Prepared by:	Dillon Alegre, Grant Brink & Rachel Ellison, Environmental Assessment Services, LLC
Report Period:	May 16th to May 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	TBD	TBD	1
Breitenbush River RST	Operation	TBD	11/30/2023	TBD
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
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
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

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
Detroit Head of Reservoir- North Santiam River RST	5/4/2023	5/16/2023	5/31/2023	15	26
Green Peter Head of Reservoir- Middle Santiam River RST	5/4/2023	5/16/2023	5/31/2023	16	27
Hills Creek Head of Reservoir RST	5/9/2023	5/16/2023	5/31/2023	16	22

Table 3. Willamette Valley Rotary Screw Trap Monitoring Catch Summary

Site	Species	Catch (Reporting Period)	Recaptures (Reporting Period)	Total Catch	Total Recaptures
Detroit Head of Reservoir- North Santiam River RST	CHS	4,751	0	6849	0
Detroit Head of Reservoir- North Santiam River RST	STW	337	0	451	0
Green Peter Head of Reservoir- Middle Santiam River RST	CHS	1	0	21	0
Green Peter Head of Reservoir- Middle Santiam River RST	STW	0	0	0	0
Hills Creek Head of Reservoir RST	CHS	20	46	45	46

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 Hills Creek Head of Reservoir on the upper Middle Fork Willamette 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.

Winter Steelhead may be present at the Breitenbush River, Detroit Head of Reservoir – North Santiam, 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.

The RST for the Breitenbush River sampling site is still being constructed by EG Solutions. This RST and its highline are slated for install as soon as the new RST is available.

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 is still being manufactured by EG Solutions. The trap is slated for install as soon as it is available.

Target Species

No target species have been captured as the RST has yet to be installed. There were 0 Chinook and 0 Winter steelhead caught during the reporting period (Figure 5). 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.

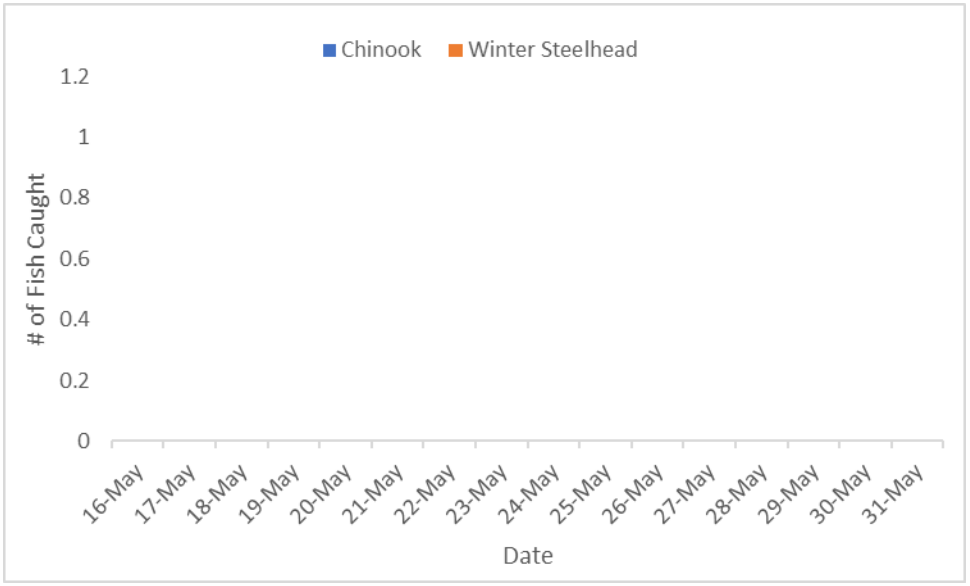


Figure 5. Chinook Captured per day 5/16/2023 to 5/31/2023 (Breitenbush River)

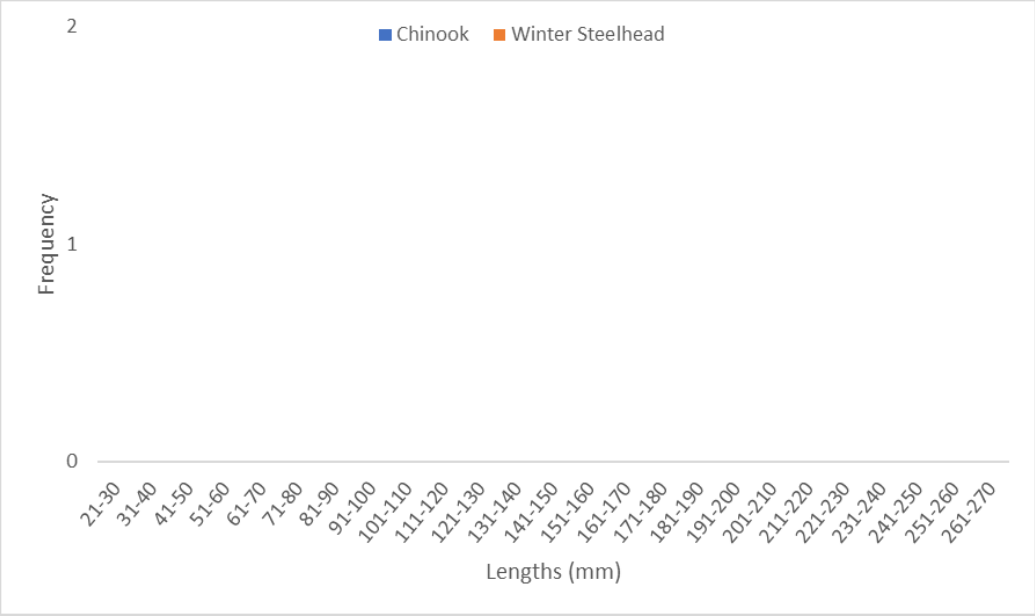


Figure 6. Length Frequency of Juvenile Chinook Sampled Season To-Date (Breitenbush River)

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	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.

May 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	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

No trapping efficiency trials have been performed at this site to date.

Injuries and Copepod Infection

No target species have been captured at this site to date. A summary of injury data for fish captured during this reporting period are shown 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	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

No target fish were captured during this reporting period.

PIT Tags

No fish were PIT tagged during this reporting period.

Non-Target Species

No 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
Sculpin	0	0	0	0
Totals	**0**	**0**	**0**	**0**

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 1,050.0 cfs to 1,930.0 (mean: 1,526.0 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.

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

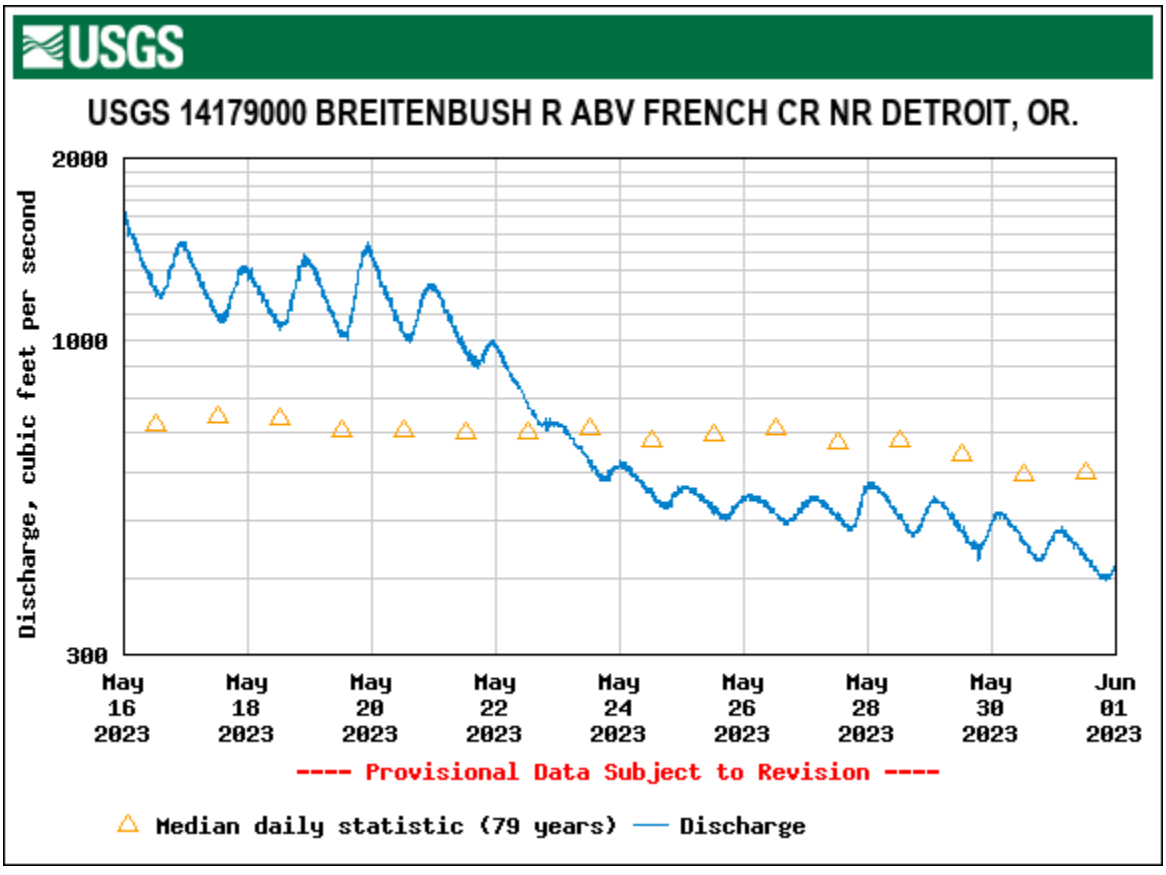


Figure 7. Discharge (cfs); Breitenbush River

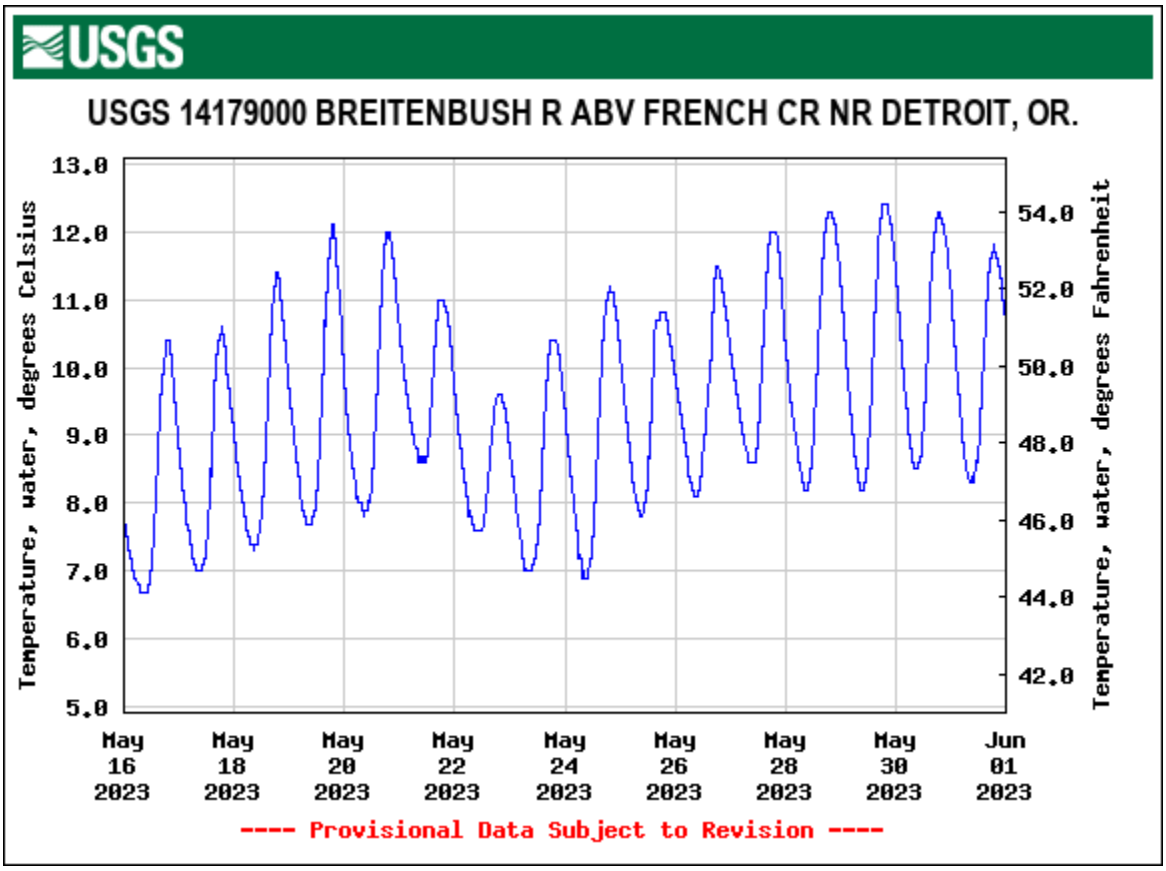


Figure 8. Temperature at RST (Breitenbush River)

*Note: Temperature data was supplemented from USGS gage 14179000 as the trap is not yet deployed nor is a temperature probe.

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.

Target Species

This reporting period began on May 16th and ended on May 31st. There were a total of 4,751 Chinook Salmon (CHS) and 337 Winter Steelhead (STW) captured during the 16-day sampling period (Figure 9). Sampling duration was 93.8% of the reporting period for the RST. The RST was raised into the non-sampling position on May 30th to allow for hatchery O. mykiss released at the trapping site to disperse. The RST was lowered into the sampling position again on May 31st. 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.

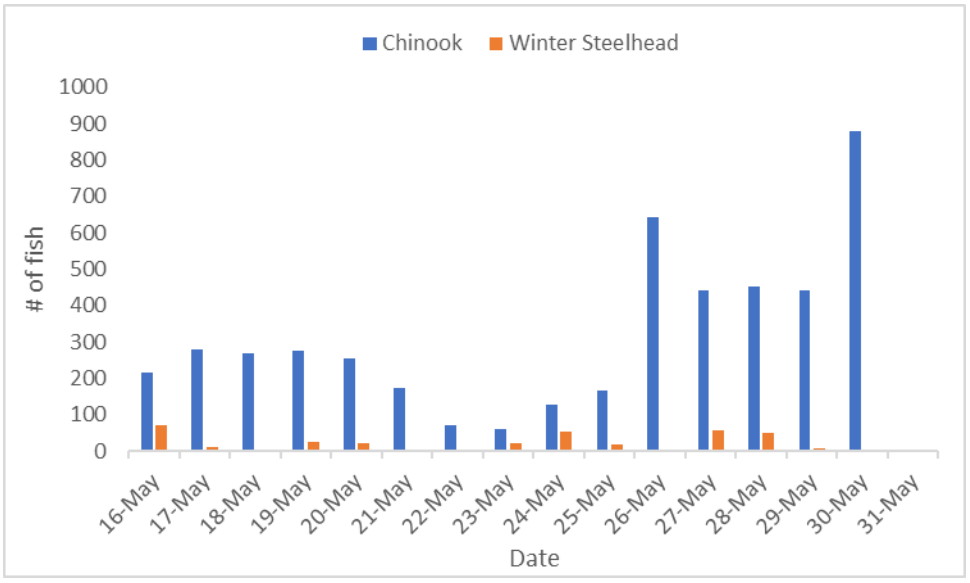


Figure 9. Chinook and Winter Steelhead Captured per day 05/16/2023 to 05/31/2023 (Detroit Head of Reservoir)

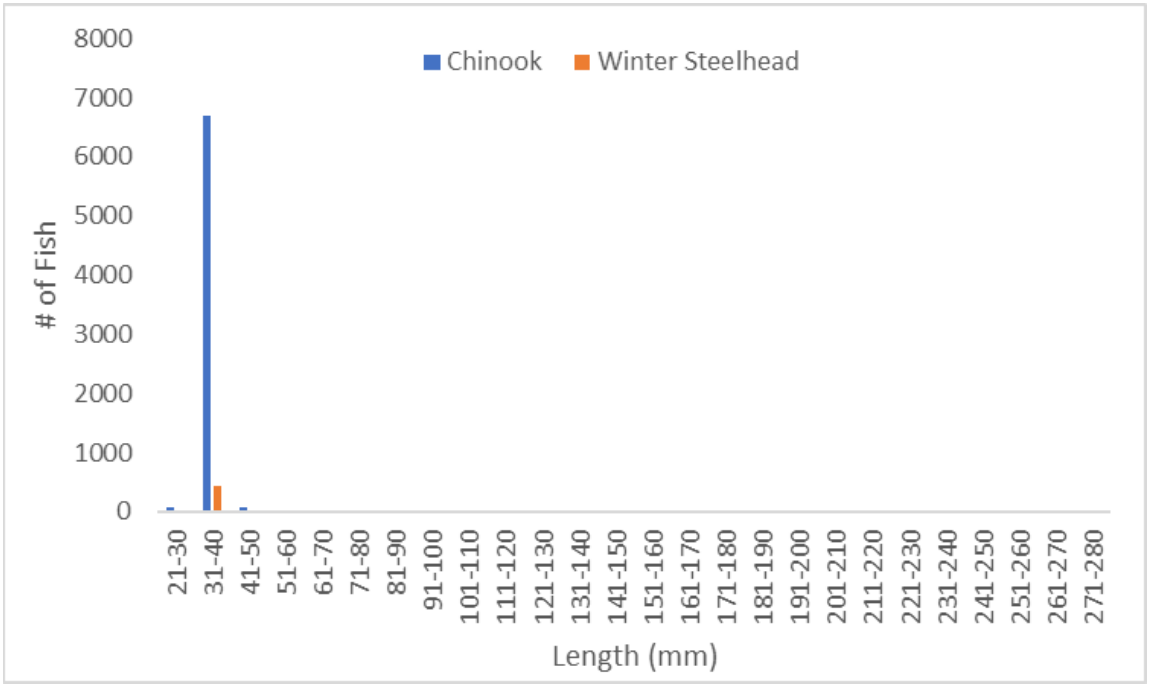


Figure 10. Length Frequency of Juvenile Chinook and Winter Steelhead Sampled Season To-Date (Detroit Head of Reservoir)

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	6848	29	50	34.9	N/A	N/A	N/A	
		CHS	Parr	1	61	61	61	2.6	2.6	2.6	
		CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A	
		STW	Fry	448	30	46	35.5	N/A	N/A	N/A	
		STW	Parr	2	62	91	76.5	2.3	9.8	6.1	
		STW	Smolt	1	188	188	188	66.5	66.5	66.5	

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

May 16-31, 2023											
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*			
					Min	Max	Mean	Min	Max	Mean	
Detroit HOR	5ft	CHS	Fry	4,750	29	50	35.0	N/A	N/A	N/A	
		CHS	Parr	1	61	61	61	2.6	2.6	2.6	
		CHS	Smolt	0	N/A	N/A	N/A	N/A	N/A	N/A	
		STW	Fry	334	30	46	35.8	N/A	N/A	N/A	
		STW	Parr	2	62	91	76.5	2.3	9.8	6.1	
		STW	Smolt	1	188	188	188	66.5	66.5	66.5	

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

Trapping Efficiency

Trapping Efficiency has yet to be conducted at the Detroit Head of Reservoir RST since its installation.

Injuries and Copepod Infection

Partial descaling <20% was observed in 12 of the 4,751 Chinook captured (0.25%), 5 displayed descaling >20% (0.11%), 139 displayed body injury (2.9%), 7 had eye injury (0.15%), 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 18 mortalities (0.38%).

Partial descaling <20% was observed on 2 of the 337 Winter Steelhead captured (0.59%) and 4 displayed descaling >20% (1.2%), 15 displayed body injury (4.5%), 4 had eye injury (1.2%), 0 had copepods present in the branchial cavity (0.0%) and 0 had copepods on fins (0.0%). 1 Winter Steelhead displayed gas bubble disease (Level 3) (0.30%). There were 5 mortalities (1.5%). Injury data is summarized in 8.

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	4,751	12	5	139	7	0	0	18
	Winter Steelhead	337	2	4	15	4	0	0	5

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

Collected DNA and Scale Samples

For the reporting period, DNA was collected from 8 Spring Chinook and 4 Winter Steelhead. Scales were collected from 3 spring chinook and 3 O. mykiss. The other targets captured did not meet length criteria for scales or DNA.

PIT Tags

2 O. mykiss caught in the RST were PIT tagged during this reporting period. The rest of the fish captured were too small to PIT tag.

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 and locations are changed every month to distinctly mark groups of fish by capture date. Since then, 3,589 Chinook and 297 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

Non-Target Species

69 non-target species fish were captured during the reporting period; the data is summarized below in 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	62	1	75	1
Cutthroat Trout	0	0	1	0
Sculpin	4	1	5	1
Mountain Whitefish	1	0	1	0
Dace	1	0	1	0
Unknown	1	1	1	1
Totals	**69**	**3**	**84**	**3**

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 1,920.0 cfs to 3,090.0 cfs (mean: 2,547.3 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	4,751	337
Effort (hrs)	357.4	357.4
CPUE (fish/hr)	13.293	0.943

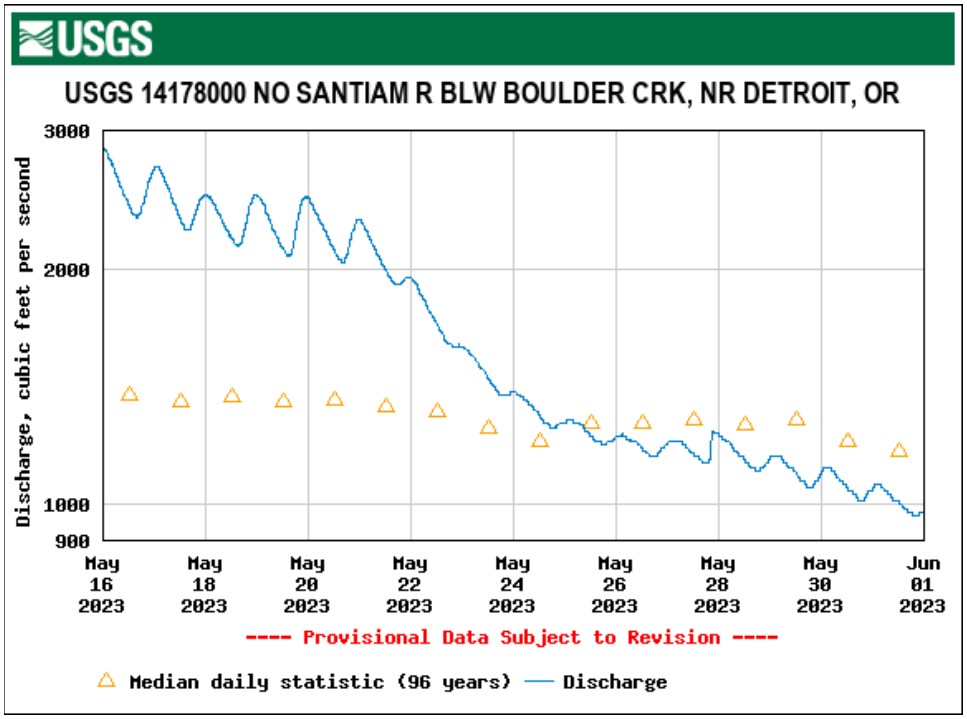


Figure 11. Discharge (cfs); Detroit Head of Reservoir – North Santiam River

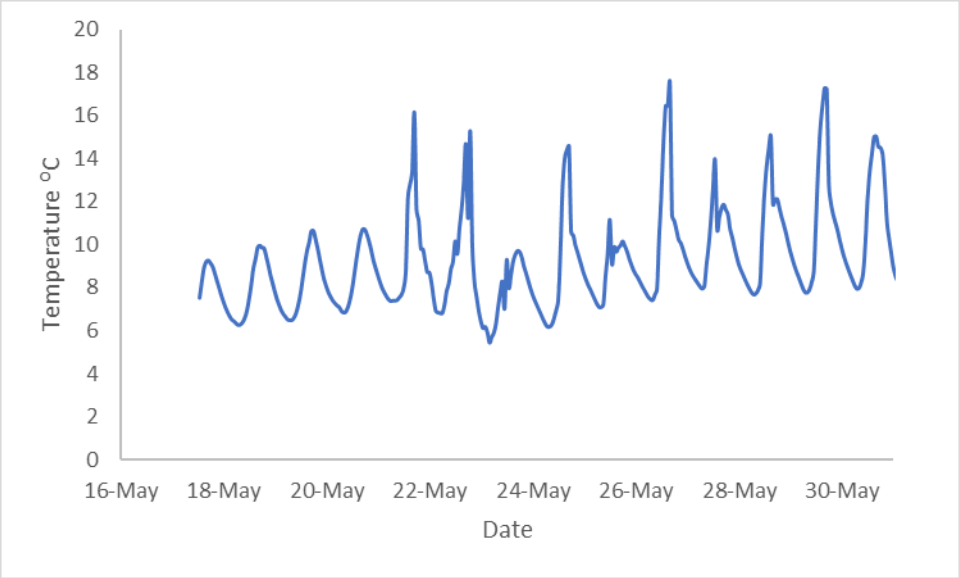


Figure 12. Temperature at RST (Detroit Head of Reservoir – North Santiam River)

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 May 16th and ended on May 31st. There was a total of 1 Chinook Salmon (CHS) and 0 Winter Steelhead (STW) captured during the 16-day sampling period (Figure 13). Sampling duration was 100.0% 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.

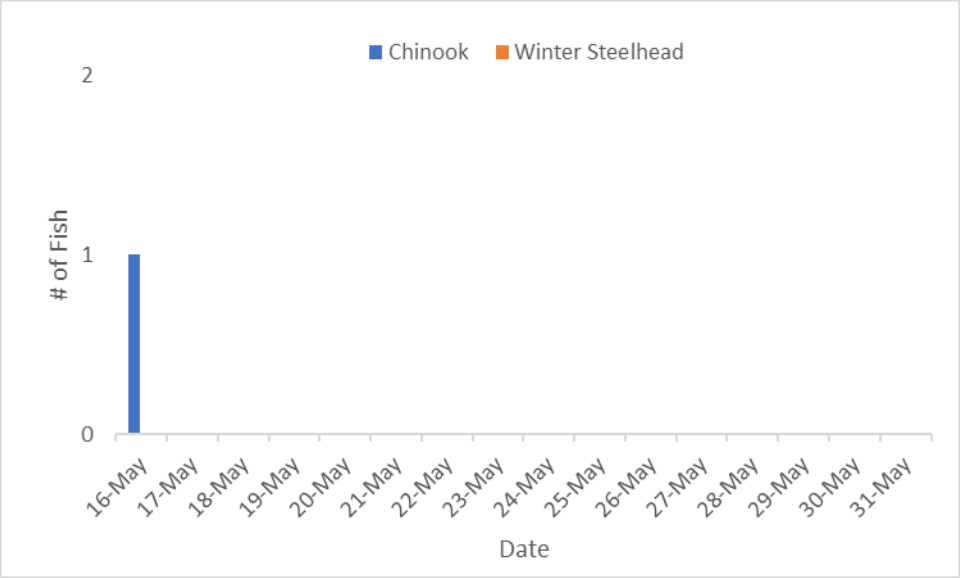


Figure 13. Chinook Captured per day 5/16/2023 to 5/31/2023 (Green Peter Head of Reservoir – Middle Santiam River)

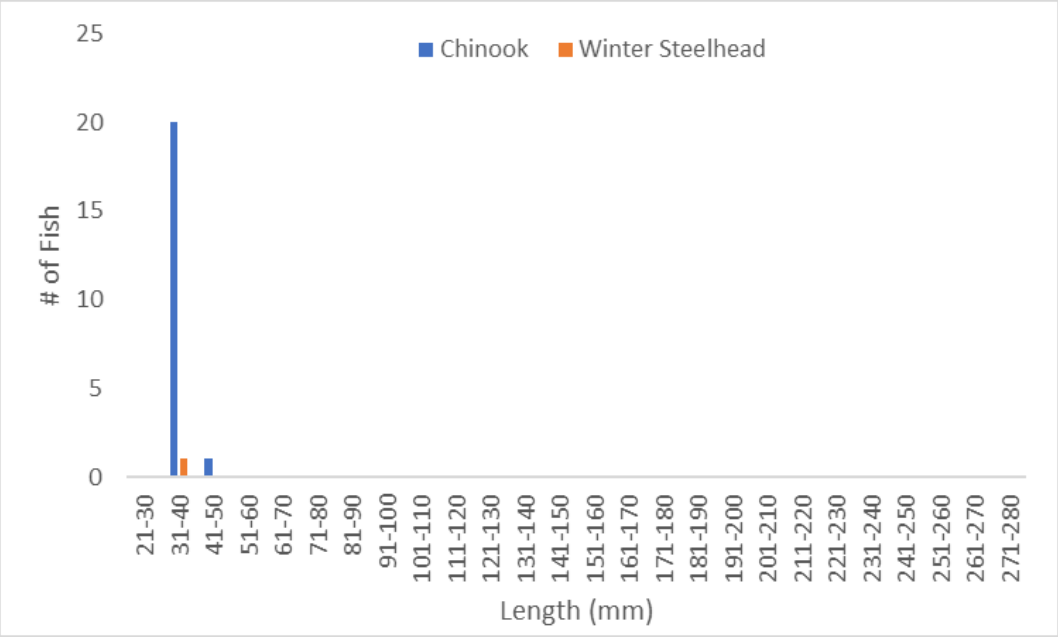


Figure 14. Length Frequency of Juvenile Chinook Sampled Season To-Date (Green Peter Head of Reservoir – Middle Santiam River)

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.

May 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	1	38	38	38	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.

Trapping Efficiency

Trapping Efficiency has yet to be conducted at the Green Peter Head of Reservoir – Middle Santiam River RST since it began fishing on May 4th, 2023.

Injuries and Copepod Infection

Partial descaling <20% was observed in 0 of the 1 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 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	1	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. The other targets captured did not meet length criteria for DNA sampling or were too descaled/damaged to collect samples.

PIT Tags

No Spring Chinook or 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

Visual 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

3 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	2	0	2	0
Sculpin	1	0	1	0
Totals	**3**	**0**	**8**	**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 4.0 ft to 5.2 ft (mean: 4.5 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	1	0
Effort (hrs)	383.8	383.8
CPUE (fish/hr)	0.003	0.000

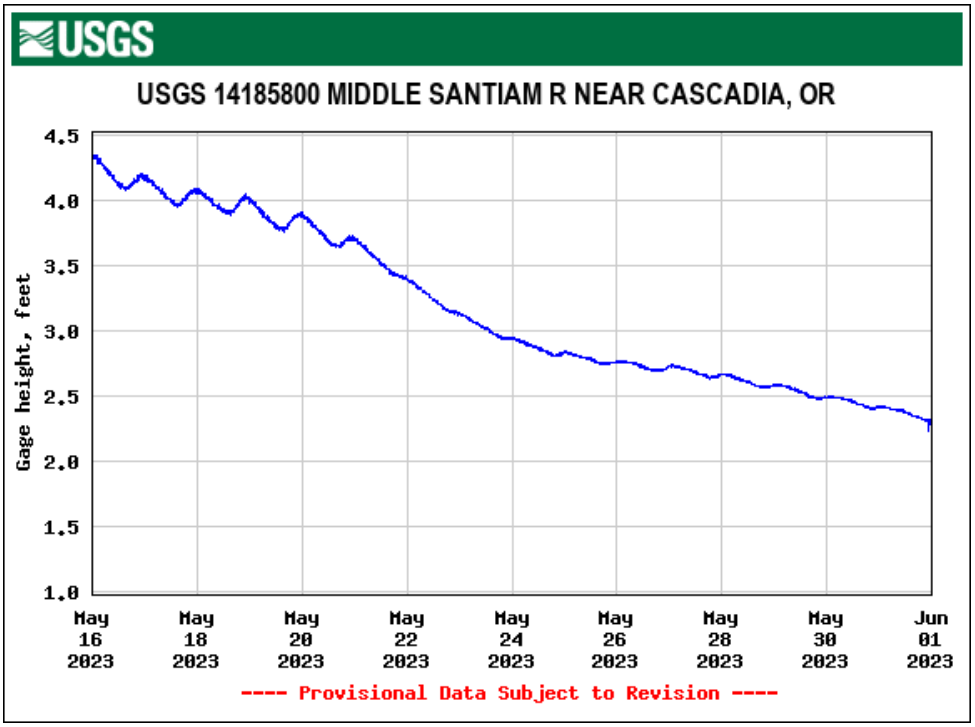


Figure 15. Gage Height (feet); Green Peter Head of Reservoir – Middle Santiam River

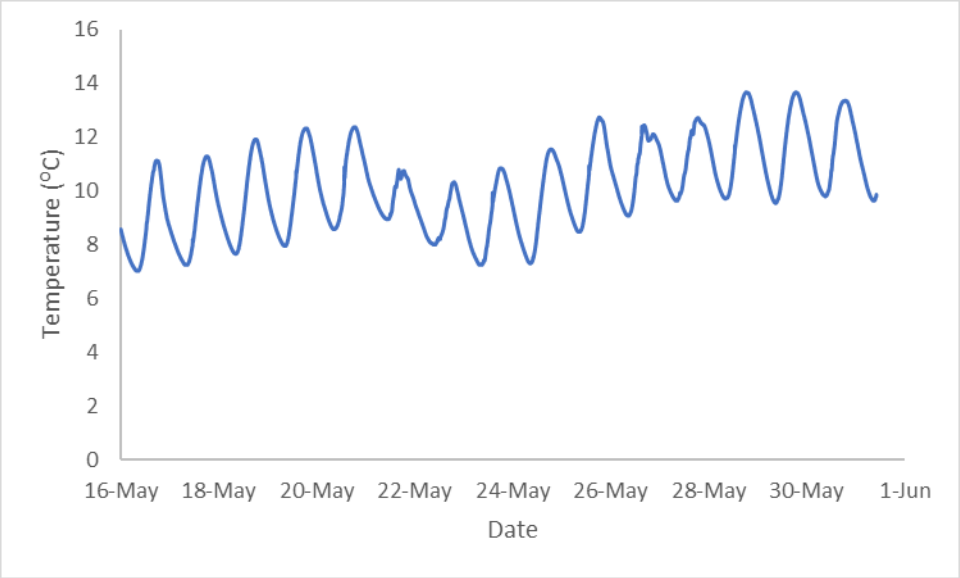


Figure 16. Temperature at RST (Green Peter Head of Reservoir – Middle Santiam River)

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.

Target Species

This reporting period began on May 16th and ended on May 31st. There were a total of 20 Chinook Salmon captured during the 16-day sampling period (Figure 17). Sampling duration was 100% of the reporting period for the RST. Figure 18 shows length frequency data to-date. 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.

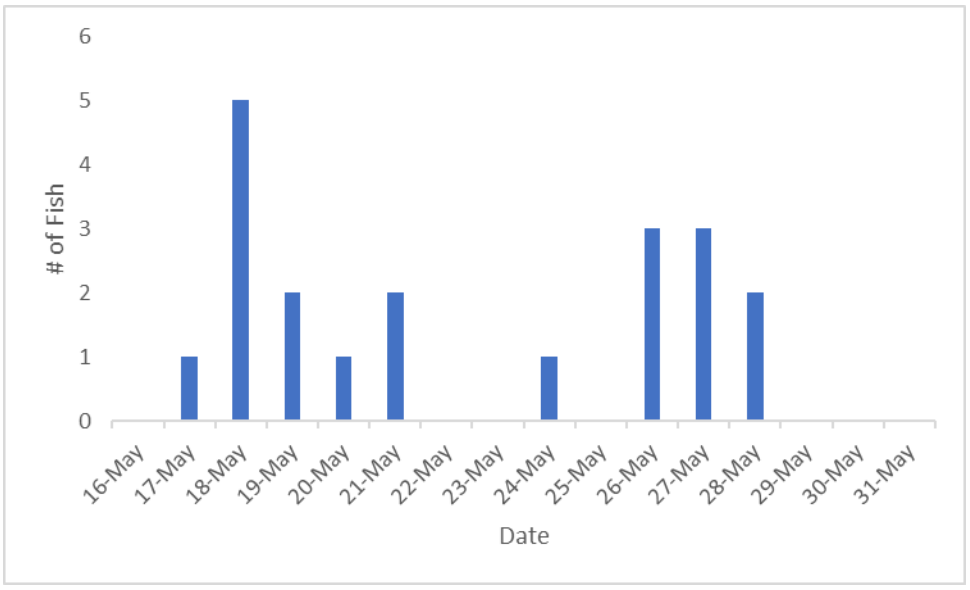


Figure 17. Chinook Captured per day 05/16/2023 to 05/31/2023 (Hills Creek Head of Reservoir)

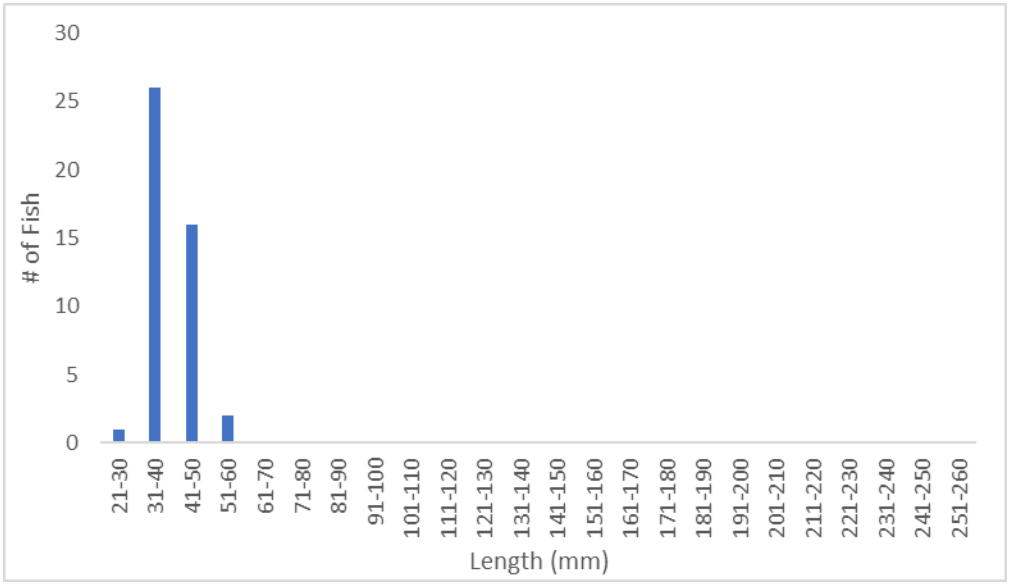


Figure 18. Length Frequency of Juvenile Chinook Sampled Season To-Date (Hills Creek Head of Reservoir)

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	38	30	50	38.2	<1	1.3	1.2
		CHS	Parr	7	44	57	49	1.2	4.1	1.9
		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.**

May 16-31, 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	14	30	50	40.9	<1	1.3	1.2
		CHS	Parr	6	44	55	47.7	1.2	4.1	1.9
		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
8ft Trap	519	44	8.5% (44/519)

Injuries and Copepod Infection

20 Chinook were captured for the reporting period. Of the fish captured, partial descaling <20% was observed on 1 fish (5.0%) and descaling >20% was observed on 0 fish (0.0%). 1 fish had bodily injury (5.0%). 0 fish displayed eye injuries (0.0%). 0 fish had copepods in the branchial cavity (0.0%), 0 had

copepods on fins (0.0%). There were 0 mortalities for this reporting period (0.0%). Injury data for the reporting period is summarized in Table 17. To date injury data can be found in Appendix A.

Table 17. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon and Winter Steelhead for Sampling Period (Hills Creek Head of Reservoir).

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

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

Collected DNA and Scale Samples

DNA was collected from 11 of the Chinook captured and scales were collected from 1 of the Chinook captured. The rest of the captured fish were under the minimum fork length threshold and samples were not collected.

PIT Tags

No Spring Chinook were PIT tagged during this reporting period. The 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 Hills Creek Head of Reservoir site on 5/10/2023. VIE tag color and locations are changed every month to distinctly mark groups of fish by capture date. Since then, 32 Chinook 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	Tag Location	VIE Color	# Tagged	# Recaptured to Date
5/1/2023-5/15/2023	Left Dorsal	Orange	6	0
5/1/2023-5/15/2023	Right Dorsal*	Orange	9	0
5/16/2023-5/31/2023	Left Dorsal	Orange	15	0
5/16/2023-5/31/2023	Right Dorsal*	Orange	2	0

*Denotes fish marked at incorrect location for that period.

Non-Target Species

71 non-target species fish were captured during the reporting period; the data is summarized below in Table 18.

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

Species	5 ft Capture	5 ft Mortality	Season Total	Season Total Mortality
Dace	29	0	45	0
Cutthroat Trout	1	0	2	0
O. mykiss	4	0	4	0
Bull Trout	1	0	1	0
Brook Lamprey	2	0	2	0
Sculpin	6	0	10	1
Largescale Sucker	24	0	58	1
Redside Shiner	4	0	10	0
Totals	**71**	**0**	**126**	**2**

Stream Statistics

Basic stream statistics at the Hills Creek Head of Reservoir site were calculated from data downloaded from the U.S. Geological Survey stream gauge number 14144800. Gauge height (feet) is the only flow metric available at this gauge. During the reporting period, daily maximum values for gage height ranged from 10.2 ft to 12.0 ft (mean: 10.9 ft). Figure 20 shows gage height.

Stream temperatures were recorded every 2 hours for the length of the report period for the RST (Figure 21). Temperature probes for the trap operated normally throughout this reporting period.

Catch per unit of effort (CPUE) data are summarized in Table 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, Hills Creek Head of Reservoir.

	Chinook
Description	**5 ft**
Catch	20
Effort (hrs)	382.6
CPUE (fish/hr)	0.052

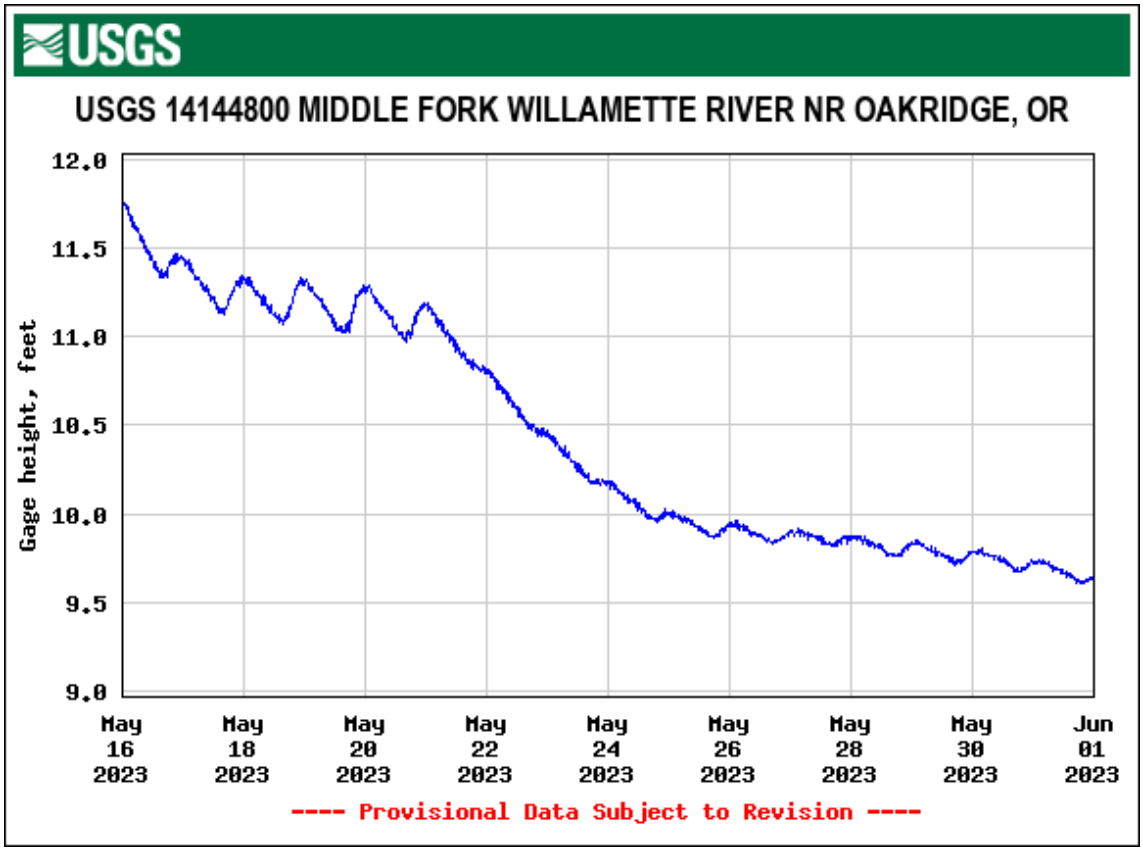


Figure 20. Gage Height (feet); Hills Creek Head of Reservoir, Near Oakridge, OR

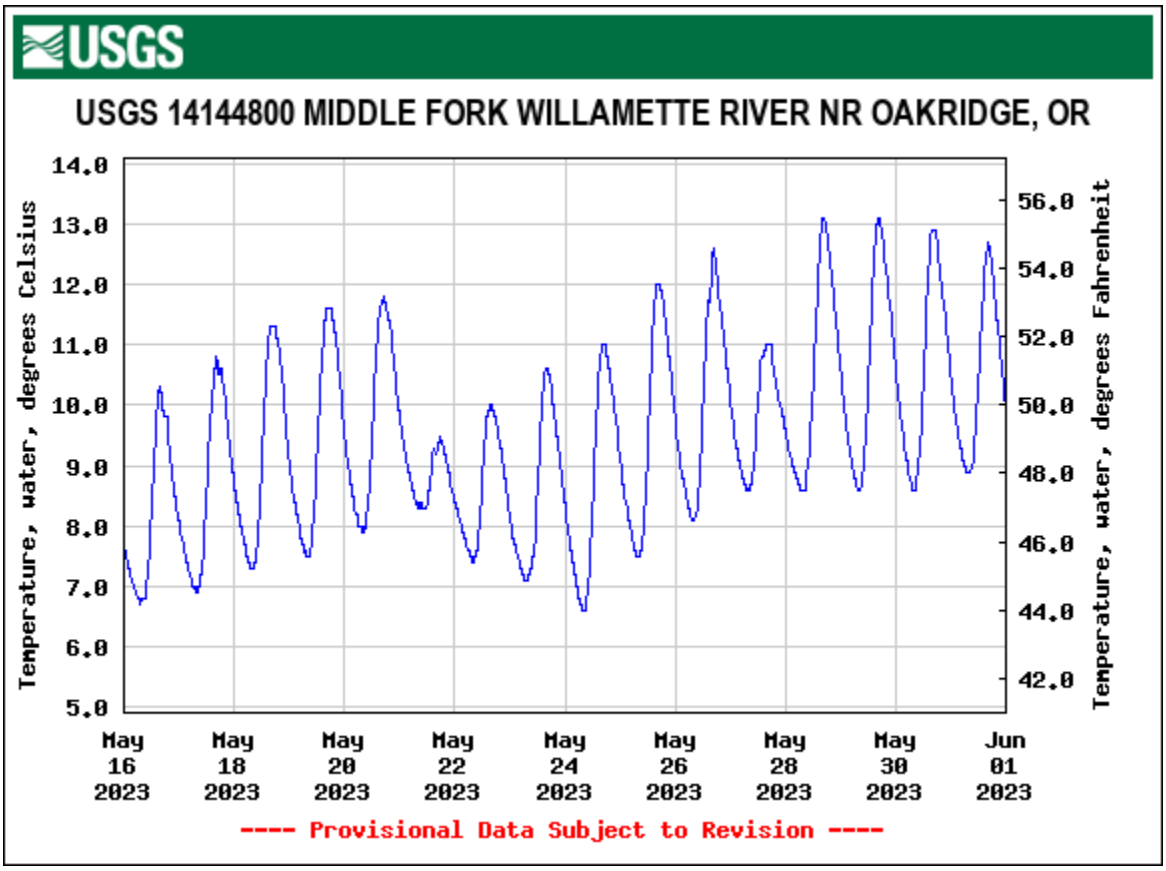


Figure 21. Temperature at RST (Hills Creek Head of Reservoir)

*Note: The temperature logger faulted during the reporting period, temperature for the reporting period was provided from USGS stream gage 14144800

Issues Encountered

Hatchery O. mykiss were released in close proximity to the RST at Detroit Head of Reservoir- North Santiam site. The cone was raised to allow the released O. mykiss to disperse and prevent predation on captured fry in the RST.

Upcoming USACE Support Services

None at this time.

Appendix A

Chinook (CHS) To-Date

Chinook Injuries to Date

Site/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
Detroit HOR	6849		13		11				6	7	41				16		54	22	37	22	42	4	
5 ft	6849	1	13		11				6	7	41				16		54	22	37	22	42	4	
Fry	6848	1	13		11				6	7	40				16		54	22	37	22	42	4	
Parr	1										1												
Green Peter HOR	21										1						1						
5 ft	21										1						1						
Fry	21										1						1						
Hills Creek HOR	45		2							1													
5 ft	45		2							1													
Fry	38		1																				
Parr	7		1							1													

Chinook (CHS) During Reporting Period

Chinook Injuries During the Reporting Period (5/16/23 to 5/31/23)

Site/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
Detroit HOR	4751		12		7				5	7	37				16		53	17	22	17	25	4	
5 ft	4751		12		7				5	7	37				16		53	17	22	17	25	4	
Fry	4750		12		7				5	7	36				16		53	17	22	17	25	4	
Parr	1										1												
Green Peter HOR	1																						
5 ft	1																						
Fry	1																						
Hills Creek HOR	20		1							1													
5 ft	20		1							1													
Fry	14																						
Parr	6		1							1													

Steelhead (O. mykiss) To Date

O. mykiss Injuries to Date

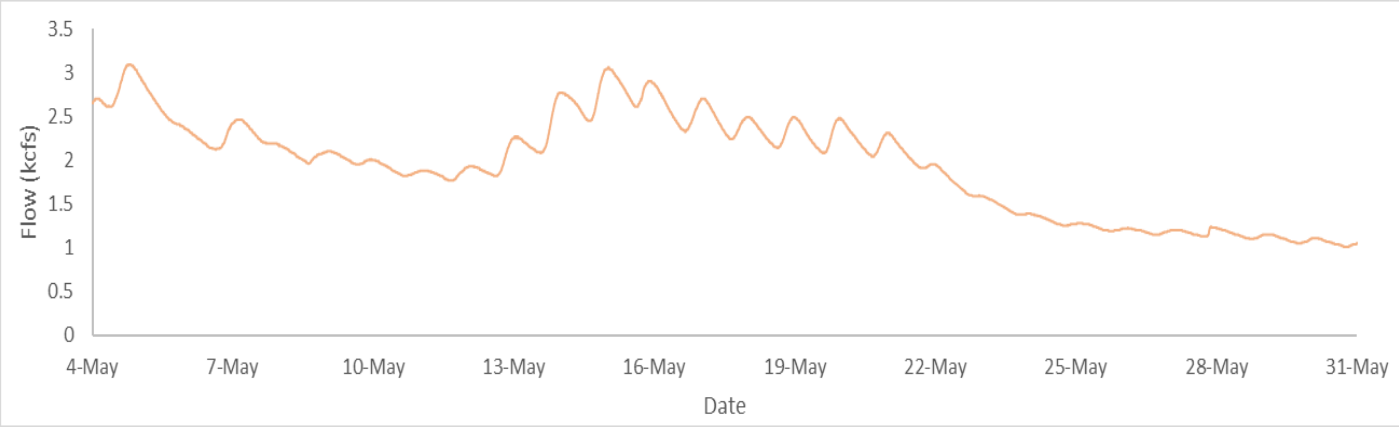
Site/Life Stage	# Total Fish	#MUNK	#DS<2	#BLO	#EYB	#FUN	#BKD	#COP	#DS>2	#PRD	#FID	#HBO	#BO	#HO	#BVT	#HBP	#BRU	#TEA	#OPD	#HIN	#FVB	#POP	#GBD
Detroit HOR	451	1	2		5				4	1	6				1		5	1	4	4	1	1	1
5 ft	451	1	2		5				4	1	6				1		5	1	4	4	1	1	1
Fry	448	1	2		5				3		5				1		5	1	4	4	1	1	1
Parr	2										1												
Smolt	1								1	1													
Green Peter HOR	1																						
5 ft	1																						
Fry	1																						

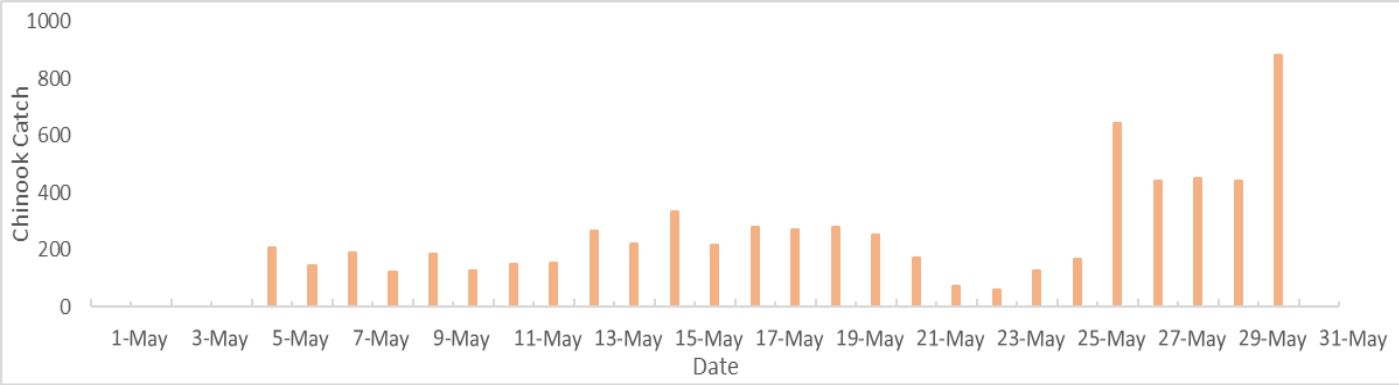
Steelhead (O. mykiss) During Reporting Period

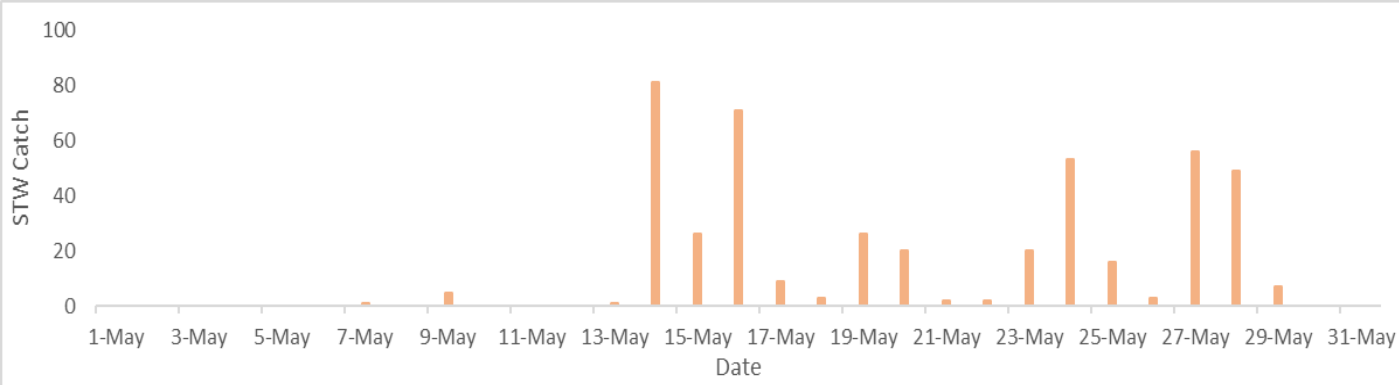
O. mykiss Injuries During Reporting Period (5/16/23 to 5/31/23)																									
Site/Life Stage	# Total Fish	#MUNK	#DS<2	#BLO	#EYB	#FUN	#BKD	#COP	#DS>2	#PRD	#FID	#HBO	#BO	#HO	#BVT	#HBP	#BRU	#TEA	#OPD	#HIN	#FVB	#POP	#GBD
Detroit HOR	337	1	2		4				4	1	6						5	1	3	4		1	1
5 ft	337	1	2		4				4	1	6						5	1	3	4		1	1
Fry	334	1	2		4				3		5						5	1	3	4		1	1
Parr	2										1												
Smolt	1								1	1													

Appendix B

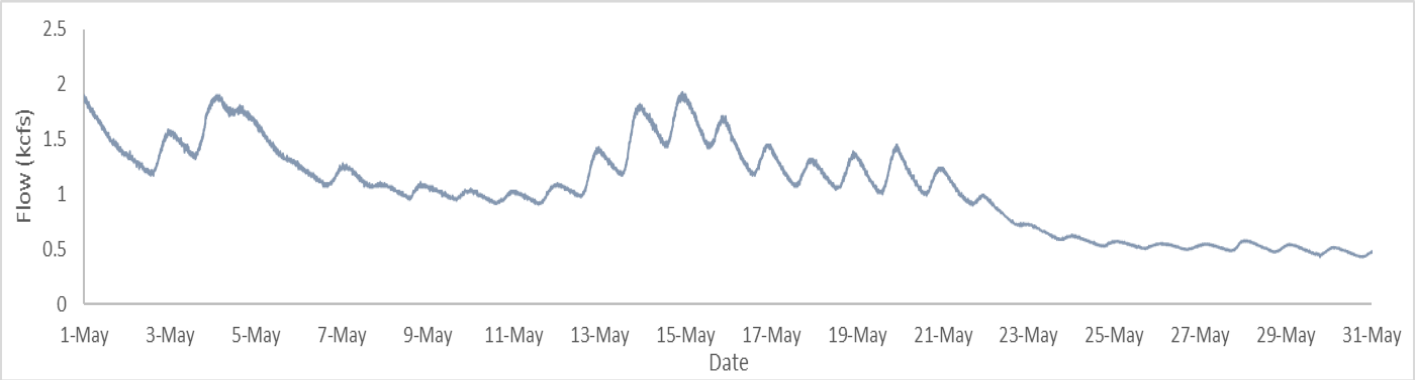
Detroit Head of Reservoir-North Santiam River Operational and Capture Data Since Start of Monitoring

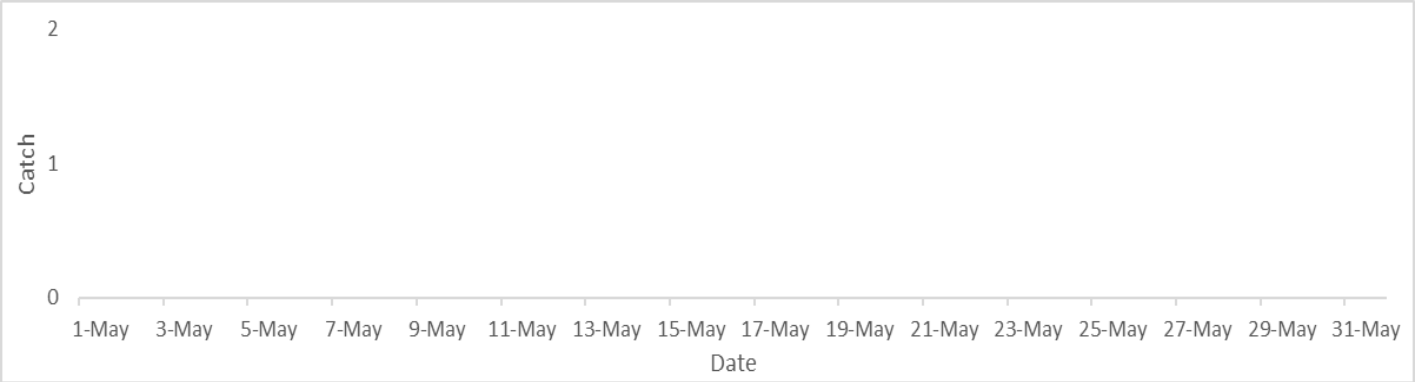




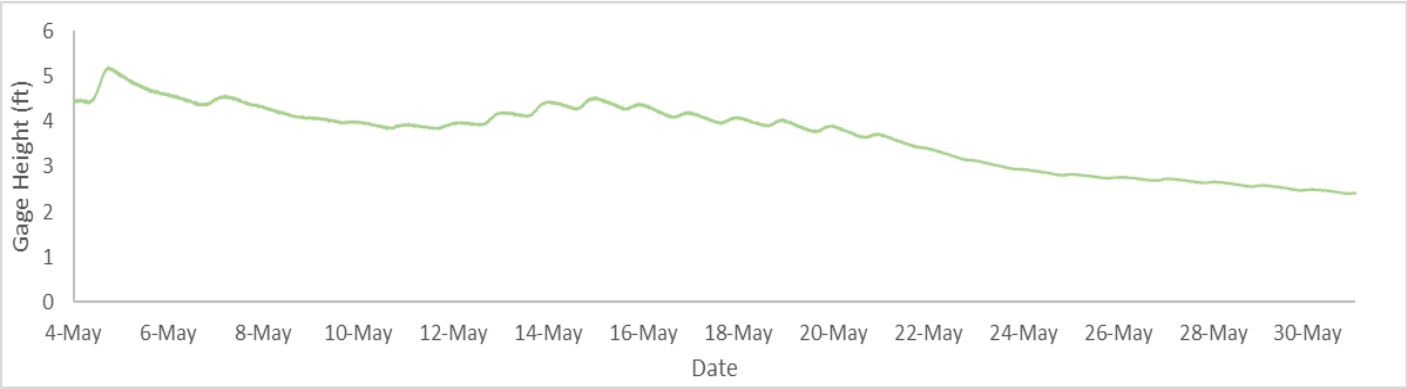


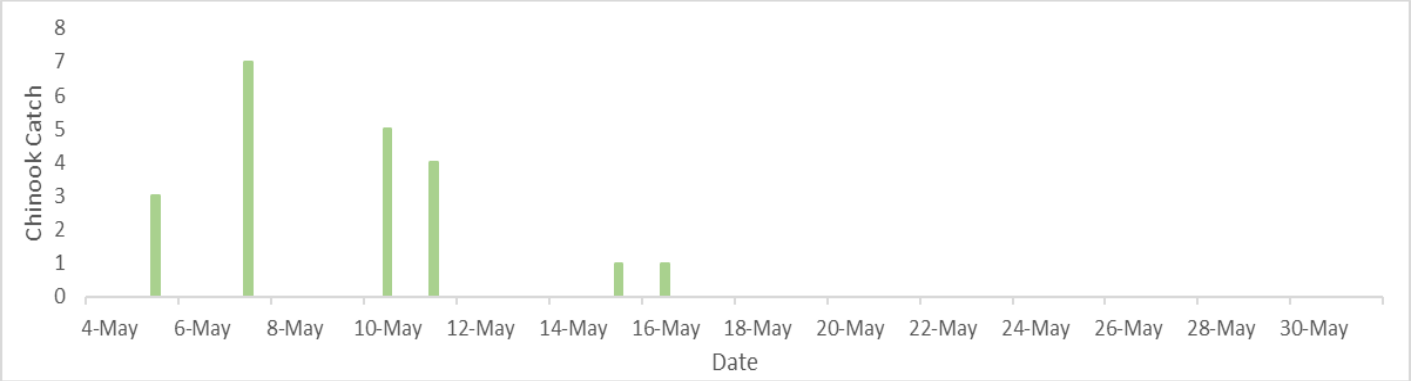
Breitenbush River Operational and Capture Data Since Start of Monitoring



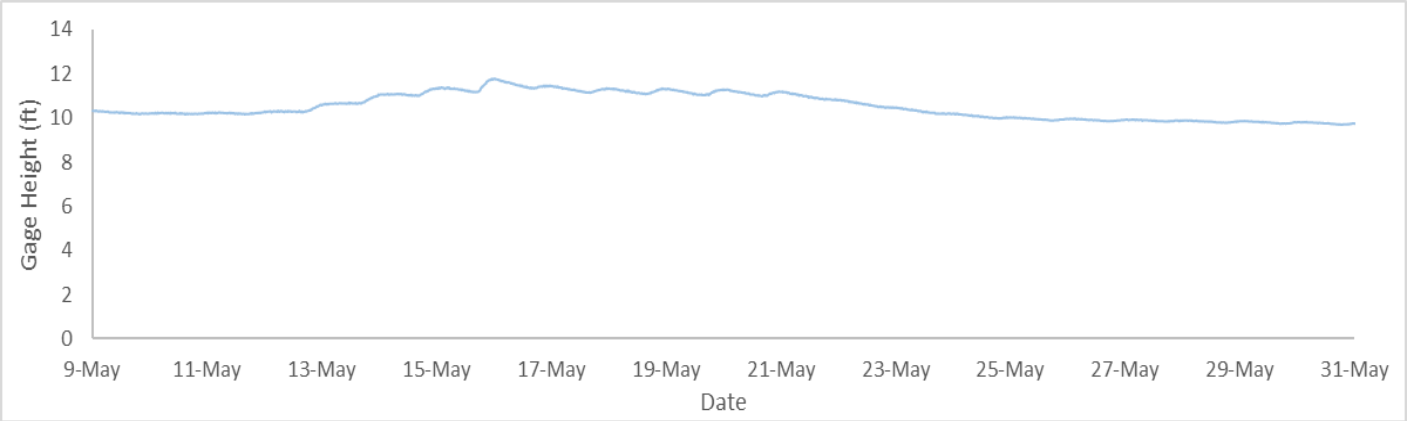


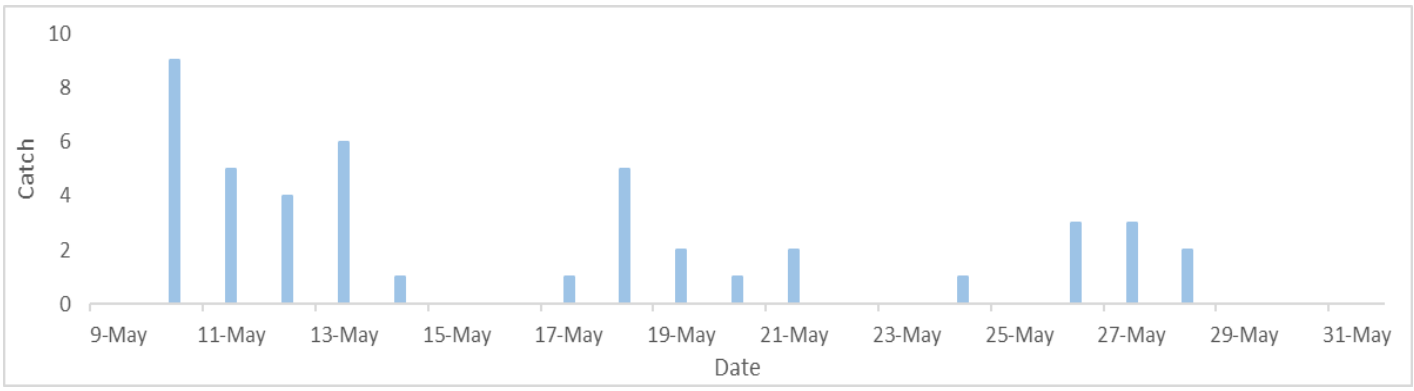
Green Peter Head of Reservoir-Middle Santiam River Operational and Capture Data Since Start of Monitoring





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




10
8
6
4
2
0
Catch
9-May
11-May
13-May
15-May
17-May
19-May
21-May
23-May
25-May
27-May
29-May
31-May
Date

Appendix C

Summary of PIT Tagged Fish for Reporting Period

Site	Trap	# of PIT Tagged Fish
Detroit Head of Reservoir- North Santiam River	5 ft	2

Summary of Captured Fish Containing PIT Tags This Season

Site	Trap	# of PIT Tagged Fish
N/A	N/A	N/A

Summary of EAS VIE Marked Fish for Reporting Period

Site	Trap	VIE Mark Code	Species	# VIE
Detroit Head of Reservoir – North Santiam River	5 ft	RDO	Chinook	2,700
Detroit Head of Reservoir – North Santiam River	5 ft	RDO	O. mykiss	237
Green Peter Head of Reservoir – Middle Santiam River	5 ft	RDO	Chinook	1
Green Peter Head of Reservoir – Middle Santiam River	5 ft	RDO	O. mykiss	0
Hills Creek Head of Reservoir	5 ft	LDO	Chinook	13
Hills Creek Head of Reservoir	5 ft	RDO*	Chinook	2

RDO denotes location and color (Right Dorsal Orange)

**2 fish were accidentally tagged in the wrong location*

List of EAS PIT Tagged Fish for Reporting Period

Site	Trap	PIT Tag	Date	Species
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BEE0C2E	5/23/2023	O. mykiss
Detroit Head of Reservoir- North Santiam River	5 ft	3DD.003BEE0C4F	5/24/2023	O. mykiss