Prepared by:	Dillon Alegre, Grant Brink & Rachel Ellison, Environmental Assessment Services, LLC
Report Period:	July 1st to July 15th, 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
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
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
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	7/1/2023	7/15/2023	15	45
Detroit Head of Reservoir- North Santiam River RST	5/4/2023	7/1/2023	7/15/2023	15	71
Green Peter Head of Reservoir- Middle Santiam River RST	5/4/2023	7/1/2023	7/15/2023	15	72
Hills Creek Head of Reservoir RST	5/9/2023	7/1/2023	7/15/2023	0	52

Table 3. Willamette Valley Rotary Screw Trap Monitoring Catch Summary

Site	Species	Catch (Reporting Period)	Recaptures (Reporting Period)	Total Catch	Total Recaptures
Breitenbush River RST	CHS	5	25	35	78
Breitenbush River RST	STW	283	0	287	0
Detroit Head of Reservoir- North Santiam River RST	CHS	118	13	9243	101
Detroit Head of Reservoir- North Santiam River RST	STW	22	0	514	0
Green Peter Head of Reservoir- Middle Santiam River RST	CHS	0	0	21	1
Green Peter Head of Reservoir- Middle Santiam River RST	STW	0	0	0	0
Hills Creek Head of Reservoir RST	CHS	0	0	93	52

Summary of Rotary Screw Trap Data

There are 3 rotary screw traps (RSTs) that have been installed and sampled during the reporting period. For this reporting period, traps were operated at the following 3 locations: Detroit Head of Reservoir – North Santiam River, Green Peter Head of Reservoir – Middle Santiam River and Breitenbush River.

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.

Winter Steelhead may be present at the 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 4.

FIGURE 1
Breitenbush River

RST Locations

500 Feet

N

EAS ENVIRONMENTAL ASSESSMENT SERVICES
Wholly Owned Subsidiary of Natives of Kodiak

FIGURE 2
North Santiam Above Detroit

RST Locations

500 Feet

EAS ENVIRONMENTAL ASSESSMENT SERVICES
Wholly Owned Subsidiary of Natives of Kodiak

FIGURE 3
Middle Santiam River

RST Locations

500 Feet

EAS ENVIRONMENTAL ASSESSMENT SERVICES
Wholly Owned Subsidiary of Natives of Kodiak

FIGURE 4
Middle Fork Willamette Above Hills Creek

RST Locations

500 Feet

N

EAS ENVIRONMENTAL ASSESSMENT SERVICES
Wholly Owned Subsidiary of Natives of Kodiak

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 July 1st and ended on July 15th. There were a total of 5 Chinook Salmon (CHS) and 282 Winter Steelhead (STW) captured during the 15-day sampling period (Figure 5). Sampling duration was 100% of the reporting period for the RST. Figure 6 shows length frequency data to-date. Table 4 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.

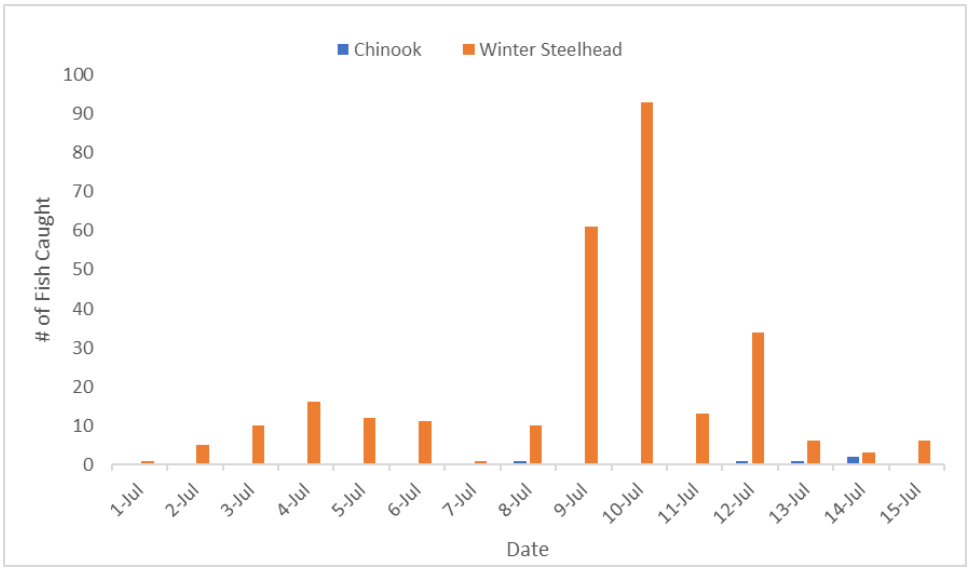


Figure 5. Chinook and Winter Steelhead Captured per day 07/01/2023 to 07/15/2023 (Breitenbush River)

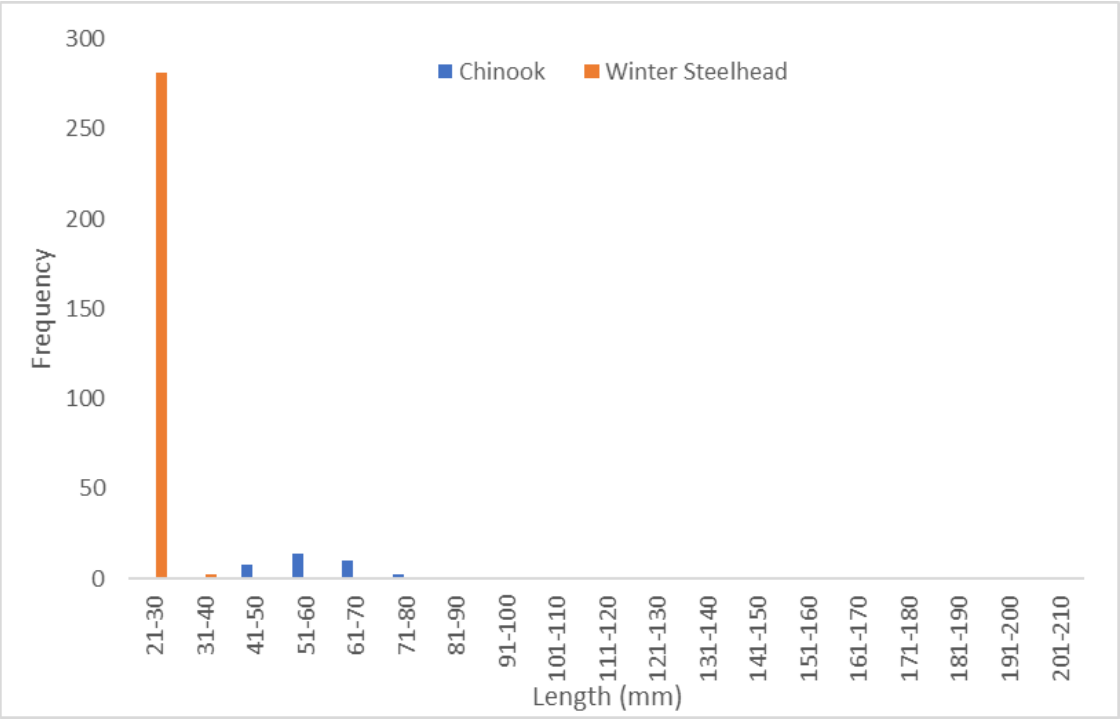


Figure 6. Length Frequency of Juvenile Chinook Sampled Season To-Date (Breitenbush River)

Table 4. Descriptive Statistics of Target Species Captured at the Breitenbush River To-Date

To-Date										
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	25	46	85	61.0	1.4	7.4	2.8
		CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Fry	283	21	33	26.8	N/A	N/A	N/A
		STW	Parr	3	76	120	101.0	5.2	20.0	13.4
		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.

July 1-15, 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	5	51	85	70	2.0	7.4	4.4
		CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A
		STW	Fry	282	21	33	26.8	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 7/6/2023 763 adipose and right ventral fin clipped fish were released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 25 fish were recaptured for an efficiency of 3.3%

Breitenbush River	Release #	Recapture #	Capture Efficiency
5ft Trap	763	25	3.3% (25/763)

Injuries and Copepod Infection

Partial descaling <20% was observed in 1 of the 5 Chinook captured (20.0%), 0 displayed descaling >20% (0.0%), 2 displayed body injury (40.0%), 0 had eye injuries (0.0%), 0 had copepods present in the branchial cavity (0.0%) and 1 had copepods on fins (20.0%). 0 Chinook displayed gas bubble disease (0.0%). There were 0 mortalities (0.0%).

Partial descaling <20% was observed on 0 of the 282 Winter Steelhead captured (0.0%) and 0 displayed descaling >20% (0.0%), 2 displayed body injury (0.7%), 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 2 mortalities (0.7%). Injury data is summarized in table 5.

Table 5. 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	5	1	0	2	0	0	1	0
	Winter Steelhead	282	0	0	2	0	0	0	2

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

Collected DNA and Scale Samples

DNA was collected from 5 Spring Chinook and 0 Winter Steelhead. Scale samples were collected from 5 Spring Chinook and 0 Winter Steelhead. The remaining targets were too small to sample.

PIT Tags

3 fish 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 on 6/16/2023. VIE tag color is changed every month to distinctly mark groups of fish by capture date. Since then, 26 Spring Chinook 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

Non-Target Species

11 non-target species were captured during this reporting period. A summary of non-target fish capture is provided in table 6.

Table 6. Summary of Non-target Species (Breitenbush River).

Species	5 ft Capture	5 ft Mortality	Season Total	Season Total Mortality
Kokanee	0	0	0	0
Cutthroat Trout	0	0	0	0
O. mykiss (clipped)	5	3	8	5
Sculpin	6	2	7	2
Totals	**11**	**5**	**15**	**7**

Stream Statistics

Basic stream statistics at the proposed 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 153.0 cfs to 204.0 (mean: 172.9 cfs). Figure 7 shows instantaneous discharge.

Stream temperatures will be recorded every 2 hours for the length of the reporting period for the RST (Figure 8).

Catch per unit of effort (CPUE) data are summarized in Table 7. Gage height and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 7. Summary of salmonid CPUE, Breitenbush River.

Description	Chinook (5 ft)	Winter Steelhead (5 ft)
Catch	5	282
Effort (hrs)	358.5	358.5
CPUE (fish/hr)	0.014	0.787

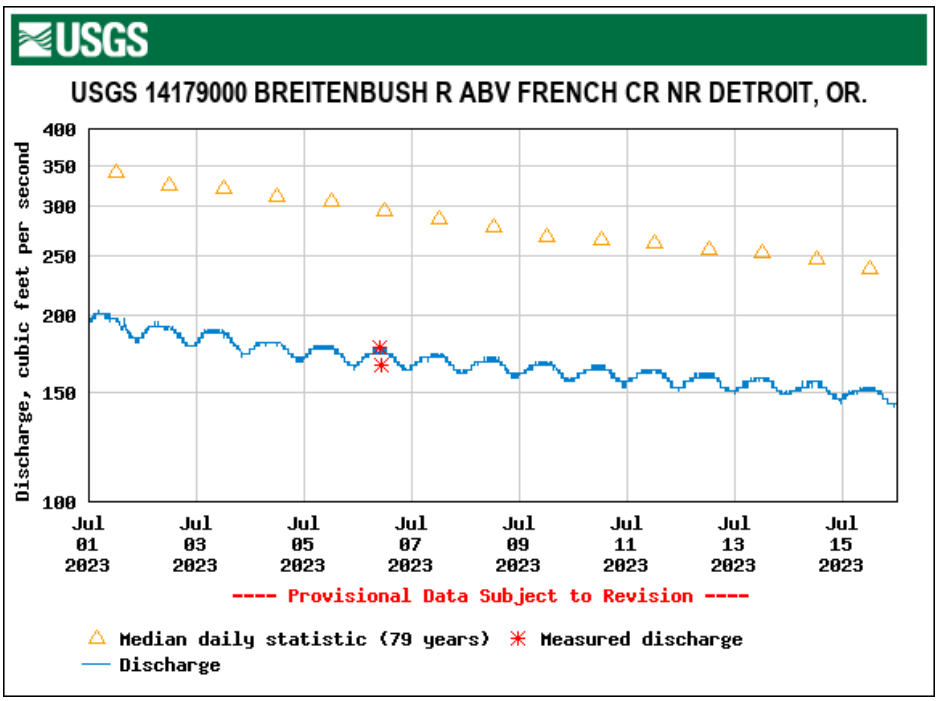


Figure 7. Discharge (cfs); Breitenbush River

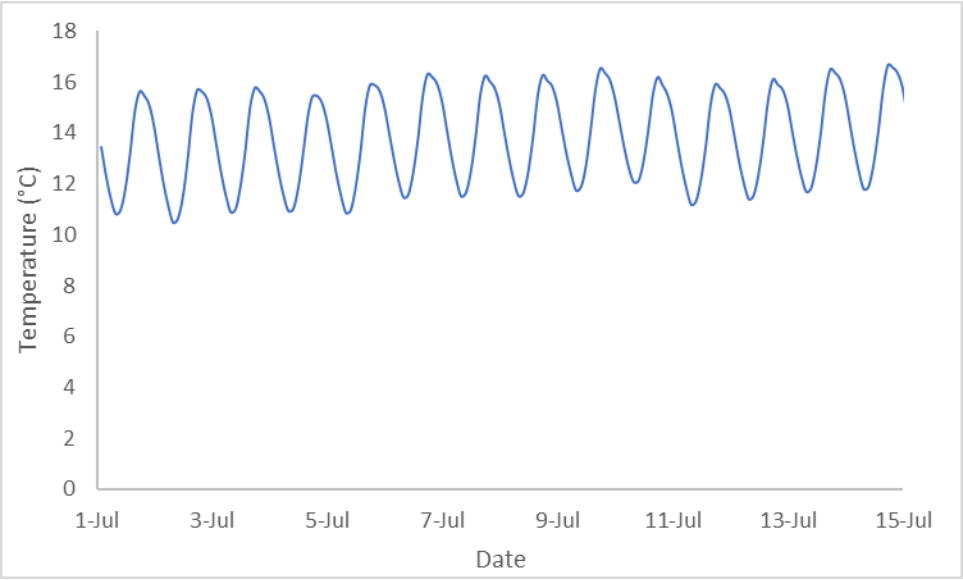


Figure 8. Temperature at RST (Breitenbush River)

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 July 1st and ended on July 15th. There were a total of 117 Chinook Salmon (CHS) and 21 Winter Steelhead (STW) captured during the 15-day sampling period (Figure 9). Sampling duration was 100% of the reporting period for the RST. Figure 10 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 Detroit Head of Reservoir site to-date and for the reporting period.

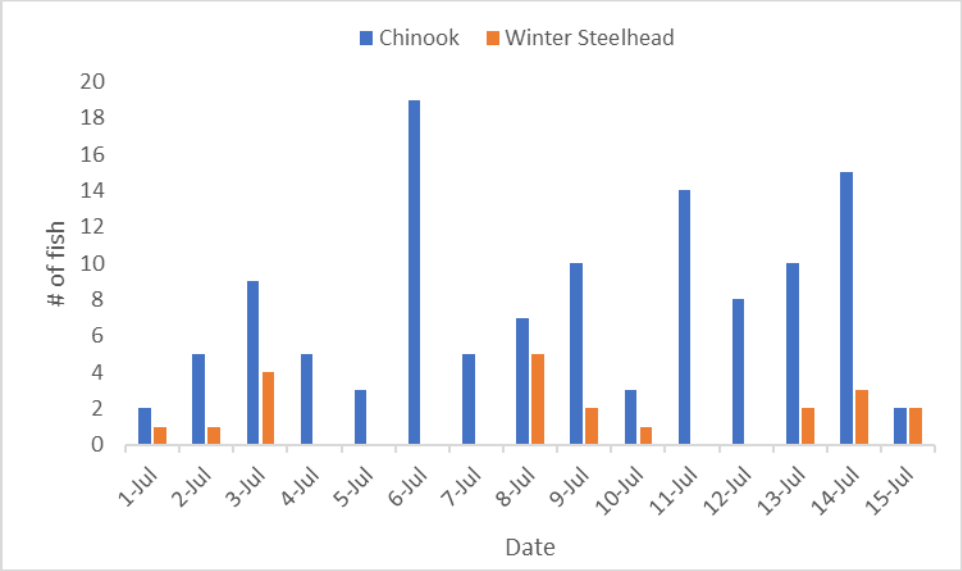


Figure 9. Chinook and Winter Steelhead Captured per day 07/01/2023 to 07/15/2023 (Detroit Head of Reservoir)

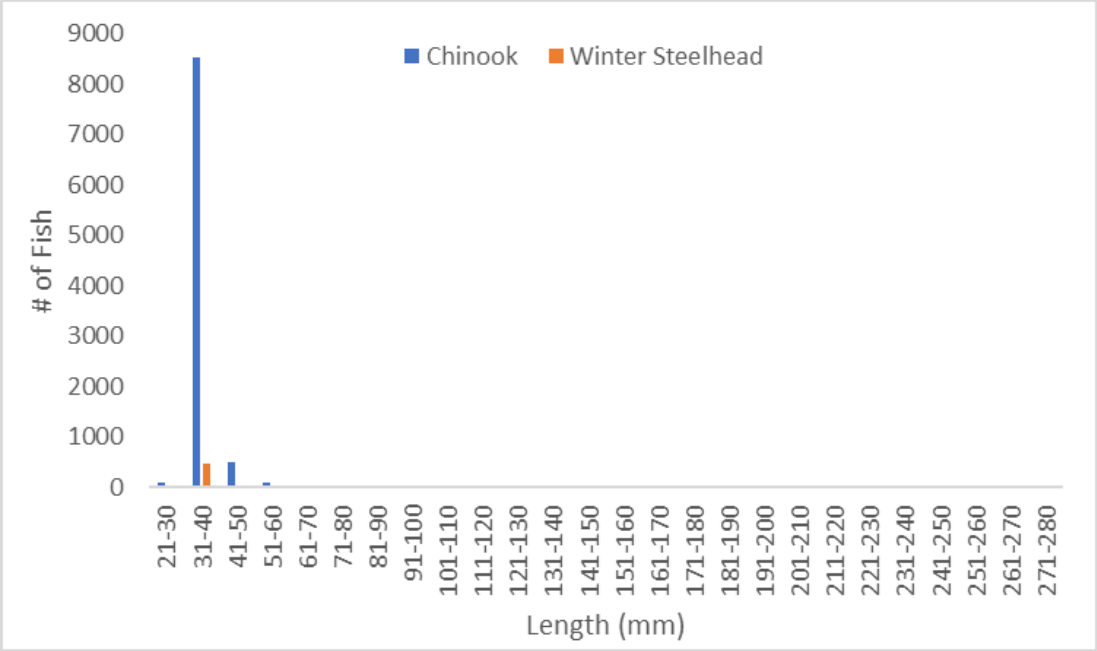


Figure 10. Length Frequency of Juvenile Chinook and Winter Steelhead Sampled Season To-Date (Detroit Head of Reservoir)

Table 8. 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	9100	28	60	35.5	N/A	N/A	N/A
		CHS	Parr	143	41	86	51.7	1.0	7.1	1.7
		CHS	Smolt	1	78	78	78.0	5.0	5.0	5.0
		STW	Fry	505	21	49	35.1	N/A	N/A	N/A
		STW	Parr	6	62	99	84.5	2.3	10.6	7.5
		STW	Smolt	2	188	408	298	66.5	66.5	66.5

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

July 1-15, 2023										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Detroit HOR	5ft	CHS	Fry	43	35	59	43.1	1.1	1.9	1.6
		CHS	Parr	75	41	86	52.0	1.0	7.1	1.8
		CHS	Smolt	1	78	78	78.0	5.0	5.0	5.0
		STW	Fry	21	21	28	25.0	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 7/6/2023 750 adipose and left ventral fin clipped fish were released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 13 fish were recaptured for an efficiency of 1.7%

Detroit Head of Reservoir	Release #	Recapture #	Capture Efficiency
5ft Trap	750	13	1.7% (13/750)

Injuries and Copepod Infection

Partial descaling <20% was observed in 9 of the 117 Chinook captured (7.7%), 0 displayed descaling >20% (0.0%), 11 displayed body injury (9.4%), 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 2 mortality (1.7%).

Partial descaling <20% was observed on 0 of the 21 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 was 1 mortality (1.7%). 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 (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	117	9	0	11	0	0	0	2
	Winter Steelhead	21	0	0	0	0	0	0	1

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

Collected DNA and Scale Samples

For the reporting period, DNA was collected from 78 Spring Chinook and 0 Winter Steelhead. Scale samples were collected from 44 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

7 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, 5,286 Chinook and 318 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	*O. mykiss*	Right Dorsal	Orange	60	0
5/16/2023- 5/31/2023	Chinook	Right Dorsal	Orange	2,700	0
5/16/2023- 5/31/2023	*O. mykiss*	Right Dorsal	Orange	237	0
6/1/2023-6/15/2023	Chinook	Right Dorsal	Pink	1048	0
6/1/2023-6/15/2023	*O. mykiss*	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

Non-Target Species

6 non-target species fish were captured during the reporting period; the data is summarized below in table 10.

Table 10. Summary of Non-target Species (Detroit Head of Reservoir).

Species	5 ft Capture	5 ft Mortality	Season Total	Season Total Mortality
Kokanee	1	0	81	1
Chinook (clipped)	0	0	1	0
Cutthroat Trout	0	0	1	0
Sculpin	5	1	12	2
Mountain Whitefish	0	0	2	0
O. mykiss (clipped)	0	0	6	0
Dace	0	0	1	0
Unknown	0	0	1	1
Totals	**6**	**1**	**105**	**4**

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 486.0 cfs to 561.0 cfs (mean: 517.7 cfs) during the reporting period. Figure 11 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 12 shows temperature during the reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 11. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B**.**

Table 11. Summary of salmonid CPUE, Detroit Head of Reservoir – North Santiam River.

	Chinook	Winter Steelhead
Description	**(5 ft)**	**(5 ft)**
Catch	117	21
Effort (hrs)	359.2	359.2
CPUE (fish/hr)	0.326	0.058

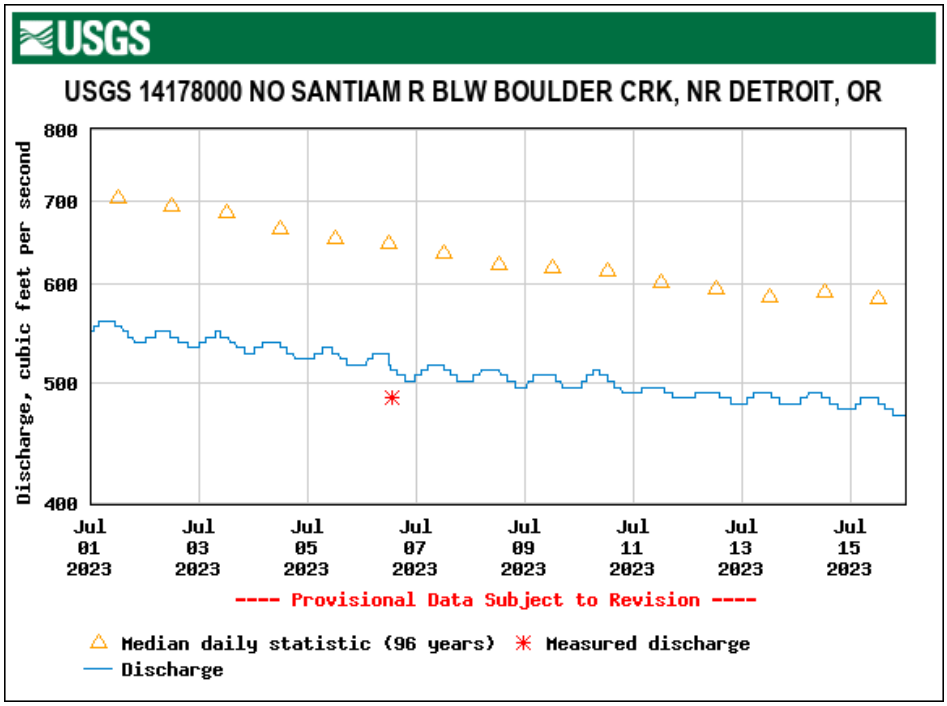


Figure 11. Discharge (cfs); Detroit Head of Reservoir – North Santiam River

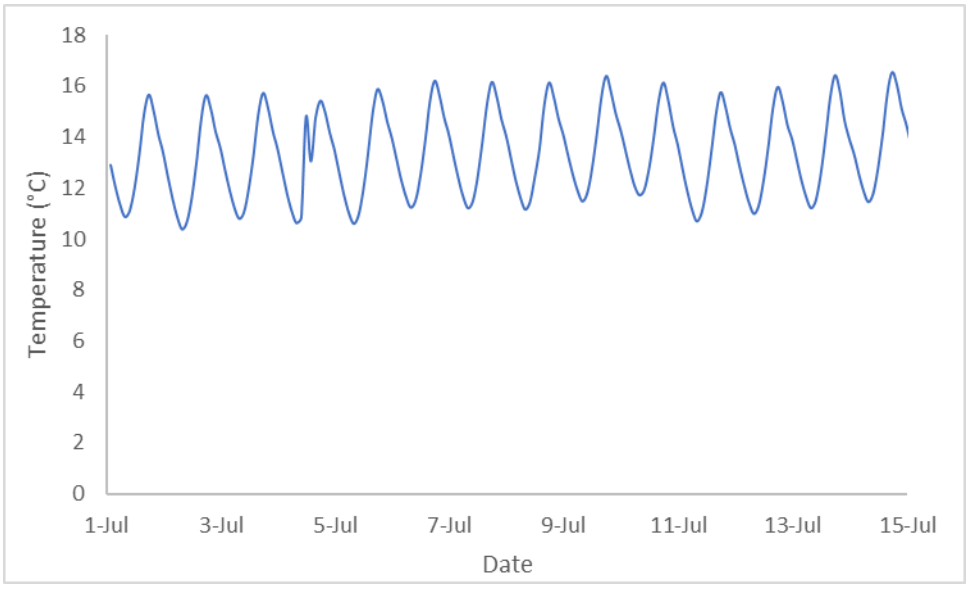


Figure 12. Temperature at RST (Detroit Head of Reservoir – North Santiam River)

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 July 1st and ended on July 15th. There were a total of 0 Chinook Salmon (CHS) and 0 Winter Steelhead (STW) captured during the 15-day sampling period (Figure 13). The 5 foot trap was raised to the non-sampling position on July 6th due to a road closure for culvert work by Giustina Resources. It was lowered to the sampling position on July 8th once construction had concluded. Sampling duration was 86.7% of the reporting period for the RST. Figure 14 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 Middle Santiam River- Green Peter Head of Reservoir site to-date and for the reporting period.

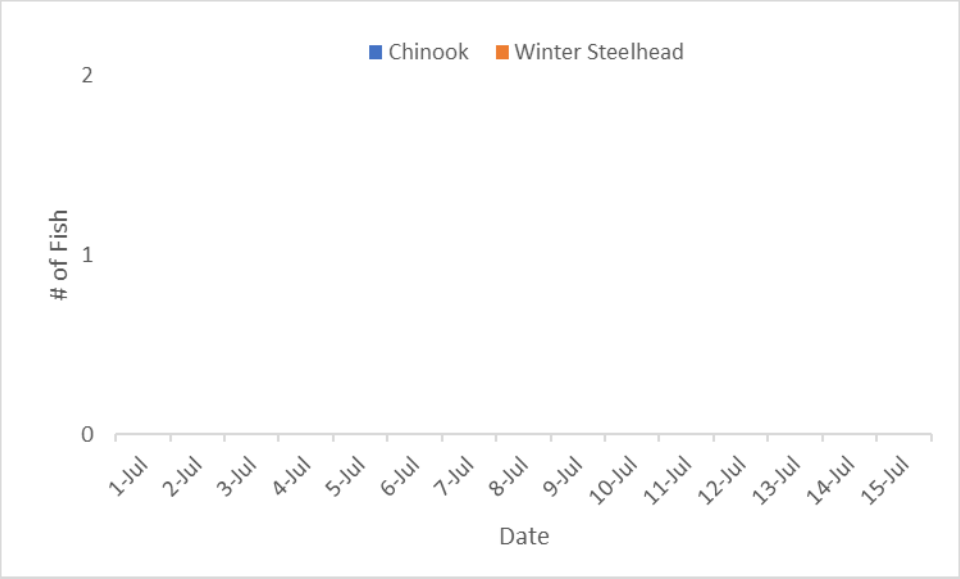


Figure 13. Chinook Captured per day 7/01/2023 to 7/15/2023 (Green Peter Head of Reservoir – Middle Santiam River)

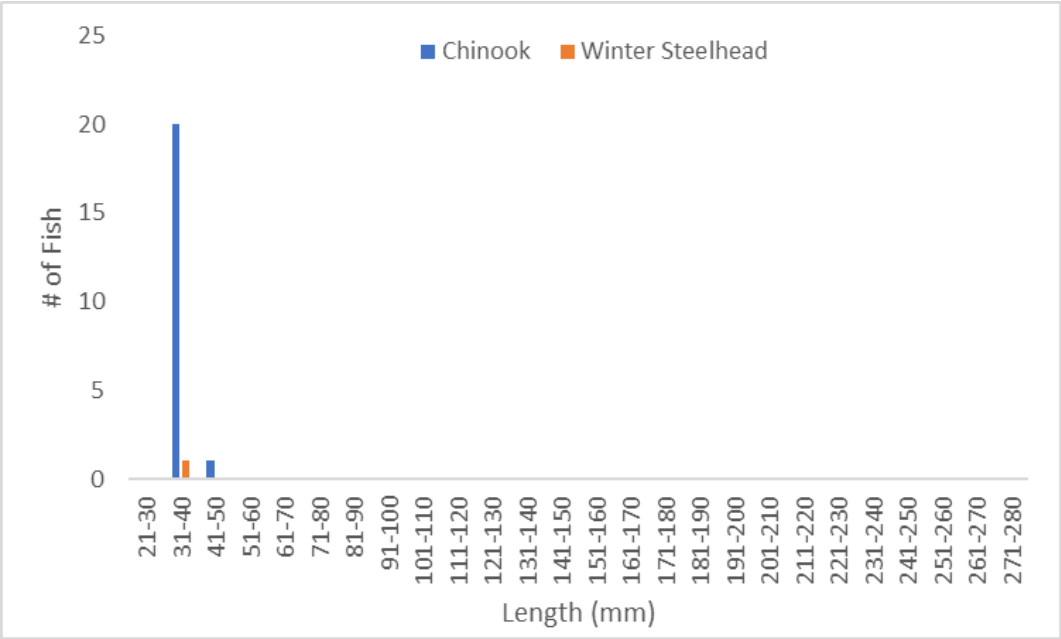


Figure 14. Length Frequency of Juvenile Chinook Sampled Season To-Date (Green Peter Head of Reservoir – Middle Santiam River)

Table 12. Descriptive Statistics of Target Species Captured at Green Peter Head of Reservoir – Middle Santiam River Season To-Date

To-date (since May 4, 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.

July 1-15, 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 6/7/2023 750 adipose and left ventral clipped fish were released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 1 fish was recaptured for an efficiency of 0.13%.

On 6/7/2023 1000 adipose clipped and Bismarck brown dyed fish were euthanized and released above the trap site to evaluate the trapping efficiency of the 5 ft RST. 0 fish were recaptured for an efficiency of 0.0%.

Green Peter Head of Reservoir-Middle Santiam River	Release #	Recapture #	Capture Efficiency
5ft Trap	750 (live)	1	0.13% (1/750)
	1000 (dead)	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 was 0 mortality (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 13.

Table 13. 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	*O. mykiss*	Right Dorsal	Orange	1	0
5/16/2023-5/31/2023	Chinook	Right Dorsal	Orange	1	0

Non-Target Species

6 non-target fish were collected during the reporting period; the data is summarized below in Table 14.

Table 14. 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	6	0	14	0
Sculpin	0	0	9	0
Totals	**6**	**0**	**28**	**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 1.2 ft to 1.4 ft (mean: 1.3 ft). Figure 15 shows gage height.

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

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

Table 15. 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)	304.6	304.6
CPUE (fish/hr)	0	0

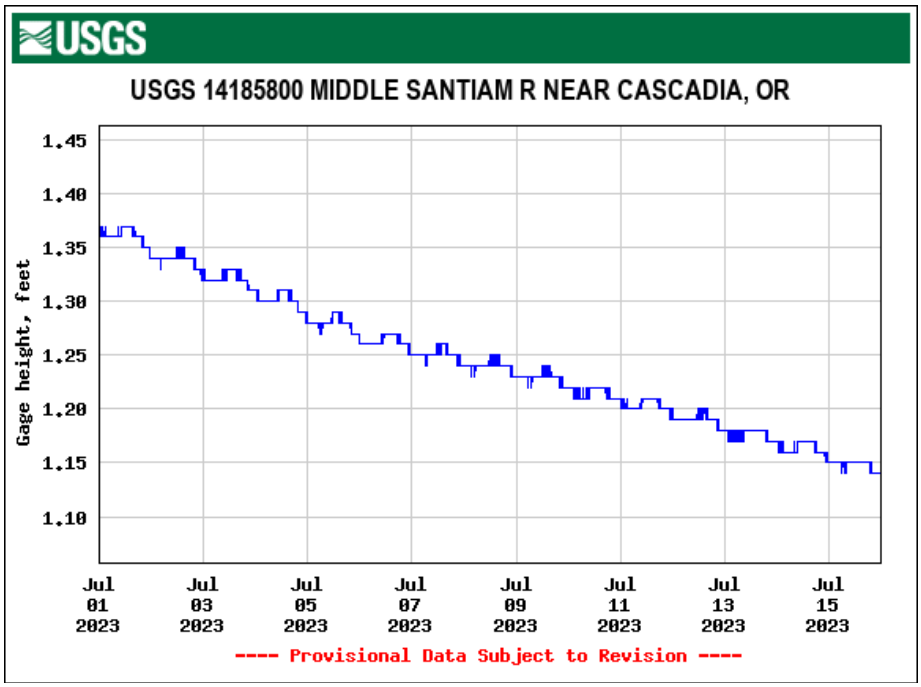


Figure 15. Gage Height (feet); Green Peter Head of Reservoir – Middle Santiam River

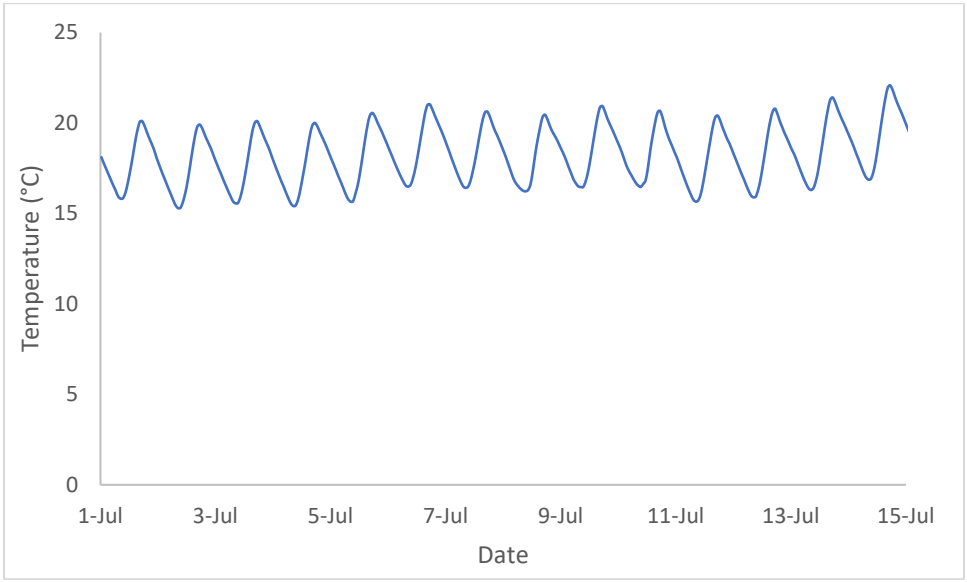


Figure 16. Temperature at RST (Green Peter Head of Reservoir – Middle Santiam River)

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 17 shows length frequency data of captured Chinook for sampling in 2023. Table 16 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.

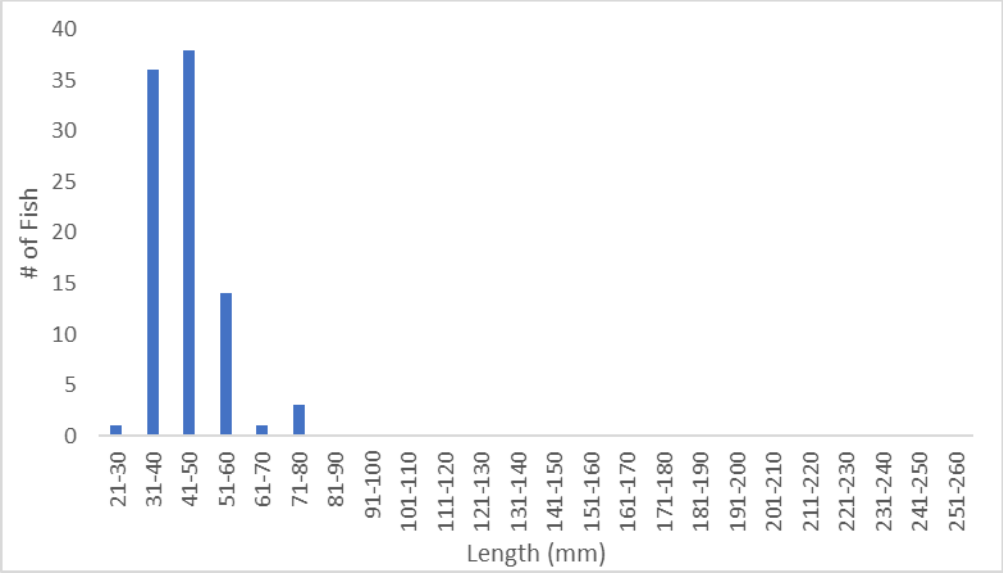


Figure 17. Length Frequency of Juvenile Chinook Sampled Season To-Date (Hills Creek Head of Reservoir)

Table 16. Descriptive Statistics of Target Species Captured at Hills Creek Head of Reservoir Season To-Date

To-Date (Since May 9th, 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	0.7% (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 17 provides a summary of VIE marked fish at the Hills Creek Head of Reservoir- Middle Fork Willamette River site.

Table 17. 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 197 non-target species fish were captured during sampling in 2023; the data is summarized below in Table 18.

Table 18. Summary of Non-target Species (Hills Creek Head of Reservoir).

Species	Season Total	Season Total Mortality
Dace	87	1
Cutthroat Trout	2	0
O. mykiss	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	**197**	**3**

Issues Encountered

Temperatures in the Middle Santiam have been approaching sampling thresholds. If warm weather continues, sampling may have to be paused until conditions improve.

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	30		3								9						1						
5 ft	30		3								9						1						
Parr	20		3								6						1						
Fry	10										3												
Detroit HOR	9243	1	36		11	1			8	9	62			1	17		57	29	38	25	43	9	
5 ft	9243	1	36		11	1			8	9	62			1	17		57	29	38	25	43	9	
Parr	142		8			1					14						2	2					
Smolt	1		1																				
Fry	9100	1	27		11				8	9	48			1	17		55	27	38	25	43	9	
Green Peter HOR	21										1									1			
5 ft	21										1									1			
Fry	21										1									1			
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 7-01-2023 to 7-15-2023																							
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	5		2			1		1			1												
5 ft	5		2			1		1			1												
Parr	5		2			1		1			1												
Detroit HOR	117		9							1	10						2	1	1				
5 ft	117		9							1	10						2	1	1				
Fry	42		1							1	1								1				
Parr	74		7								9						2	1					
Smolt	1		1																				

Steelhead (*O. mykiss*) To Date

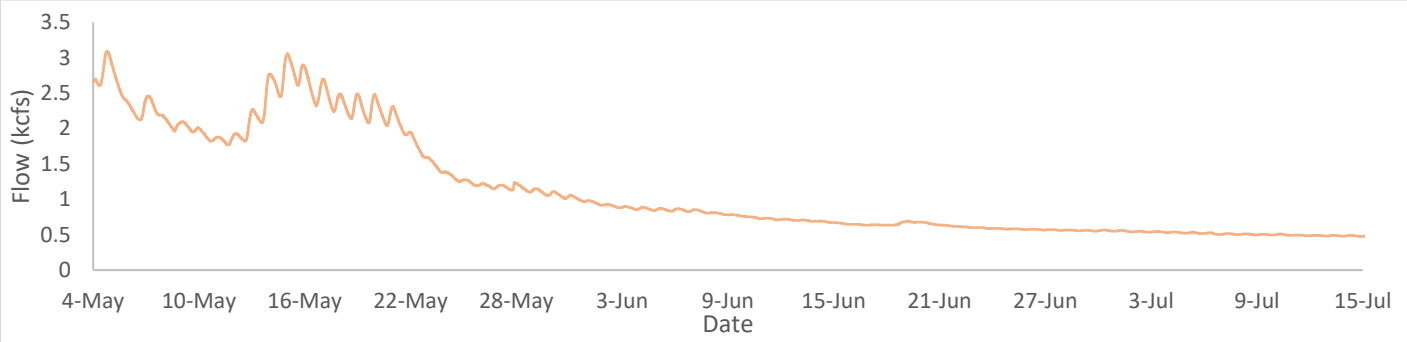
O. mykiss Injuries to-date																							
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Breitenbush River	286	1	1								1								1	1			
5 ft	286	1	1								1								1	1			
Parr	3		1								1												
Fry	283	1																	1	1			
Detroit HOR	513	2	5		5	1		1	4	1	9				1		5	2	4	5	2	2	1
5 ft	513	2	5		5	1		1	4	1	9				1		5	2	4	5	2	2	1
Parr	6		2								3												
Smolt	2		1			1		1	1	1	1							1		1	1	1	
Fry	505	2	2		5				3		5				1		5	1	4	4	1	1	1
Green Peter HOR	1																						
5 ft	1																						
Fry	1																						

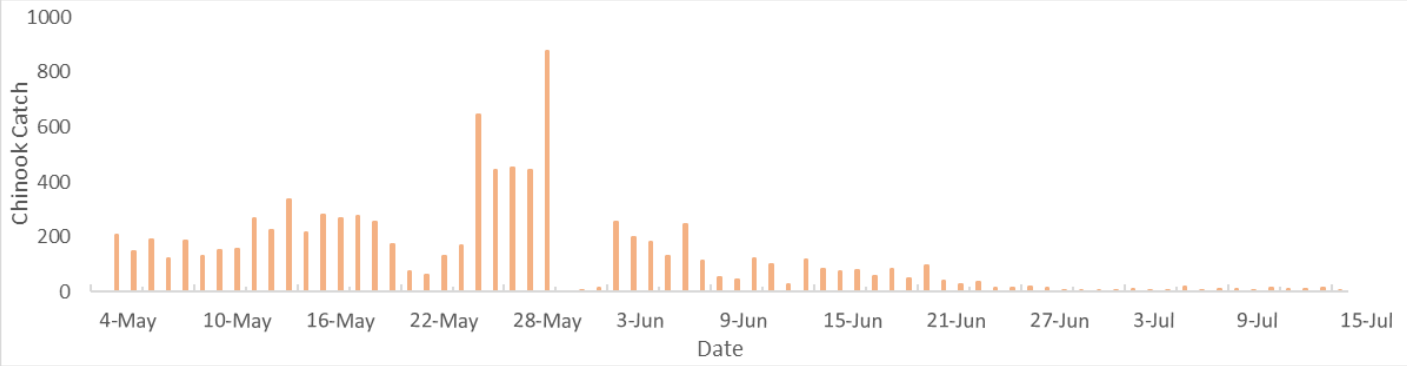
Steelhead (*O. mykiss*) During Reporting Period

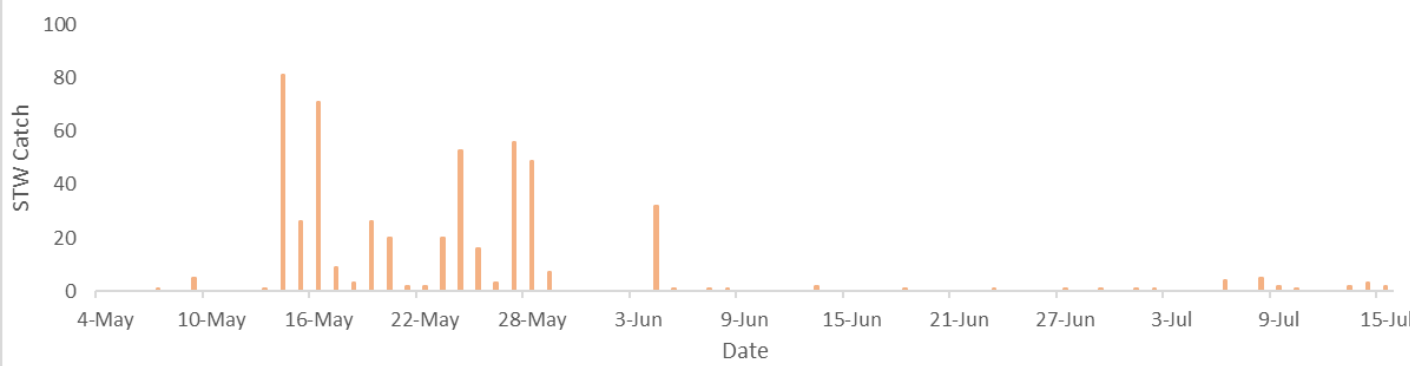
O. mykiss Injuries During Reporting Period 7-01-2023 to 7-15-2023																								
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Breitenbush River	282	1																	1	1			
5 ft	282	1																	1	1			
Fry	282	1																	1	1			
Detroit HOR	21	1																					
5 ft	21	1																					
Fry	21	1																					

Appendix B

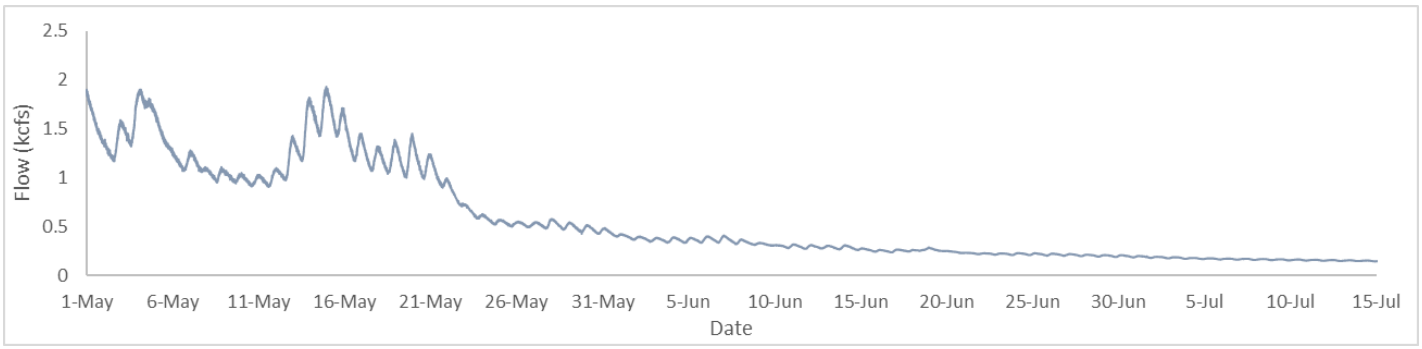
Detroit Head of Reservoir-North Santiam River Operational and Capture Data Since Start of Monitoring

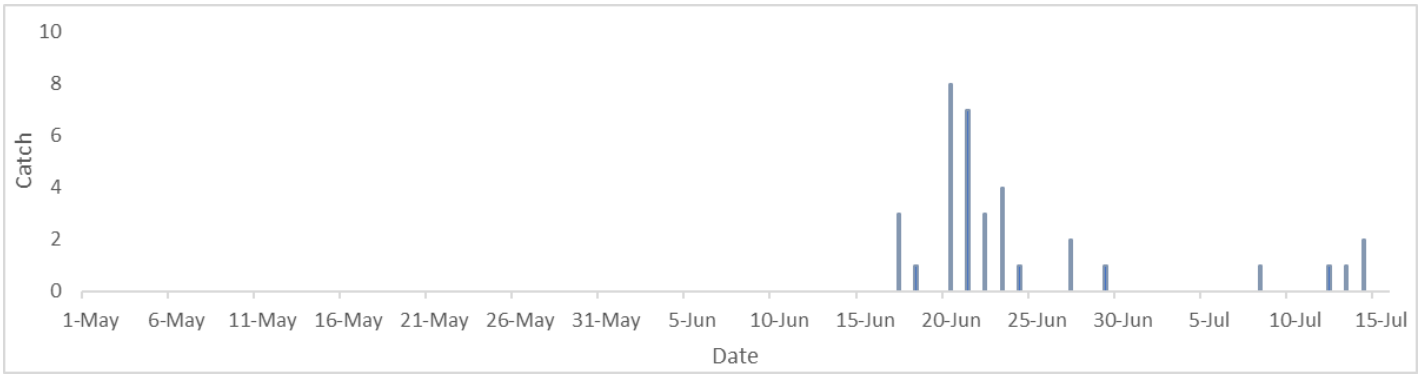




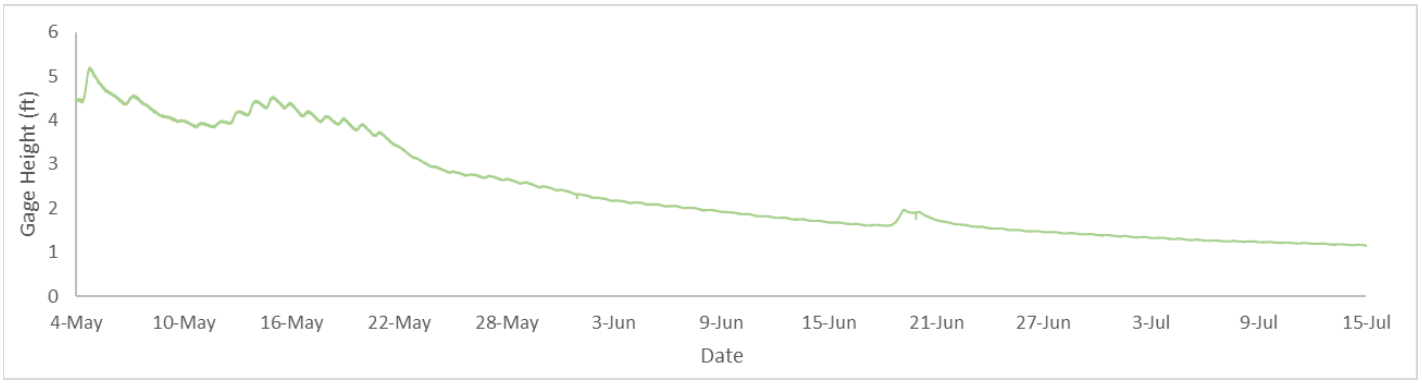


Breitenbush River Operational and Capture Data Since Start of Monitoring

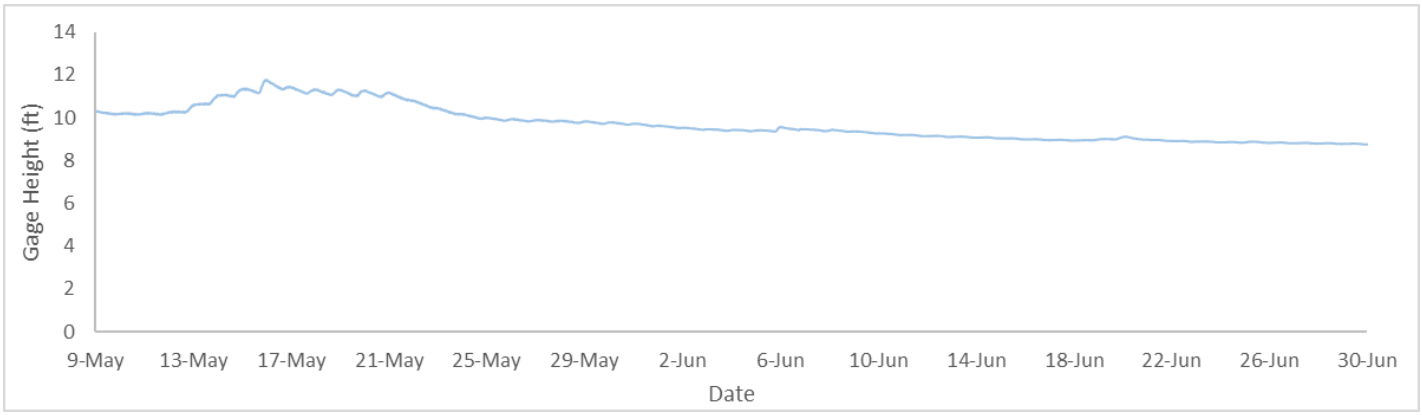


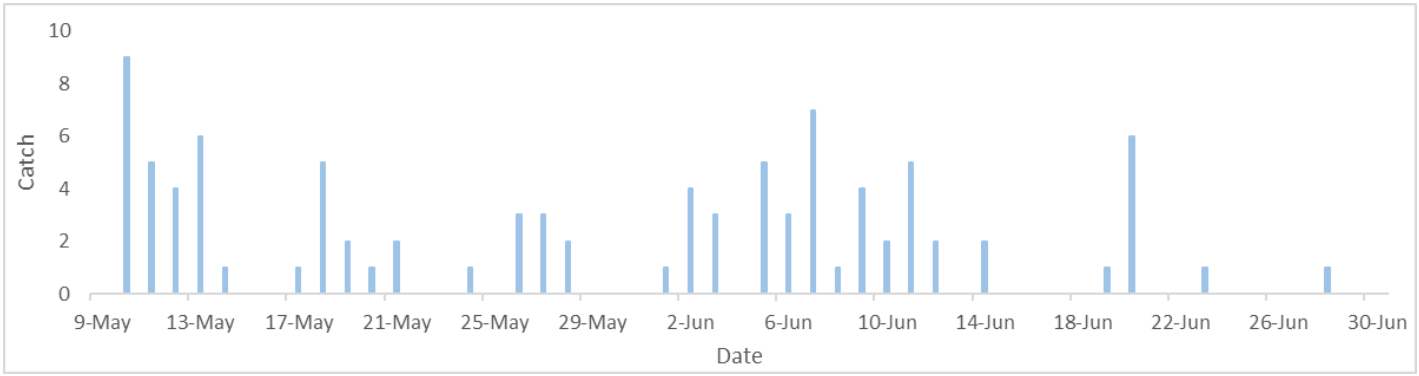


Green Peter Head of Reservoir-Middle Santiam River Operational and Capture Data Since Start of Monitoring



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





Appendix C

Summary of PIT Tagged Fish for Reporting Period

Site	Trap	Species	# of PIT Tagged Fish
Breitenbush River	5 ft	Chinook	3
Breitenbush River	5 ft	*O. mykiss*	0
Detroit Head of Reservoir – North Santiam River	5 ft	Chinook	7
Detroit Head of Reservoir – North Santiam River	5 ft	*O. mykiss*	0
Green Peter Head of Reservoir – Middle Santiam River	5 ft	Chinook	0
Green Peter Head of Reservoir – Middle Santiam River	5 ft	*O. mykiss*	0
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	HG	Chinook	2
Breitenbush River	5 ft	HG	*O. mykiss*	0
Detroit Head of Reservoir – North Santiam River	5 ft	RDG	Chinook	111
Detroit Head of Reservoir – North Santiam River	5 ft	RDG	*O. mykiss*	0
Green Peter Head of Reservoir – Middle Santiam River	5 ft	RDG	Chinook	0
Green Peter Head of Reservoir – Middle Santiam River	5 ft	RDG	*O. mykiss*	0
Hills Creek Head of Reservoir	5 ft	LDG	Chinook	0

RDG denotes location and color (Right Dorsal Green, Head Green)

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

List of EAS PIT Tagged Fish for Reporting Period

Site	Trap	PIT Tag	Date	Species
Breitenbush River	5 ft	3DD.003BD39601	7/12/2023	Chinook
Breitenbush River	5 ft	3DD.003BD39639	7/8/2023	Chinook
Breitenbush River	5 ft	3DD.003BEE0E06	7/14/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BD39632	7/3/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BD3960C	7/9/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BEE0703	7/15/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BD395DB	7/8/2023	Chinook

Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BEE0E0E	7/14/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BD39608	7/7/2023	Chinook
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BD395DC	7/7/2023	Chinook