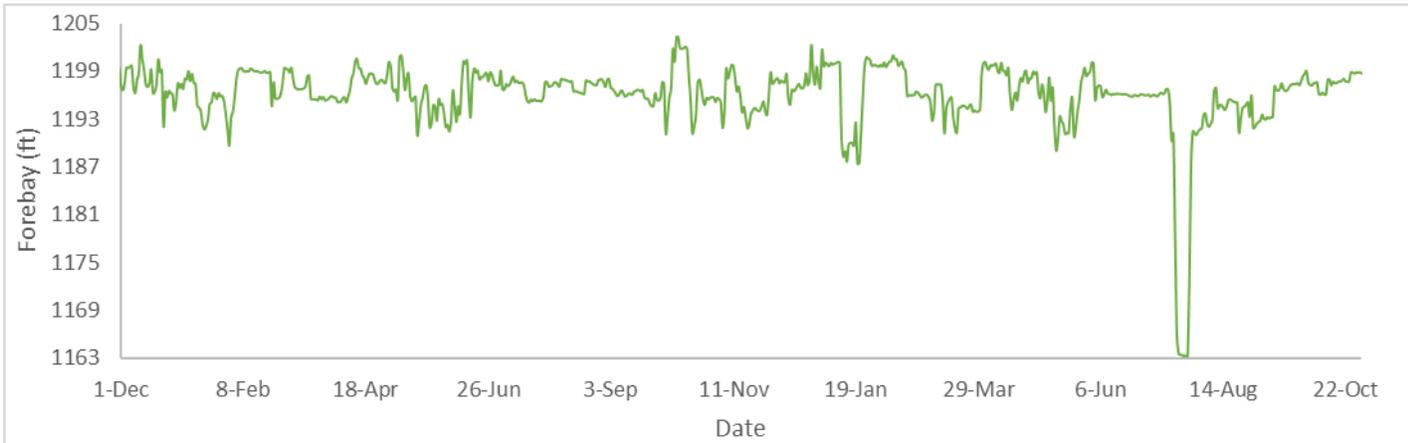
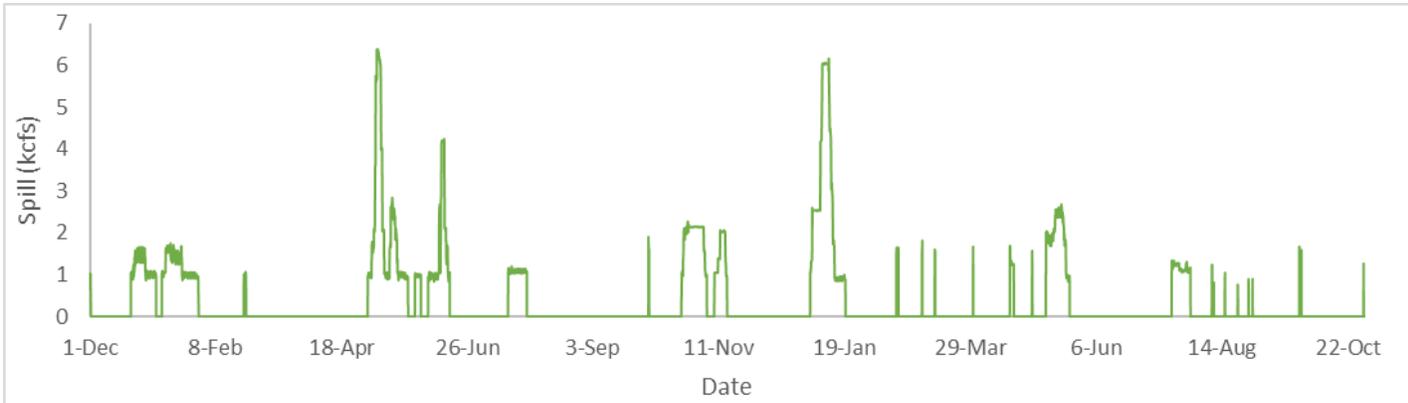
Steelhead (O. mykiss) To Date

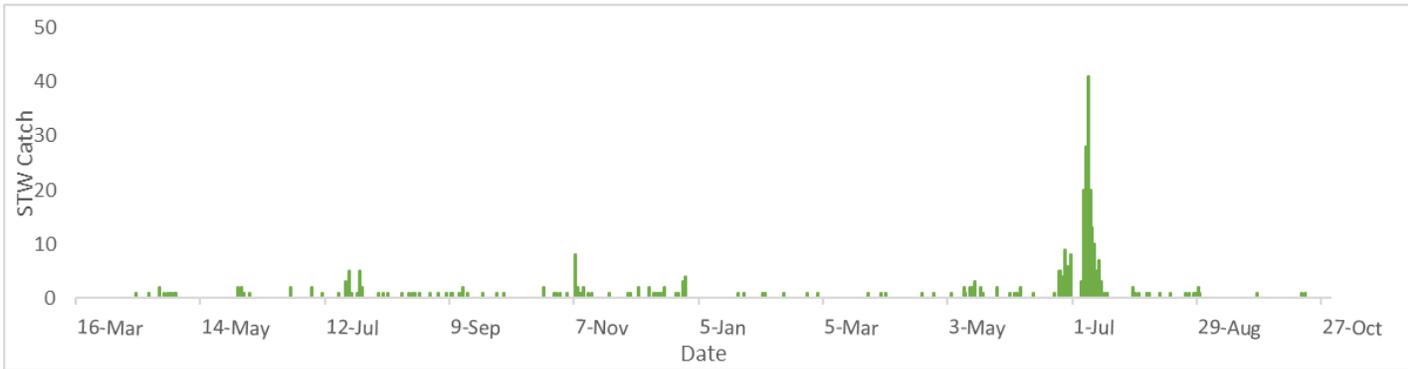
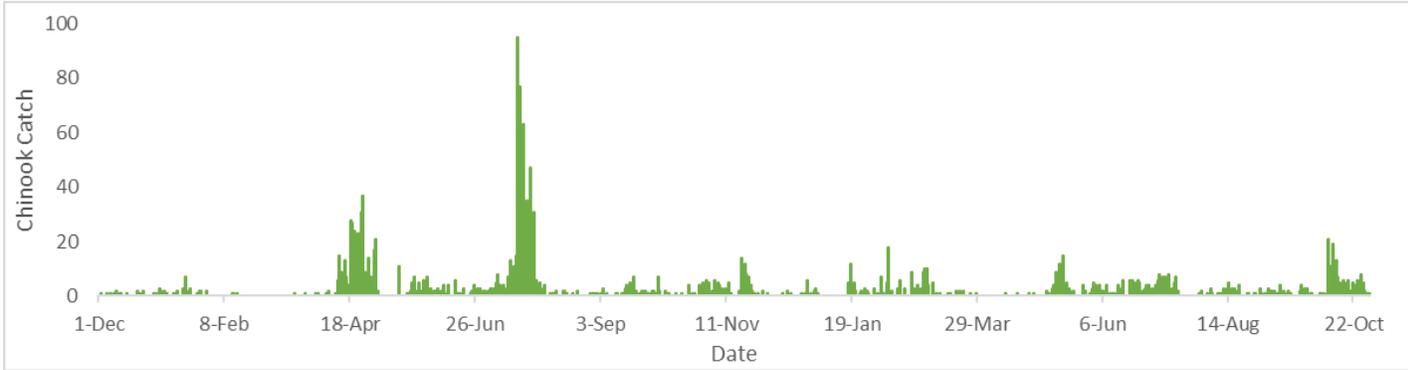
O. mykiss Injuries to-date																							
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Breitenbush River	355	1	12					1	3		13				1		2	2	2	1	1		
5 ft	355	1	12					1	3		13				1		2	2	2	1	1		
Parr	32		7					1	2		8						2	2			1		
Smolt	7		5						1		4				1				1				
Fry	316	1									1								1	1			
Detroit HOR	582	2	10	1	5	1		1	5	2	16				1		6	3	4	6	2	2	1
5 ft	582	2	10	1	5	1		1	5	2	16				1		6	3	4	6	2	2	1
Parr	28		6	1					1		8						1	1		1			
Smolt	3		2			1		1	1	1	2						1	1		1	1	1	
Fry	551	2	2		5			3	1	1	6				1		5	1	4	4	1	1	1
Green Peter HOR	1																						
5 ft	1																						
Fry	1																						

Steelhead (O. mykiss) During Reporting Period

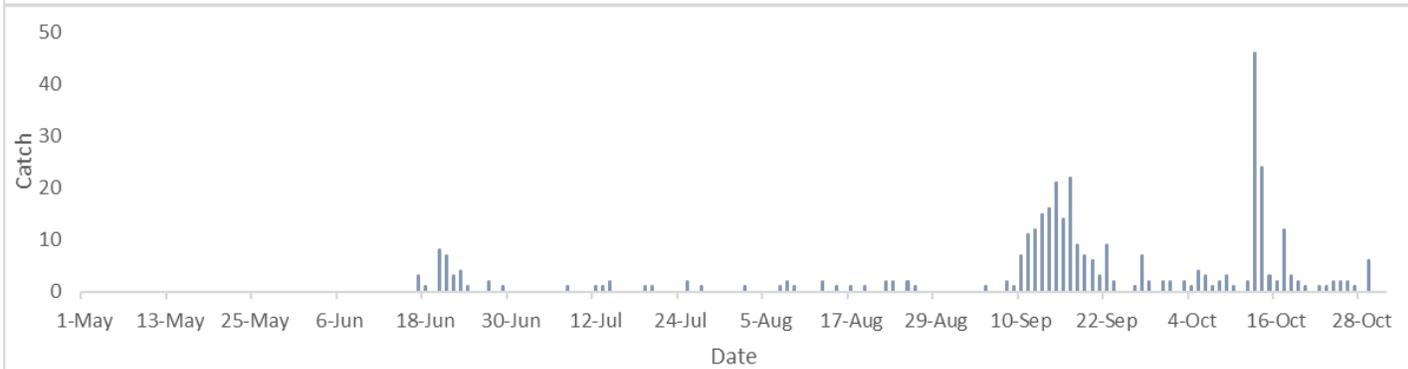
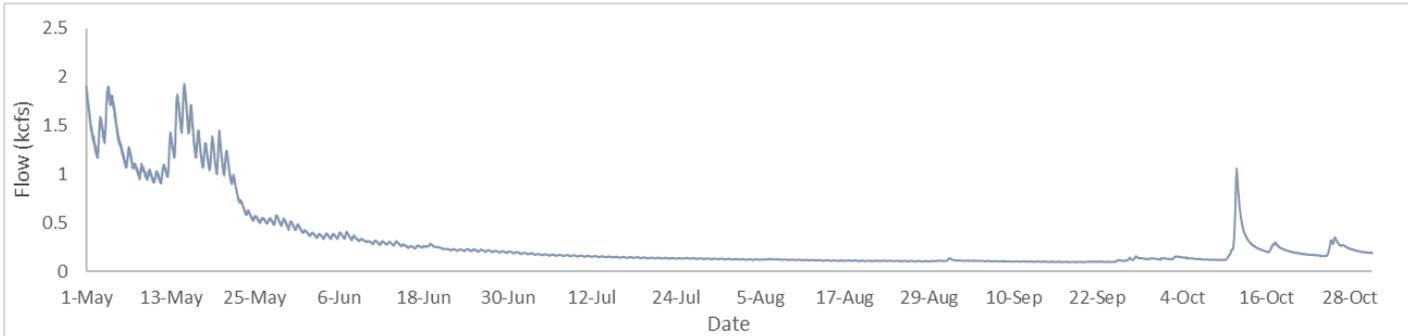
O. mykiss Injuries During Reporting Period 10-16-2023 to 10-31-2023																							
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Breitenbush River	2																						
5 ft	2																						
Parr	2																						
Detroit HOR	2																						
5 ft	2																						
Parr	2																						

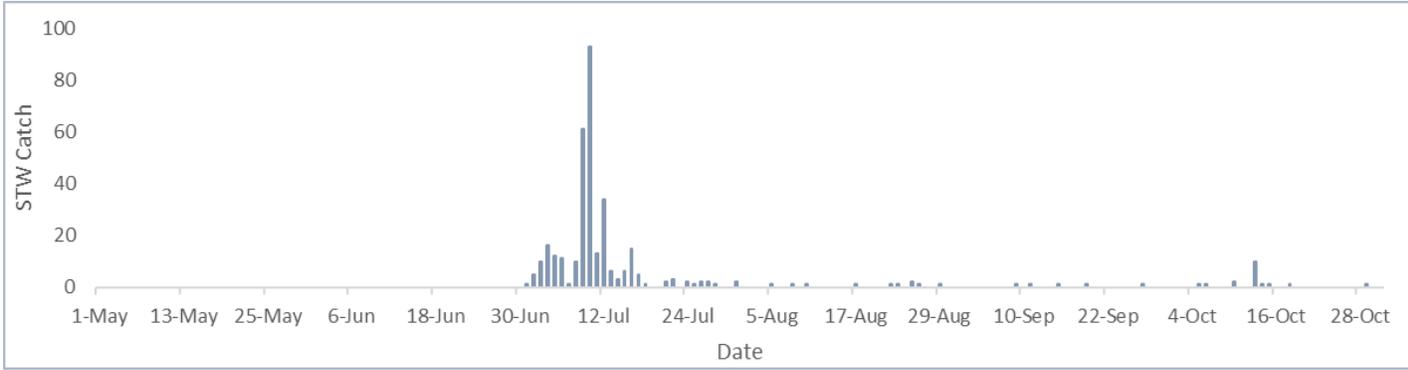
Appendix B
Big Cliff Dam Operational and Capture Data Since Start of Monitoring



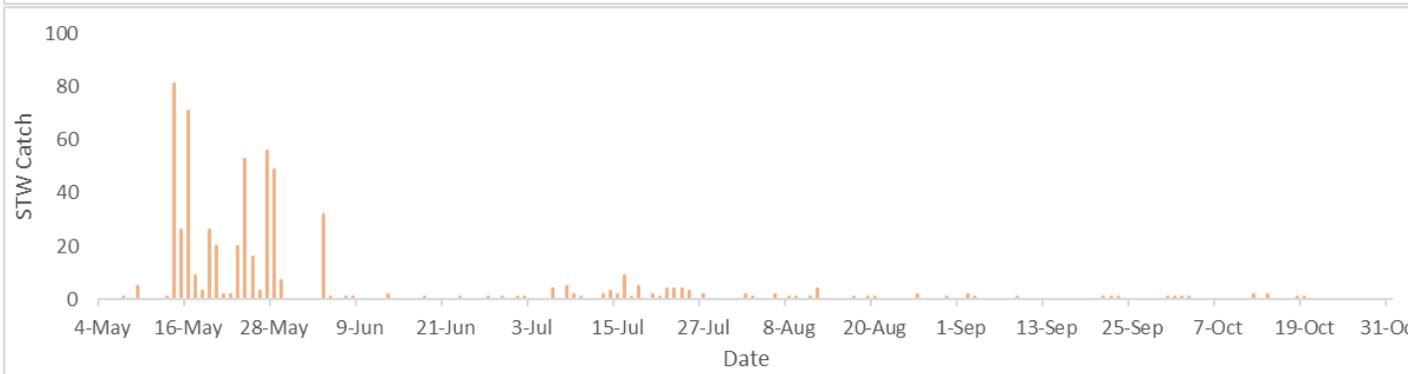
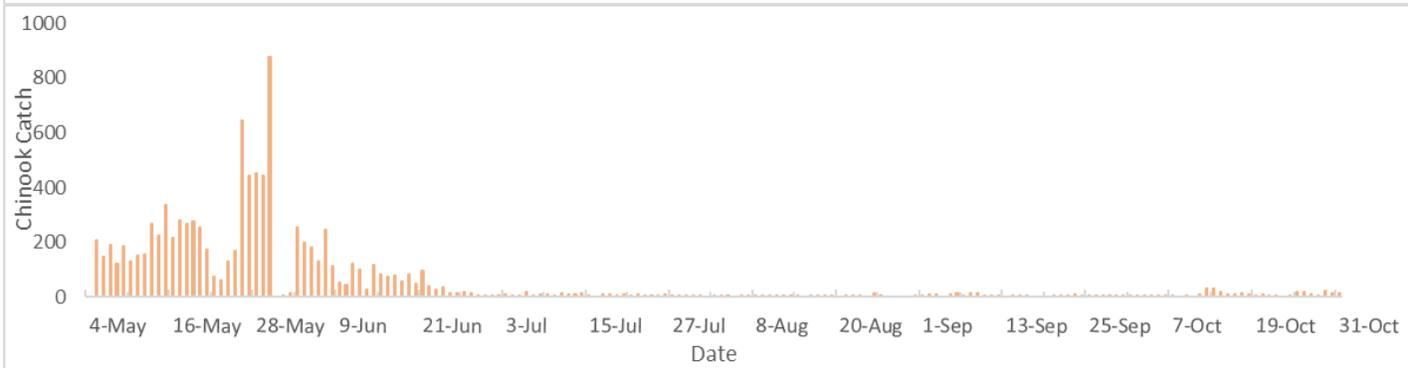
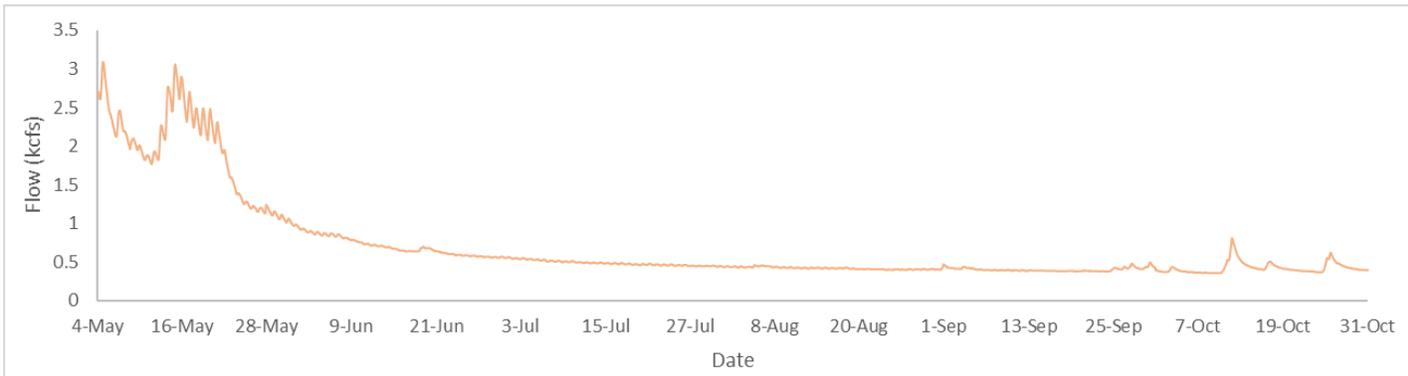


Breitenbush River Operational and Capture Data Since Start of Monitoring





Detroit Head of Reservoir-North Santiam River Operational and Capture Data Since Start of Monitoring



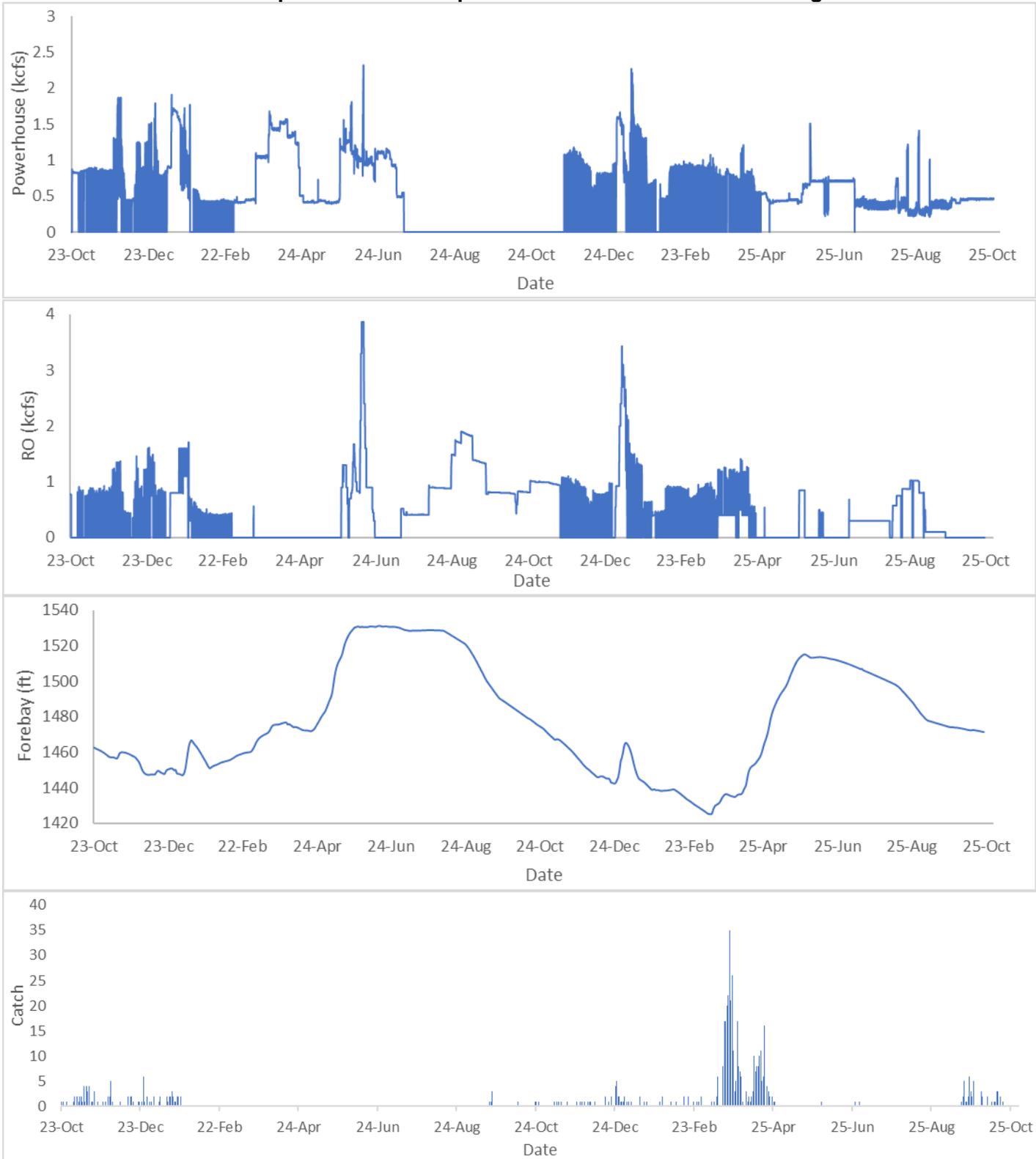
Green Peter Head of Reservoir-Middle Santiam River Operational and Capture Data Since Start of Monitoring



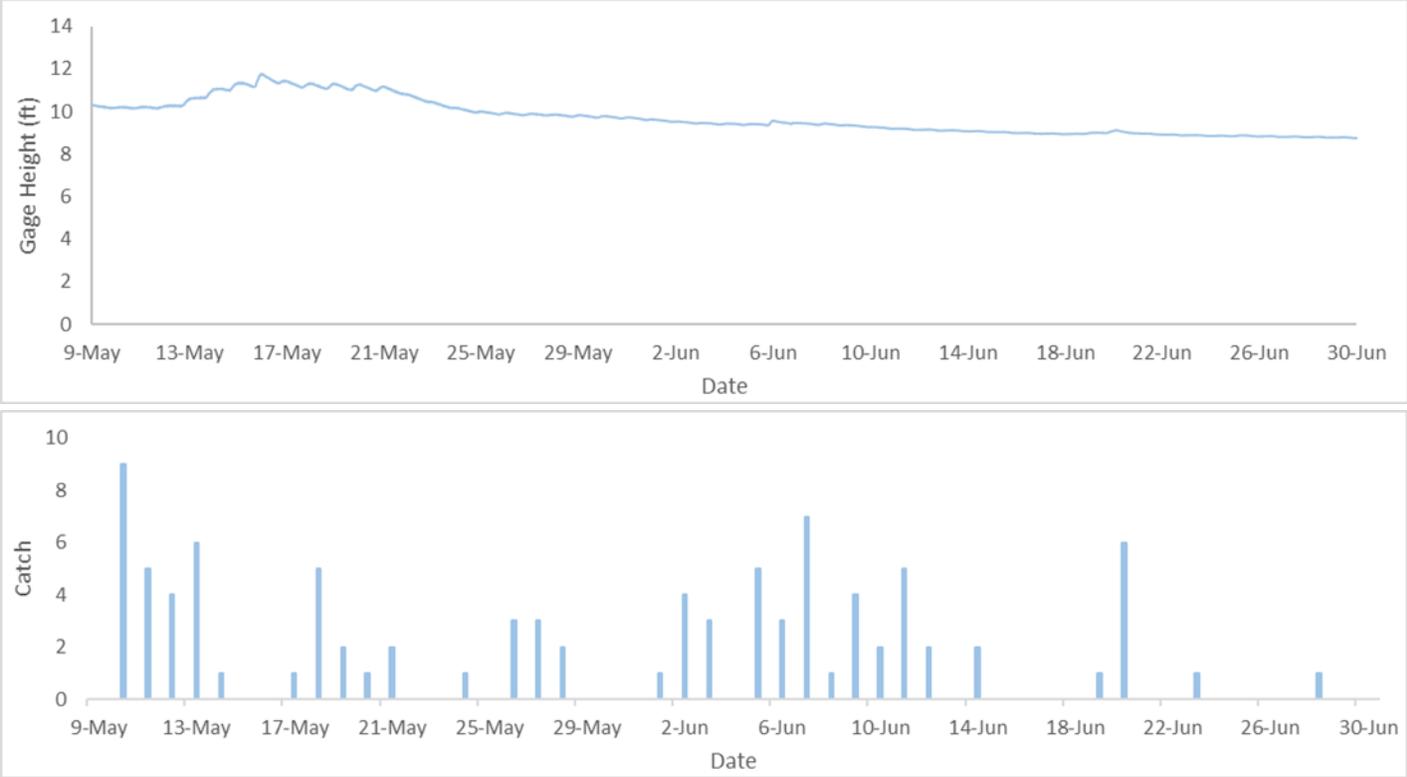
Lookout Dam Operational and Capture Data Since Start of Monitoring



Hills Creek Dam Operational and Capture Data Since Start of Monitoring



Hills Creek Head of Reservoir-Middle Fork Willamette River Operational and Capture Data Since Start of Monitoring



Appendix C

Release Location	Date of Release	# of Fish Released	# of Fish Recaptured	% Efficiency
Breitenbush River	6/21/2023	749	53	7.10%
Breitenbush River	7/6/2023	763	25	3.30%
Breitenbush River	8/2/2023	791	12	1.50%
Breitenbush River	9/20/2023	756	7	0.90%
Breitenbush River	10/5/2023	789	18	2.30%
Breitenbush River	10/25/2023	750	51	6.80%
Big Cliff Dam Tailrace*	12/22/2021	997	39	3.90%
Big Cliff Dam Tailrace*	5/25/2022	995	21	2.10%
Big Cliff Dam Tailrace*	8/9/2022	1000	92	9.20%
Big Cliff Dam Tailrace*	9/30/2022	995	48	4.80%
Big Cliff Dam Tailrace*	10/13/2022	500	15	3.00%
Big Cliff Dam Tailrace*	10/24/2022	535	25	4.70%
Big Cliff Dam Tailrace*	11/2/2022	949	40	4.20%
Big Cliff Dam Tailrace*	11/16/2022	509	15	2.90%
Big Cliff Dam Tailrace*	12/14/2022	502	60	12.00%
Big Cliff Dam Tailrace*	12/19/2022	1010	92	9.10%

Big Cliff Dam Tailrace*	12/21/2022	1014	33	3.30%
Big Cliff Dam Tailrace*	12/27/2022	704	47	6.70%
Big Cliff Dam Tailrace*	12/29/2022	452	22	4.90%
Big Cliff Dam Tailrace*	1/25/2023	500	56	11.20%
Big Cliff Dam Tailrace*	2/17/2023	499	37	7.40%
Big Cliff Dam Tailrace*	3/7/2023	2,968	61	2.10%
Big Cliff Dam Tailrace*	3/10/2023	541	112	20.70%
Big Cliff Dam Tailrace*	4/28/2023	498	34	6.80%
Big Cliff Dam Tailrace*	5/23/2023	500	6	1.20%
Big Cliff Dam Tailrace*	6/21/2023	500	8	1.60%
Big Cliff Dam Tailrace*	7/5/2023	500	33	6.60%
Big Cliff Dam Tailrace*	8/3/2023	474	42	8.90%
Big Cliff Dam Tailrace*	9/19/2023	424	64	15.1
Big Cliff Dam Tailrace*	10/6/2023	500	56	11.20%
Big Cliff Dam Tailrace	10/25/2023	633	99	15.60%
Detroit Head of Reservoir- North Santiam River	6/6/2023	540	28	5.00%
Detroit Head of Reservoir- North Santiam River	6/20/2023	750	61	4.60%
Detroit Head of Reservoir- North Santiam River	7/6/2023	750	13	1.70%
Detroit Head of Reservoir- North Santiam River	8/2/2023	750	19	2.50%
Detroit Head of Reservoir- North Santiam River	9/6/2023	700	19	2.70%
Detroit Head of Reservoir- North Santiam River	10/5/2023	750	24	3.20%
Detroit Head of Reservoir- North Santiam River	10/25/2023	757	72	9.50%
Green Peter Head of Reservoir- Middle Santiam	6/7/2023	1,000 (dead fish)	0	0%
Green Peter Head of Reservoir- Middle Santiam	6/7/2023	750	1	0.10%
Green Peter Head of Reservoir- Middle Santiam	7/28/2023	750	0	0%
Green Peter Head of Reservoir- Middle Santiam	8/30/2023	749	0	0%
Green Peter Head of Reservoir- Middle Santiam	9/27/2023	741	0	0%
Green Peter Head of Reservoir- Middle Santiam	10/11/2023	750	0	0%
Fall Creek Dam Regulating Outlet*	6/8/2022	517	11	2.10%
Fall Creek Dam Regulating Outlet*	6/30/2022	513	0	0%
Fall Creek Dam Regulating Outlet*	7/13/2022	498	0	0%
Fall Creek Dam Regulating Outlet*	5/11/2023	998	0	0%
Fall Creek Dam Regulating Outlet*	6/28/2023	992	0	0%
Fall Creek Dam Regulating Outlet	10/3/2023	1,020	0	0%
Fall Creek Dam Regulating Outlet	10/17/2023	1,011	14	13.80%
Lookout Dam Powerhouse*	4/13/2022	998	0	0%
Lookout Dam Powerhouse*	5/23/2023	3,999	32	0.80%
Lookout Dam Powerhouse*	6/1/2023	4,011	6	0.10%
Lookout Dam Powerhouse*	6/14/2023	4,010	4	0.10%

Lookout Dam Powerhouse*	6/28/2023	4,010	3	0.10%
Lookout Dam Powerhouse*	7/18/2023	4,012	1	0.02%
Lookout Dam Spillway	9/13/2023	3,636	0	0.00%
Lookout Dam Spillway	9/14/2003	3,998	0	0.00%
Lookout Dam Spillway	10/25/2023	4,042	0	0.00%
Hills Creek Dam Powerhouse*	1/6/2022	596	20	3.40%
Hills Creek Dam Regulating Outlet*	1/6/2022	605	13	2.10%
Hills Creek Dam Powerhouse*	2/16/2022	600	12	2.00%
Hills Creek Dam Regulating Outlet*	2/16/2022	593	19	3.20%
Hills Creek Dam Powerhouse*	2/25/2022	604	6	1.00%
Hills Creek Dam Regulating Outlet*	2/25/2022	625	6	1.00%
Hills Creek Dam Powerhouse*	12/7/2022	514	29	5.60%
Hills Creek Dam Regulating Outlet*	12/13/2022	516	1	0.20%
Hills Creek Dam Powerhouse- RO Trial*	1/6/2022	596	5	0.80%
Hills Creek Dam Powerhouse- RO Trial*	2/16/2022	600	0	0%
Hills Creek Dam Powerhouse- RO Trial*	2/25/2022	604	1	0.20%
Hills Creek Dam Powerhouse- RO Trial*	12/7/2022	514	3	0.60%
Hills Creek Dam Powerhouse*	2/25/2023	519	15	2.90%
Hills Creek Dam Powerhouse- RO Trial*	2/25/2023	519	0	0%
Hills Creek Dam Regulating Outlet*	2/25/2023	478	0	0%
Hills Creek Dam Powerhouse*	4/26/2023	506	62	12.30%
Hills Creek Dam Powerhouse- RO Trial*	4/26/2023	506	12	2.40%
Hills Creek Dam Powerhouse*	5/17/2023	505	57	11.30%
Hills Creek Dam Powerhouse- RO Trial*	5/17/2023	505	2	0.40%
Hills Creek Dam Powerhouse*	6/3/2023	508	36	7.10%
Hills Creek Dam Powerhouse- RO*	6/3/2023	508	2	0.40%
Hills Creek Dam Regulating Outlet*	6/13/2023	760	0	0%
Hills Creek Dam Powerhouse*	6/27/2023	507	22	4.30%
Hills Creek Dam Powerhouse- RO Trial*	6/27/2023	507	0	0%
Hills Creek Dam Powerhouse	9/27/2023	510	10	2.00%
Hills Creek Dam Powerhouse	10/31/2023	503	8	1.6%
Hills Creek Head of Reservoir- MF Willamette	5/18/2023	519	44	8.50%
Hills Creek Head of Reservoir- MF Willamette	6/19/2023	760	7	0.90%

*Releases performed under the USACE RST contract

Appendix D

Summary of PIT Tagged Fish for Reporting Period

Site	Trap	Species	# of PIT Tagged Fish
Breitenbush River	5 ft	Chinook	93
Breitenbush River	5 ft	<i>O. mykiss</i>	12
Detroit Head of Reservoir – North Santiam River	5 ft	Chinook	114
Detroit Head of Reservoir – North Santiam River	5 ft	<i>O. mykiss</i>	2
Green Peter Head of Reservoir – Middle Santiam River	5 ft	Chinook	0
Green Peter Head of Reservoir – Middle Santiam River	5 ft	<i>O. mykiss</i>	0
Fall Creek Dam Tailrace	8 ft	Chinook	0
Lookout Dam Tailrace	Spill	Chinook	0
Lookout Dam Tailrace	PWR	Chinook	0
Hills Creek Dam	RO	Chinook	0
Hills Creek Dam	PWR	Chinook	5
Hills Creek Head of Reservoir	5 ft	Chinook	0

Summary of EAS VIE Marked Fish for Reporting Period

Site	Trap	VIE Mark Code	Species	# VIE
Breitenbush River	5 ft	HBB	Chinook	0
Breitenbush River	5 ft	HBB	<i>O. mykiss</i>	2
Detroit Head of Reservoir – North Santiam River	5 ft	RDBB	Chinook	1
Detroit Head of Reservoir – North Santiam River	5 ft	RDBB	<i>O. mykiss</i>	5
Green Peter Head of Reservoir – Middle Santiam River	5 ft	RDBB	Chinook	0
Green Peter Head of Reservoir – Middle Santiam River	5 ft	RDBB	<i>O. mykiss</i>	0
Lookout Dam Tailrace	Spill	PBB	Chinook	0
Lookout Dam Tailrace	PWR	PBB	Chinook	0
Hills Creek Dam	RO	HBB	Chinook	0
Hills Creek Dam	PWR	HBB	Chinook	0
Hills Creek Head of Reservoir	5 ft	LDBB	Chinook	0

RDBB denotes location and color (Right Dorsal Blue (two stripes))

List of Captured Fish Containing PIT Tags This Season

Site	Trap	PIT Tag	Date	Species
Detroit Head of Reservoir- North Santiam River	5 ft	3D6.15348426D4	7/1/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003E55AB07	7/19/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22BF1	9/15/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE1A9E	9/15/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22BF3	9/15/2023	Chinook
Hills Creek Dam	PH	3D6.1534831A94	9/16/2023	Chinook
Hills Creek Dam	PH	3D6.153484353B	9/20/2023	Chinook
Hills Creek Dam	RO	3D6.1534803019	9/21/2023	Chinook
Hills Creek Dam	PH	3D6.1534831FE7	9/23/2023	Chinook
Hills Creek Dam	PH	3D6.1534843B57	9/25/2023	Chinook
Hills Creek Dam	PH	3D6.15347FF81F	9/25/2023	Chinook

Hills Creek Dam	PH	3D6.15347FE8E5	9/25/2023	Chinook
Hills Creek Dam	PH	3D6.15347FEC09	9/25/2023	Chinook
Hills Creek Dam	PH	3D6.15347FEDD1	9/25/2023	Chinook
Hills Creek Dam	PH	3D6.1534802DEB	9/25/2023	Chinook
Hills Creek Dam	PH	3D6.15347FEAD8	9/26/2023	Chinook
Hills Creek Dam	PH	3D6.1534801912	9/26/2023	Chinook
Hills Creek Dam	PH	3D6.1534843157	10/2/2023	Chinook
Hills Creek Dam	PH	3D6.15347FE7D3	10/3/2023	Chinook
Hills Creek Dam	PH	3D6.15348436D8	10/7/2023	Chinook
Hills Creek Dam	PH	3D6.153484327C	10/8/2023	Chinook
Hills Creek Dam	PH	3D6.1534801D95	10/11/2023	Chinook

List of EAS PIT Tagged Fish for Reporting Period

Site	Trap	PIT Tag	Date	Species
Breitenbush River	5 ft	3DD.003BD397E8	10/1/2023	Chinook
Breitenbush River	5 ft	3DD.003BD3982D	10/1/2023	Chinook
Breitenbush River	5 ft	3DD.003BD397D2	10/3/2023	Chinook
Breitenbush River	5 ft	3DD.003BD3980D	10/3/2023	Chinook
Breitenbush River	5 ft	3DD.003BD39807	10/4/2023	Chinook
Breitenbush River	5 ft	3DD.003BD39821	10/5/2023	Chinook
Breitenbush River	5 ft	3DD.003BD39809	10/5/2023	Chinook
Breitenbush River	5 ft	3DD.003BD397CE	10/5/2023	Chinook
Breitenbush River	5 ft	3DD.003BD39805	10/5/2023	Chinook
Breitenbush River	5 ft	3DD.003BD3980B	10/6/2023	Chinook
Breitenbush River	5 ft	3DD.003BD397F3	10/6/2023	O. mykiss
Breitenbush River	5 ft	3DD.003BD397FC	10/6/2023	Chinook
Breitenbush River	5 ft	3DD.003BD397FF	10/6/2023	Chinook
Breitenbush River	5 ft	3DD.003BD397FB	10/7/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22F8D	10/8/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22FB2	10/8/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22FDC	10/9/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22F92	10/9/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22FD4	10/9/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22FE1	10/10/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22F8C	10/10/2023	O. mykiss
Breitenbush River	5 ft	3DD.003BD22FC6	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22F95	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22F8A	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22FCA	10/13/2023	O. mykiss
Breitenbush River	5 ft	3DD.003BD22FCC	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0887	10/13/2023	O. mykiss
Breitenbush River	5 ft	3DD.003BEE088A	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0898	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE087F	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0881	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0884	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0851	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE088B	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0864	10/13/2023	O. mykiss
Breitenbush River	5 ft	3DD.003BEE085F	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BD22FE9	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE087D	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0847	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE089B	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0897	10/13/2023	O. mykiss
Breitenbush River	5 ft	3DD.003BD22FA7	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0859	10/13/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE084D	10/13/2023	Chinook

