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Report Period:	January 16 to January 31, 2022
Report No.:	2022 Willamette RST Bi-Weekly Report 01/16 – 01/31 by EAS
Re:	**WILLAMETTE VALLEY FISH PASSAGE MONITORING VIA ROTARY SCREW TRAPS**

Project Schedule

Table 1. Project Schedule

Site	Task	Start	End	Days
Hills Creek RO and PWR	Deployment	10/12/21	10/12/21	1
Hills Creek RO	Operation	10/21/21	3/15/22	146
Hills Creek PWR	Operation	10/23/21	3/15/22	144
Big Cliff Dam	Trap Efficiency Release (1,000 Fish)	12/22/2021	12/22/2021	1
Hills Creek	Trap Efficiency Release (1,200 fish, 600 per route)	1/6/2022	1/6/2022	1
Cougar Dam	Trap Efficiency Release (1,200 Fish, 600 per route)	1/19/2022	1/19/2022	1
Cougar Dam RST	Operation	12/01/21	12/31/22	396
Big Cliff Dam RST	Operation	12/01/21	2/15/22	292
Big Cliff Dam RST	Operation	3/15/22	10/15/22	
Fall Creek RST	Operation	01/02/22	05/31/22	150

Summary of Rotary Screw Trap Data

Rotary screw traps (RSTs) were operated at four locations in the southern Willamette River watershed: on the Middle Fork Willamette River below Hills Creek Dam (Hills Creek), the South Fork McKenzie River below Cougar Dam (Cougar Dam), the North Santiam River below Big Cliff Dam (Big Cliff) and Fall Creek above Fall Creek reservoir. The locations of the RST's are depicted in Figures 1, 2, 3 and 4 respectively. Sampling sites generally monitor individual routes for fish passage at the dams, including powerhouse (PWR) and regulating outlets (RO) and above reservoir free-flowing streams. Sampling began at the Hills Creek site on October 21, 2021, at the Cougar and Big Cliff sites on December 1, 2021 and Fall Creek on January 13, 2022. Sampling dates and catch summaries are provided in Tables 2 and 3, respectively.

Figure 1. Hills Creek Dam RST Locations

Figure 2. Cougar Dam RST Locations

Figure 3. Big Cliff RST Location

Figure 4. Fall Creek RST Location

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
Hills Creek RO	10/21/2021	1/16/2022	1/31/2022	16	103
Hills Creek PWR	10/21/2021	1/16/2022	1/31/2022	16	103
Cougar RO	12/1/2021	1/16/2022	1/31/2022	16	62
Cougar PWR	12/1/2021	1/16/2022	1/31/2022	16	62
Big Cliff	12/1/2021	1/16/2022	1/31/2022	16	62
Fall Creek	1/13/2022	1/16/2022	1/31/2022	16	19

Table 3. Willamette Valley Rotary Screw Trap Monitoring Catch Summary

Site	Species	Catch (Reporting Period)	Recaptures (Reporting Period)	Total Catch	Total Recaptures
Hills Creek	CHS	13	0	133	38
Cougar	CHS	55	66	164	66
Big Cliff	CHS	22	0	92	39
Fall Creek	CHS	1	0	1	0

Middle Fork Willamette – Hills Creek Dam

Target Species

This reporting period began on January 16 and ended January 31. A total of 13 Chinook salmon (CHS) were captured during the 16-day sampling period (Figure 5). Sampling durations were 100% for both RO RST and Powerhouse RST. Table 4 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Hills Creek site to-date and Figure 5 shows length frequency data to-date.

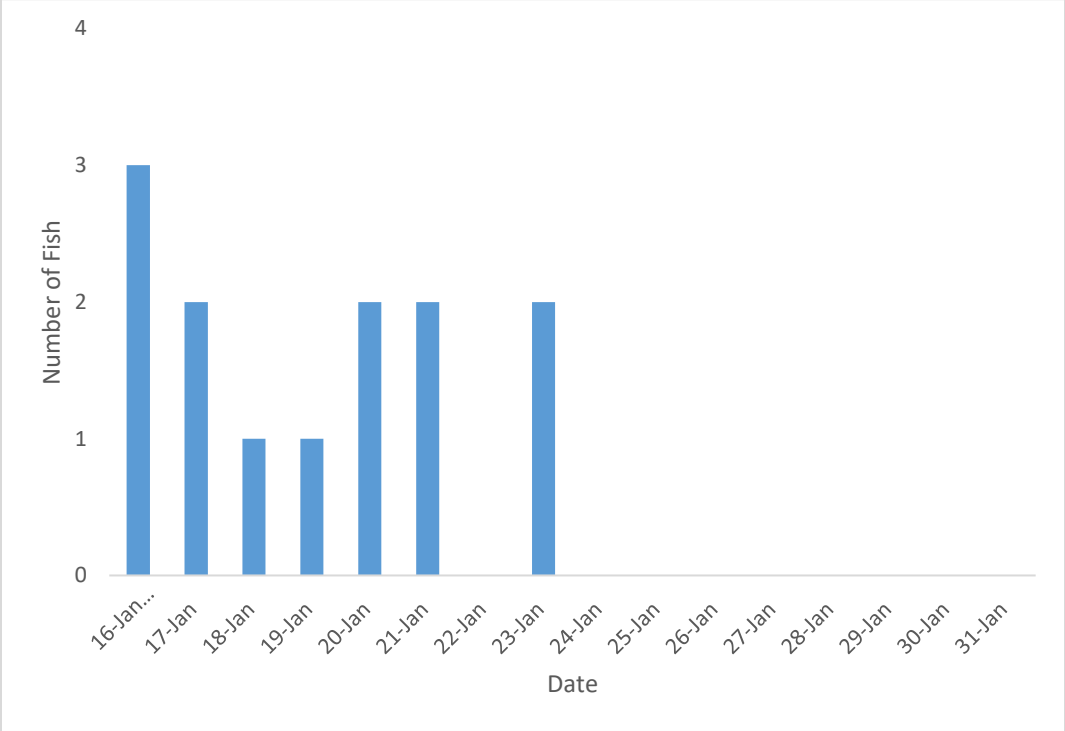

Figure 5. Chinook Captured Per Day 01/16/2022 to 01/31/2022 (Hills Creek)

Table 4. Descriptive Statistics of Target Species Captured at Hills Creek Dam 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
Hills Creek	RO	CHS	Parr	6	90.0	141.0	110.7	7.4	23.4	13.3
		CHS	Smolt	57	137.0	265.0	233.0	27.35	192.3	145.6
Hills Creek	PWR	CHS	Parr	7	69.0	127.0	98.1	3.7	24.5	11.2
		CHS	Smolt	25	128.0	265.0	224.3	26.2	188.7	130.6

January 16-31, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Hills Creek	RO	CHS	Parr	0	N/A	N/A	N/A	N/A	N/A	N/A
		CHS	Smolt	2	247.0	259.0	253.0	158.2	189.6	173.9
Hills Creek	PWR	CHS	Parr	7	69.0	127.0	98.1	3.7	24.5	11.2
		CHS	Smolt	4	128.0	254.0	204.7	26.2	186.1	115.3

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

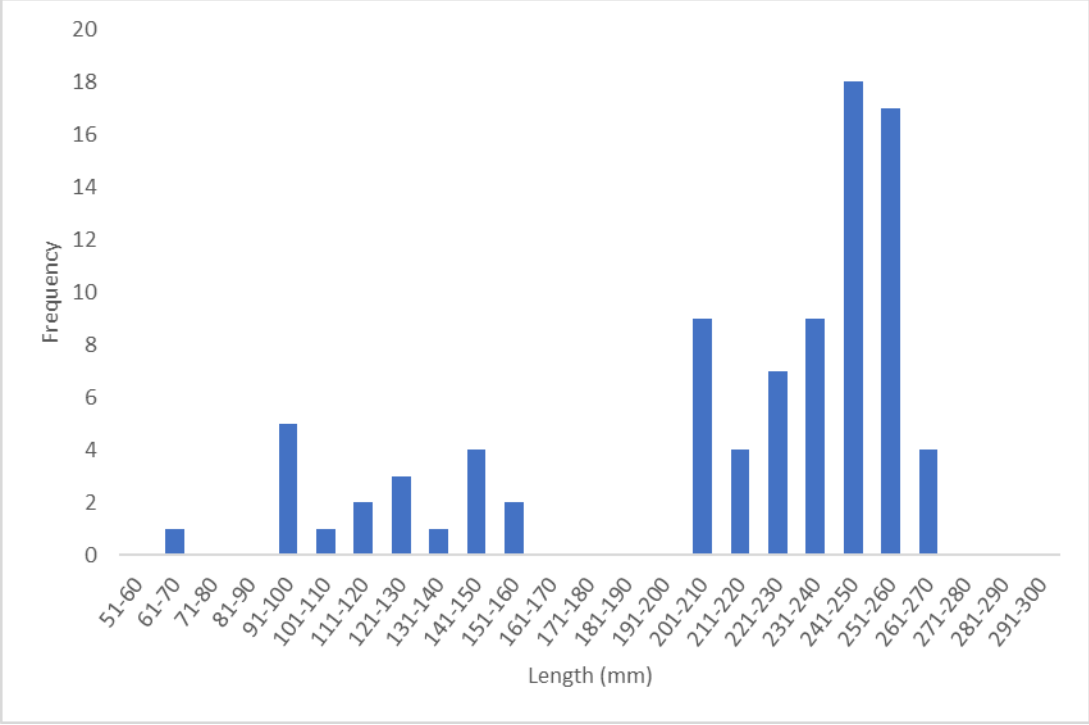

*Figure does not include fish without heads

Figure 6. Length Frequency of Juvenile Chinook Sampled Season To-Date (Hills Creek)

Injuries and Copepod Infection

Partial descaling <20% was observed on 1 of 2 Chinook collected at the RO RST (50%), and 5 of 11 Chinook collected at the PWR RST (45.5%). Descaling >20% was observed on 1 of 2 Chinook collected at the RO RST (50%), and 4 of 11 Chinook collected at the PWR RST (36.4%). 5 of 13 Chinook collected during this reporting period had copepods present (38.5%). Of the 13 Chinook captured, 2 displayed eye injuries. There was 1 Chinook mortality collected in the RO RST, and 5 collected in the PWR RST (Table 5). A summary of injuries observed during the reporting period, and for the duration of the season are provided in Appendix A.

Table 5. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Hills Creek)

Site	Route	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Hills Creek	RO	2	1	1	0	0	2	2	1
Hills Creek	PWR	11	5	4	0	2	3	2	5

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

Non-Target Species

A total of 20 non-target fish were captured at Hills Creek during the reporting period; the data is summarized below in Table 6.

Table 6. Summary of Non-target Species (Hills Creek).

Species	RO Capture	RO Mortality	PWR Capture	PWR Mortality	Season Total	Season Total Mortality
Bluegill	0	0	2	1	52	27
Brook Lamprey	0	0	0	0	1	0
Bullhead	0	0	0	0	1	0
Bull Trout	0	0	0	0	1	0
Crappie	0	0	1	1	55	40
Longnose Dace	0	0	0	0	2	0
Red-Sided Shiner	1	0	0	0	18	2
Sculpin	0	0	4	0	39	0
Spotted Bass	0	0	0	0	6	1
Sucker	0	0	0	0	2	1
Whitefish	0	0	0	0	1	1
O. mykiss	4	4	8	3	64	22
Totals	**5**	**4**	**15**	**5**	**242**	**94**

Stream Statistics

Basic stream statistics at the Hills Creek site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14145110. Gage height (feet) is the only metric provided at this gage. During the reporting period, daily maximum values for instantaneous gage height ranged from 1,224.0 feet to 1,227.56 feet (mean: 1,226.0 feet). Figure 7 shows instantaneous gage height.

Stream temperatures were recorded every 2 hours for the both the RO RST and the PWR RST (Figures 8 and 9). Temperature probes operated normally throughout this reporting period.

The PWR had no recorded flow from 0900 on 25-Jan through 2300 on 27-Jan due to maintenance on the clamshell for trashrack debris removal. During this period, the PH trap was not spinning. Flows through the PWR and RO during the reporting period averaged 821 and 737.6 cubic feet per second (cfs) respectively (Figure 10). Catch per unit of effort (CPUE) data are summarized in Table 7. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 7. Summary of Chinook CPUE, Hills Creek.

	Chinook	
Description	**RO (5ft)**	**PWR(8ft)**
Catch	2	11
Effort (hrs)	384.73	360.88
CPUE (fish/hr)	0.005	0.03

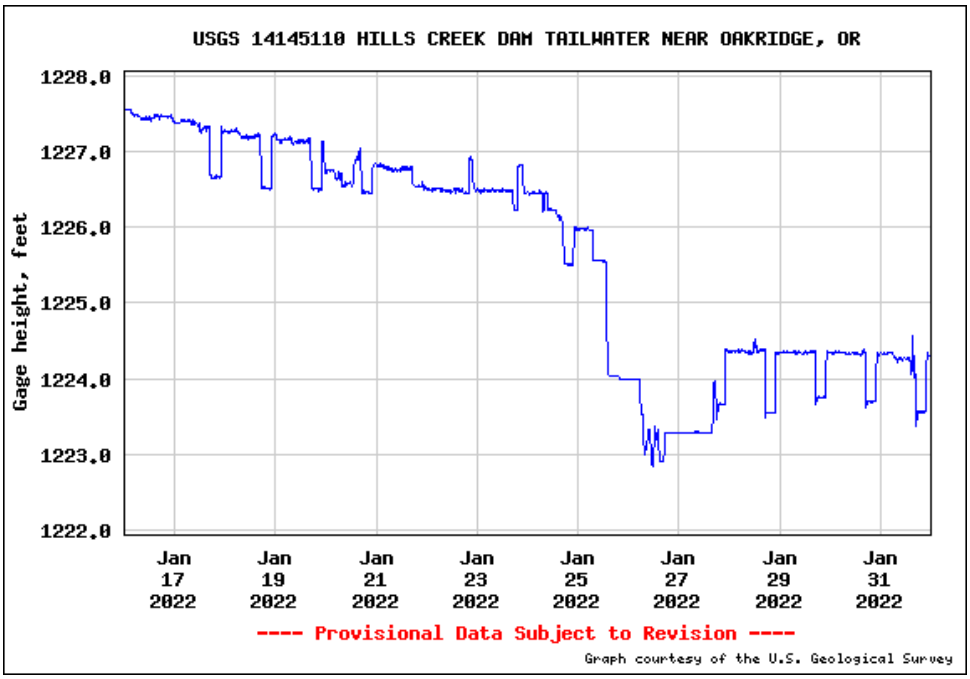

Figure 7. Gage Height (feet); below Hills Creek Dam, Middle Fork Willamette River

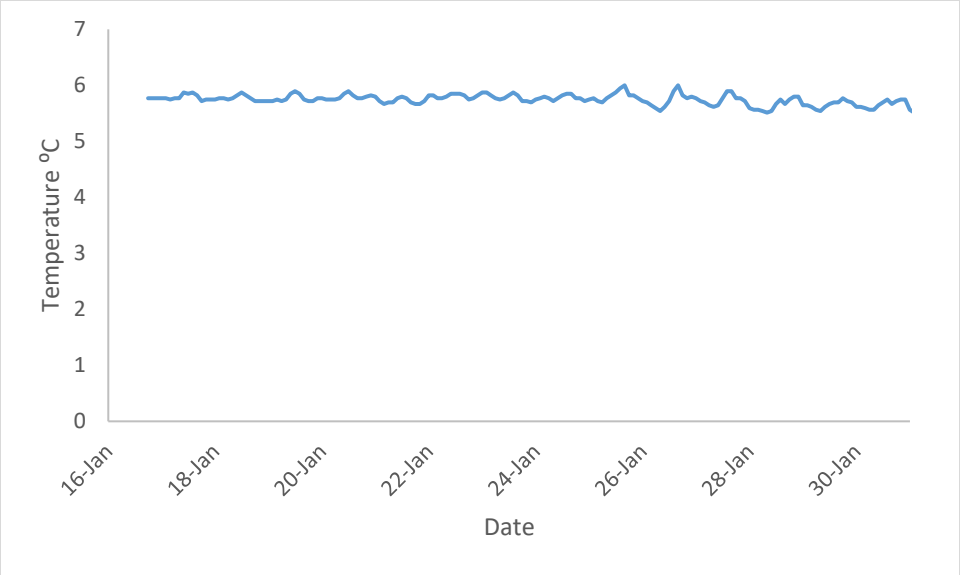

Figure 8. Temperature at RO RST (Hills Creek)

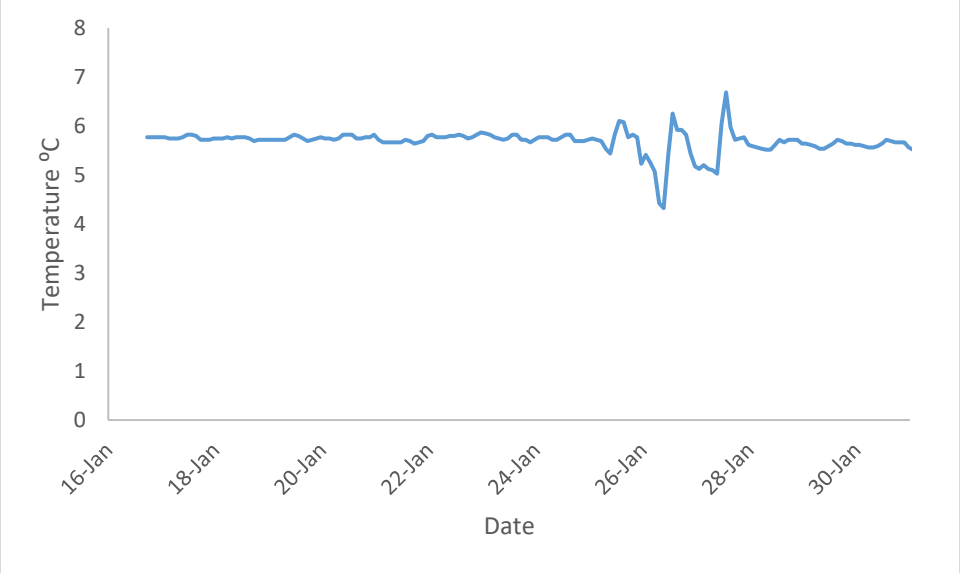

Figure 9. Temperature at Powerhouse RST (Hills Creek)

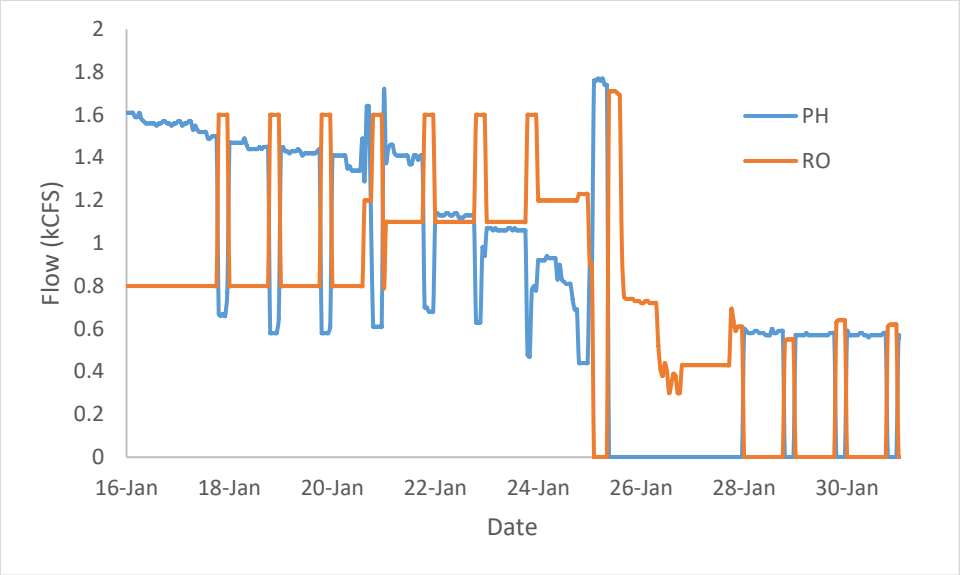

Figure 10. Hourly Flows PWR vs. RO (Hills Creek)

South Fork McKenzie – Cougar Dam

Target Species

This reporting period began on January 16 and ended on January 31. There was a total of 55 Chinook salmon (CHS) captured during the 16-day sampling period (Figure 11). Additionally, a trapping efficiency trial was conducted during this sampling period (informational section below) and 66 of the 815 released fish were recaptured. Chinook used for the trapping efficiency trial were AD clipped, ventral clipped (right and left) and bismark brown dyed. Trapping efficiency caught fish were not included in 24 hour holds. Sampling duration was 100% for both RO RST and Powerhouse RST. Table 8 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Cougar Dam site to-date and for the reporting period. Figure 11 shows the daily capture numbers for chinook and Figure 12 shows length frequency data to-date.

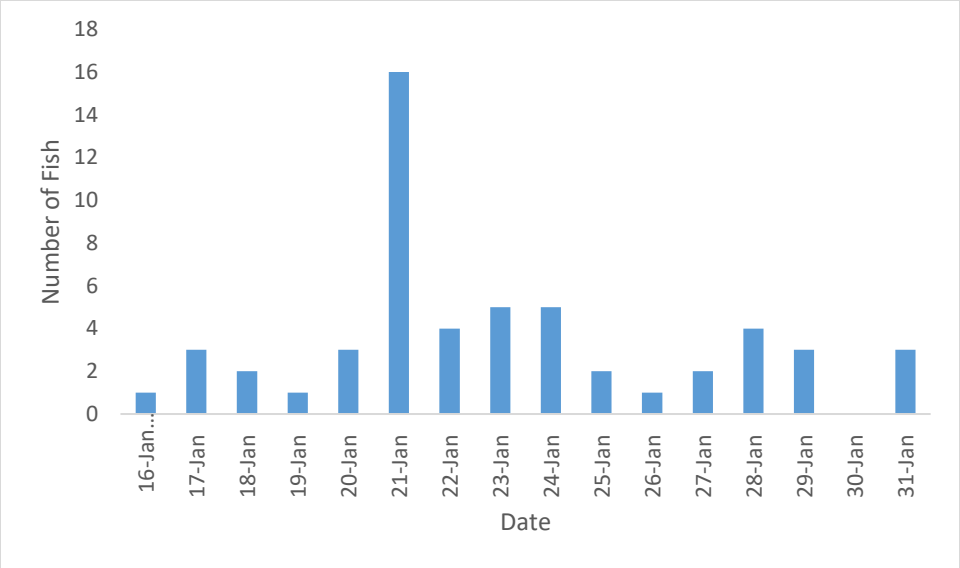

Figure 11. Chinook Captured Per Day 01/16/2022 to 01/31/2022 (Cougar Dam)

*Recaptured fish for trapping efficiency trials not included.

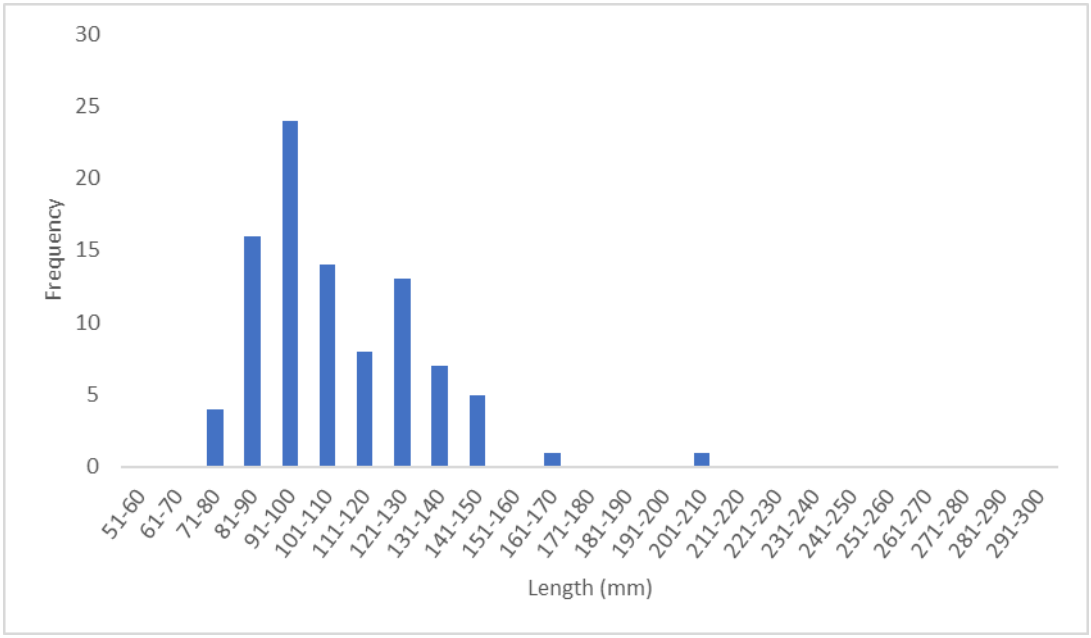

*Figure does not include fish without heads or fish used for trapping efficiency trials,

Figure 12. Length Frequency of Juvenile Chinook Sampled Season To-Date (Cougar Dam)

Trapping Efficiency

A total of 815 juvenile hatchery Chinook (parr) were bismark brown dyed, left and right ventrally clipped and released on 01/19/2022 below Cougar Dam. 405 dyed and left ventrally clipped fish were released below the PWR and 410 dyed and right ventrally clipped fish were released below the RO to evaluate the efficiency of the screw trap at those locations. A total of 37 fish were recaptured in the 8ft PH traps and 25 in the 5ft RO trap on 01/20/2022, with 3 more fish captured in the PH traps and 1 more fish in the RO trap on 01/21/2022 for a total of 40 recaptures in the PH traps and 26 in the RO trap. Route-specific trapping efficiency was 9.88% at the PH traps and 6.34% at the RO.

Of the 66 fish recaptured, 2 were dead and an additional 50 were injured,. Injuries were primarily descaling (25) and fin damage (44). Mt. Hood Environmental staff noted that fish appeared to be in good condition upon retrieval from the hatchery.

Cougar Dam	Release #	Recapture #	Capture Efficiency
PH Route	405	40	9.88% (40/405)
RO Route	410	26	6.34% (26/410)

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Table 8. Descriptive Statistics of Target Species Captured at the Cougar Dam Season To-Date

To-Date										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Cougar	RO	CHS	Parr	29	72.0	145.0	99.5	4.2	30.66	11.0
		CHS	Smolt	8	122.0	202.0	147.6	19.8	83.9	35.3
Cougar	PWR	CHS	Parr	47	74.0	142.0	105.0	4.1	31.3	12.9
		CHS	Smolt	8	115.0	133.0	125.6	13	28.4	21.3

January 16-31, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Cougar	RO	CHS	Parr	14	72.0	140.0	92.6	4.2	26.2	8.8
		CHS	Smolt	5	135.0	202.0	156.4	28	83.9	42.6
Cougar	PWR	CHS	Parr	32	74.0	142.0	100.9	4.1	31.3	11.1
		CHS	Smolt	4	115.0	133.0	126.3	13	28.4	21.8

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

24-Hour Post Collection Holding Trial

A total of 48 Chinook captured in the RSTs were held for ~24 hours in holding tanks and then evaluated for survival rates. All fish (100%) held during this period were released alive.

Injuries and Copepod Infection

Partial descaling <20% was observed on 12 of 19 Chinook collected at the RO RST (63.2%), and descaling >20% was observed on 2 of 19 Chinook collected at the RO RST (10.5%). Of the 19 chinook captured in the RO RST 0 displayed body injuries (0%) and 4 had eye injuries (21.1%). 6 of the RO RST chinook had copepods present in the branchial cavity (31.5%) and 4 had copepods present on fins (21.1%). Partial descaling <20% was observed on 8 of 36 Chinook collected at the PWR RST (22.2%), and descaling >20% was observed on 5 of 36 Chinook collected at the PWR RST (13.9%). Two of the PWR RST fish had bodily injury (5.6%) and 2 displayed eye injuries (5.6%). Eleven of the 36 PWR RST fish had copepods present in the branchial cavity (30.6%) and 9 had copepods present on fins (25%). There were 3 chinook mortality collected in the RO RST (15.8%) and 4 collected in the PWR RST (11.1%). A summary of injuries observed during the reporting period, and for the duration of the season are provided in Appendix A.

Table 9. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Cougar Dam).

Site	Route	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Cougar	RO	19	12	2	0	4	6	4	3
Cougar	PWR	36	8	5	2	2	11	9	4

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

Non-Target Species

A total of 1 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 (Cougar Dam).

Species	RO Capture	RO Mortality	PWR Capture	PWR Mortality	Season Total Live	Season Total Mortality
Bluegill	0	0	0	0	0	0
Brook Lamprey	0	0	0	0	0	0
Bullhead	0	0	0	0	0	0
Crappie	0	0	0	0	0	0
Longnose Dace	0	0	0	0	0	0
Kokanee	0	0	0	0	0	0
Red-Sided Shiner	0	0	0	0	0	0
Sculpin	0	0	0	0	2	0
Spotted Bass	0	0	0	0	0	0

Sucker	0	0	0	0	0	0
Whitefish	0	0	0	0	1	0
Cutthroat	0	0	1	0	1	0
O. mykiss	0	0	0	0	6	0
Totals	**0**	**0**	**1**	**0**	**10**	**0**

Stream Statistics

Basic stream statistics at the Cougar Dam site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14159410. Gage height (feet) is the only metric provided at this gage. During the reporting period, daily maximum values for instantaneous gage height ranged from 1,253.93 feet to 1,254.68 feet (mean: 1,254.35 feet). Figure 13 shows instantaneous gage height.

Stream temperatures were recorded every 2 hours for the length of the report period for the RO and PWR RST's (Figure 14 and 15 respectively). Temperature probes for the RO and PWR RST operated normally throughout this reporting period.

Flows through the Powerhouse and RO during the reporting period averaged 796.8 and 969.6 cubic feet per second (cfs) respectively (Figure 16). 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, Cougar Dam.

	Chinook	
Description	**RO (5ft)**	**PWR(8ft)**
Catch	19	36
Effort (hrs)	383.37	791.9
CPUE (fish/hr)	0.0496	0.0455

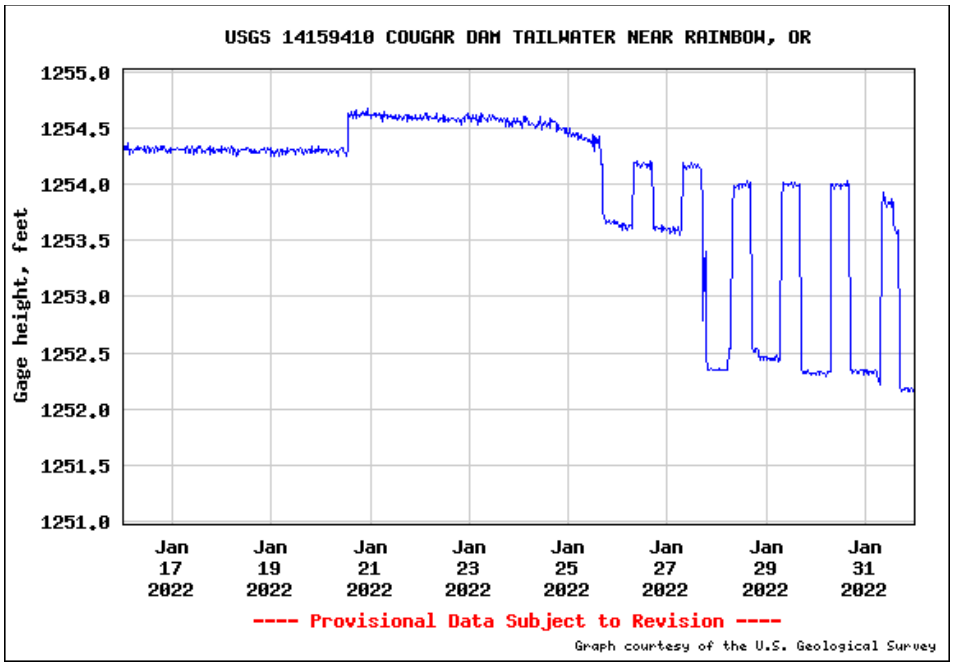


Figure 13. Gage Height (feet); below Cougar Dam, South Fork McKenzie River

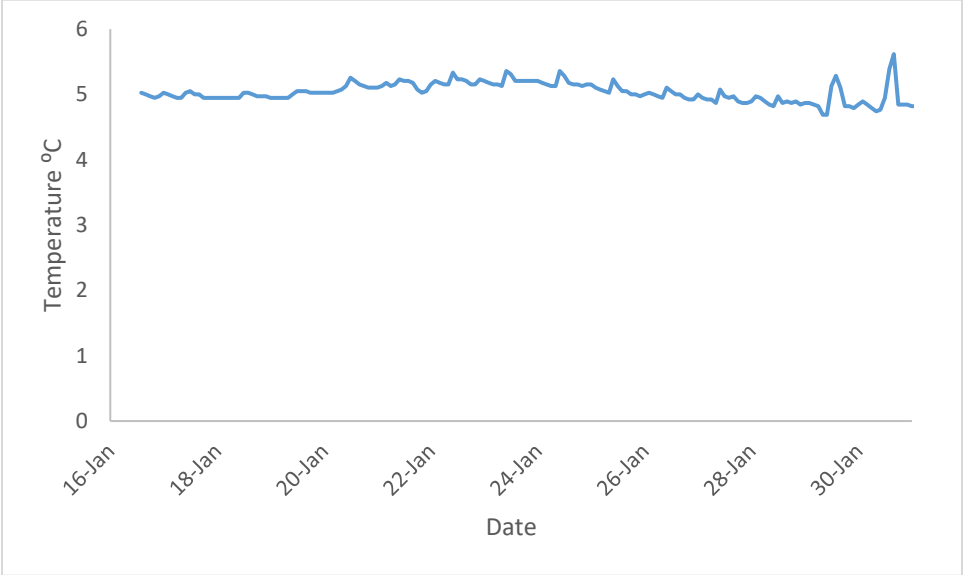


Figure 14. Temperature at RO RST (Cougar Dam)

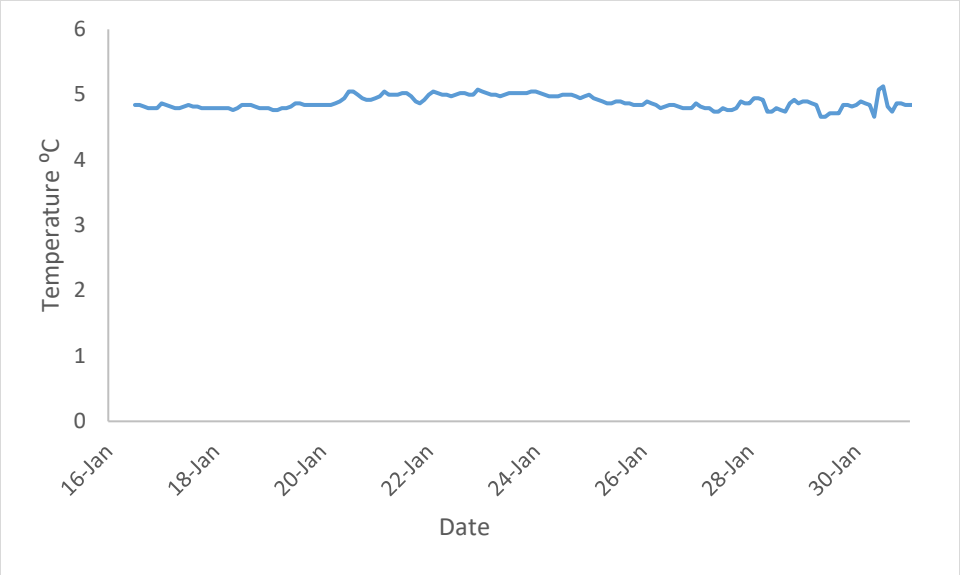


Figure 15. Temperature at PWR RST (Cougar Dam)

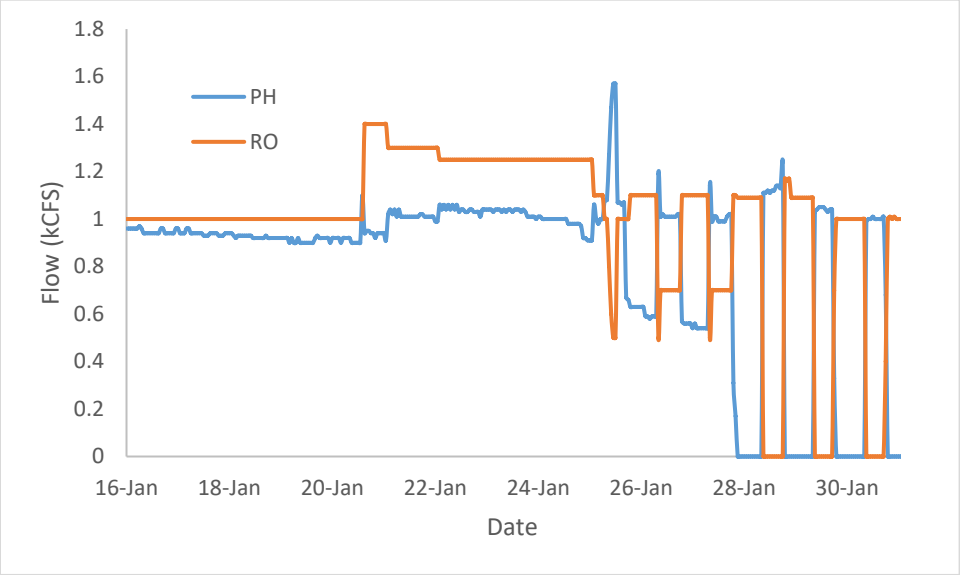


Figure 16. Hourly Flows PWR vs. RO (Cougar Dam)

North Santiam – Big Cliff Dam

Target Species

The reporting period began on January 16 and ended on January 31. 22 Chinook salmon (CHS) were collected during the 16-day sampling period (Figure 17). The trap was operated 100% of the reporting period. Table 12 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Big Cliff site to-date and Figure 18 shows length frequency data to-date.

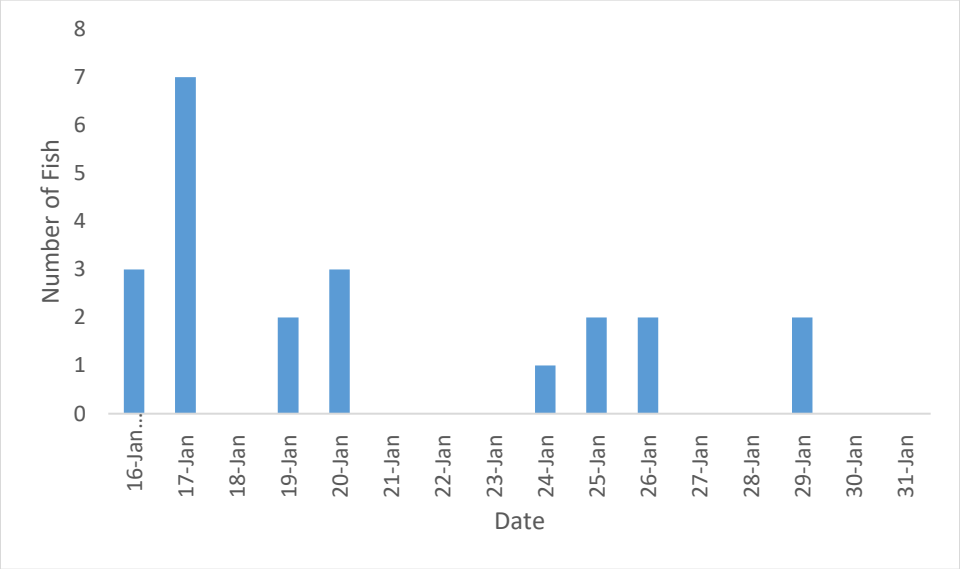


Figure 17. Chinook Captured Per Day 01/31/2022 to 01/15/2022 (Big Cliff)

Table 12. Descriptive Statistics of Target Species Captured at Big Cliff Dam Season To-Date

To-Date										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Big Cliff	PWR	CHS	Parr	13	78.0	115.0	99.4	6.1	20.1	11.8
		CHS	Smolt	39	113.0	210.0	168.7	14.2	103.8	50.5

January 16 - 31, 2022										
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*		
					Min	Max	Mean	Min	Max	Mean
Big Cliff	PWR	CHS	Parr	5	85.0	115.0	103.4	8.2	20.1	14.2
		CHS	Smolt	17	113.0	210.0	171.5	14.2	103.8	54.1

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

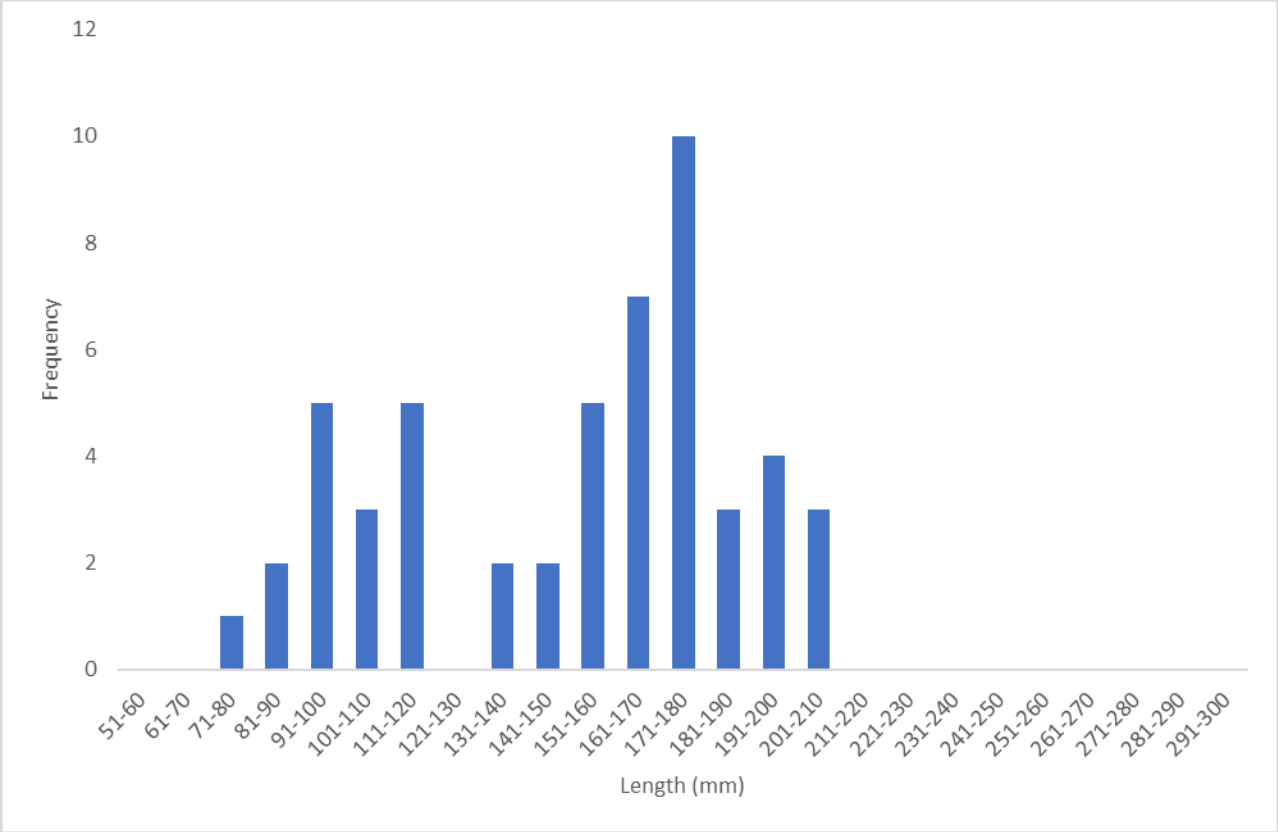


*Figure does not include fish without heads

Figure 18. Length Frequency of Juvenile Chinook Sampled Season To-Date (Big Cliff)

Injuries and Copepod Infection

Partial descaling <20% was observed on 8 of 22 target Chinook collected (36.4%), and descaling >20% was observed on 3 of 22 Chinook collected (13.6%). 19 of 22 Chinook collected during this reporting period had copepods present in the branchial cavity (86.4%) and 7 had copepods present on fins (31.8%). Of the 22 Chinook captured, 0 displayed body injuries (0%) and 2 had eye injuries present (9.1%). There was 4 Chinook mortalities (18.2%) shown in Table 5. A summary of injuries observed during the reporting period, and for the duration of the season are provided in Appendix A.

Table 13. Number of Descaled, Bodily/Eye Injured, Copepod Infected and Dead Chinook Salmon for Sampling Period. (Big Cliff Dam)

Site	# CHS Collected	# DSC* <20%	# DSC* >20%	# with Body Injuries	# with Eye Injuries	# with COP* In B.C.	# with COP* on Fins	Mortalities
Big Cliff	22	8	3	0	2	19	7	4

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

Non-Target Species

A total of 19 non-target fish were captured at Big Cliff during the reporting period; the data is summarized below in Table 14.

Table 14. Summary of Non-target Species (Big Cliff Dam).

Species	PWR Capture	PWR Mortality	Season Total	Season Total Mortality
Bluegill	2	0	6	2
Brook Lamprey	0	0	0	0
Bullhead	0	0	1	0
Crappie	0	0	0	0
Longnose Dace	0	0	0	0
Kokanee	16	6	82	34
Red-Sided Shiner	0	0	0	0
Sculpin	0	0	0	0
Spotted Bass	0	0	0	0
Sucker	0	0	0	0
Whitefish	0	0	0	0
Cutthroat	1	0	1	0
O. mykiss	0	0	1	0
Totals	**19**	**6**	**91**	**36**

Stream Statistics

Basic stream statistics at the Big Cliff site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14181410. Gage height (feet) is the only metric provided at this gage. During the reporting period, daily maximum values for instantaneous gage height ranged from 1,110.08 feet to 1,113.97 feet (mean: 1,112.83 feet). Figure 19 shows instantaneous gage height.

Stream temperatures were recorded every 2 hours for the Big Cliff RST (Figure 20). The temperature probe for the Big Cliff RST operated from 1600 on 18-Jan through the remainder of the reporting period due to a downloading error.

Flows through the Powerhouse and spill during the reporting period averaged 2,992.6 and 959.4 cubic feet per second (cfs) respectively (Figure 21). 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, Big Cliff Dam.

	Chinook
Description	**PWR(8ft)**
Catch	22
Effort (hrs)	403.633
CPUE (fish/hr)	0.0545

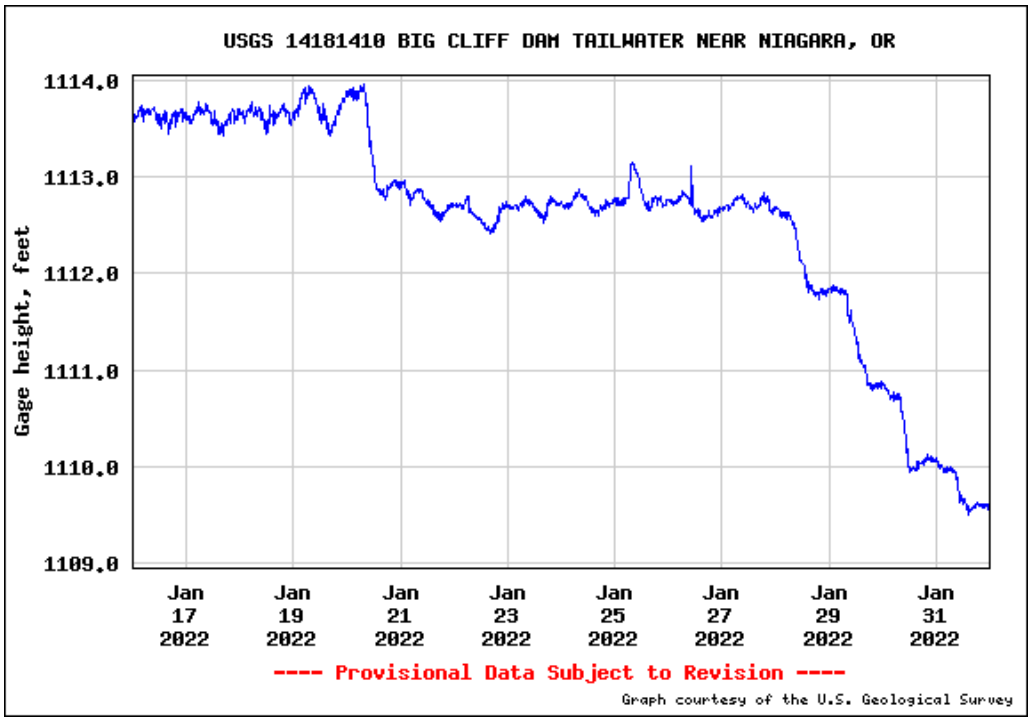


Figure 19. Gage Height (feet); below Big Cliff Dam, North Santiam River

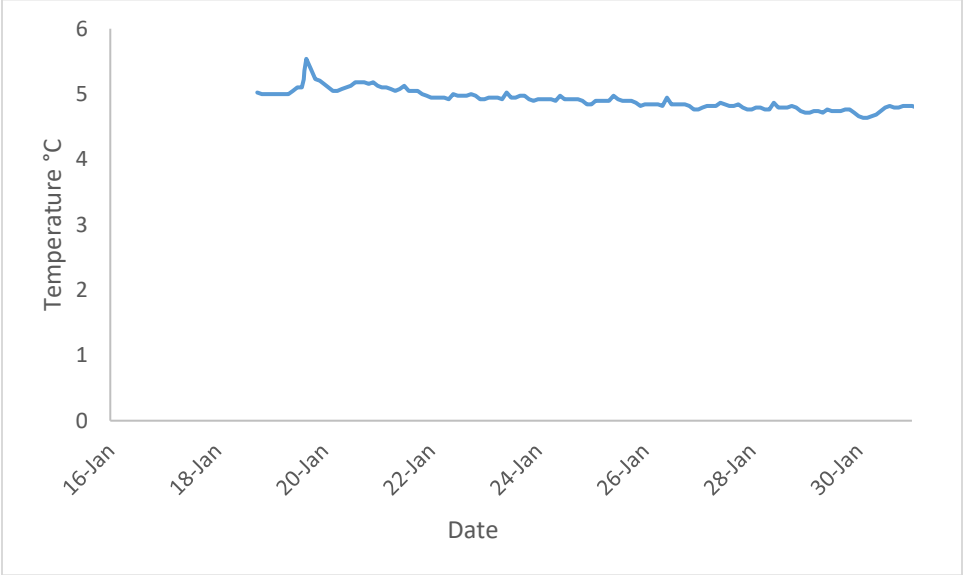


Figure 20. Temperature at RST (Big Cliff)

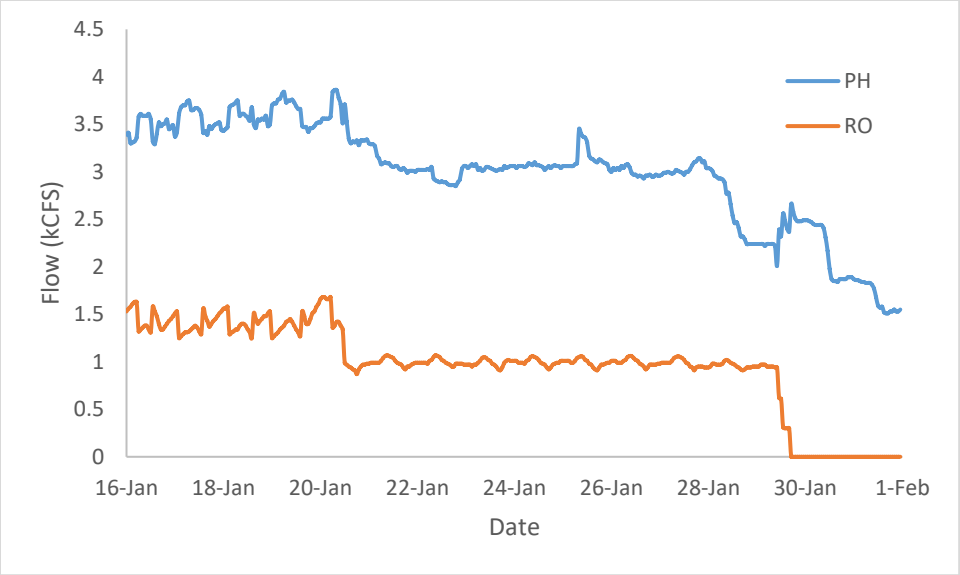


Figure 21. Hourly Flows PWR vs. Spill (Big Cliff)

Middle Fork Willamette – Fall Creek Above Reservoir

Target Species

The reporting period began January 16 and ended January 31. One chinook salmon was captured during the 16-day sampling period (Figure 22). The trap was operated 100% of the reporting period. Table 16 provides life stage, length, and weight data for all Chinook salmon that have been caught at the Fall Creek site to-date and Figure 18 shows length frequency data to-date.

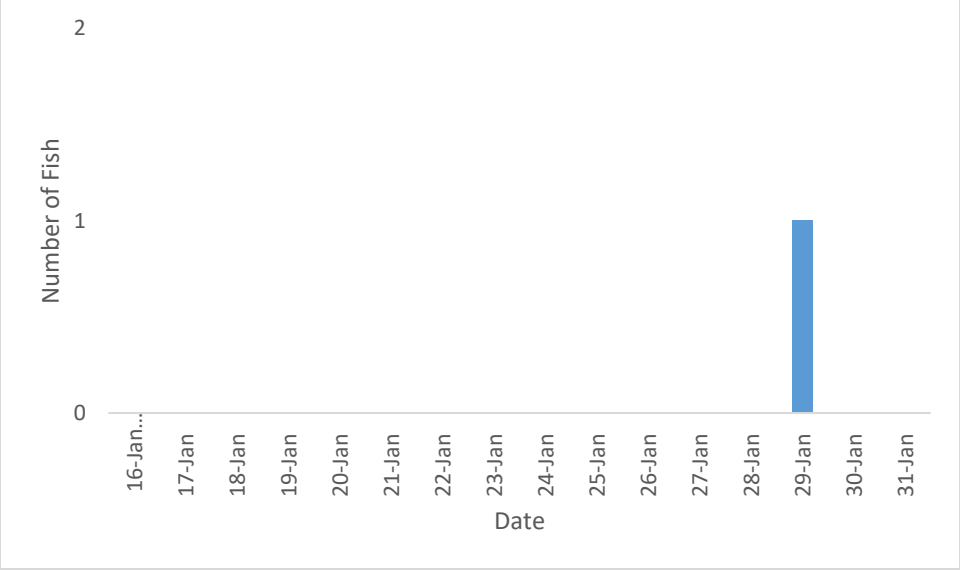


Figure 22. Chinook Captured Per Day 1/16/2022 to 1/31/2022 (Fall Creek)

Table 16. Descriptive Statistics of Target Species Captured at Fall Creek Above Reservoir, 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	n/a	CHS	Smolt	0	n/a	n/a	n/a	n/a	n/a	n/a	
		CHS	Parr	1	119	119	119	16.1	16.1	16.1	

January 16-31, 2022											
Site	Route	Species	Life stage	Collected	Length (mm)*			Weight (g)*			
					Min	Max	Mean	Min	Max	Mean	
Fall Creek	n/a	CHS	Smolt	0	n/a	n/a	n/a	n/a	n/a	n/a	
		CHS	Parr	1	119	119	119	16.1	16.1	16.1	

Injuries and Copepod Infection

The one fish caught in Fall Creek had a <20% descaling injury (Table 17).

Table 17. 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	1	1	0	0	0	0	0	0

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

Non-Target Species

A total of 26 non-target fish was captured at Fall Creek during the reporting period; the data is summarized below in Table 18.

Table 18. Summary of Non-target Species (Fall Creek).

Species	8ft Capture	8ft Mortality	Season Total	Season Total Mortality
Bluegill	0	0	0	0
Lamprey	21	0	21	0
Bullhead	0	0	0	0
Bull Trout	0	0	0	0
Crappie	0	0	0	0
Cutthroat Trout	4	0	5	0
Longnose Dace	0	0	0	0
Red-Sided Shiner	0	0	0	0
Sculpin	0	0	0	0

Spotted Bass	0	0	0	0
Sucker	0	0	0	0
Whitefish	0	0	0	0
O. mykiss	1	0	1	0
Totals	**26**	**0**	**27**	**0**

Stream Statistics

Basic stream statistics at the Fall Creek site were calculated from data downloaded from the U.S. Geological Survey stream gage number 14150290. During the reporting period, daily maximum values for instantaneous gage height ranged from 3.62 feet to 4.73 feet (mean: 4.16 feet). Figure 22 shows instantaneous gage height.

Stream temperatures were recorded every 2 hours for the Fall Creek RST (Figure 23). Temperature probes for the Fall Creek RST operated normally throughout this reporting period.

Flows during the reporting period averaged 846.6 and 1,159.5 cubic feet per second (cfs) respectively (Figure 24). The average flow of the PWR while the PWR was generating was 725.2cfs and the RO was 721.4cfs. Catch per unit of effort (CPUE) data are summarized in Table 19. Discharge and capture data for the duration of monitoring efforts at this location are provided in Appendix B.

Table 19. Summary of Chinook CPUE, Hills Creek.

	Chinook
Description	**FC(8ft)**
Catch	1
Effort (hrs)	384.283
CPUE (fish/hr)	0.0026

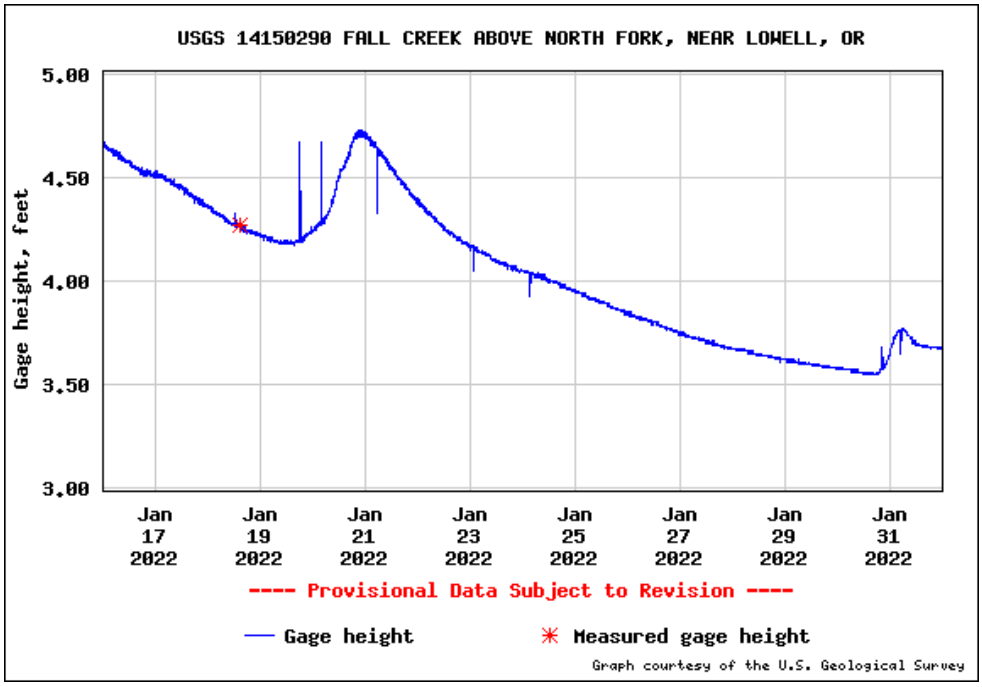


Figure 22. Gage Height (feet); Fall Creek Above North Fork, Near Lowell OR

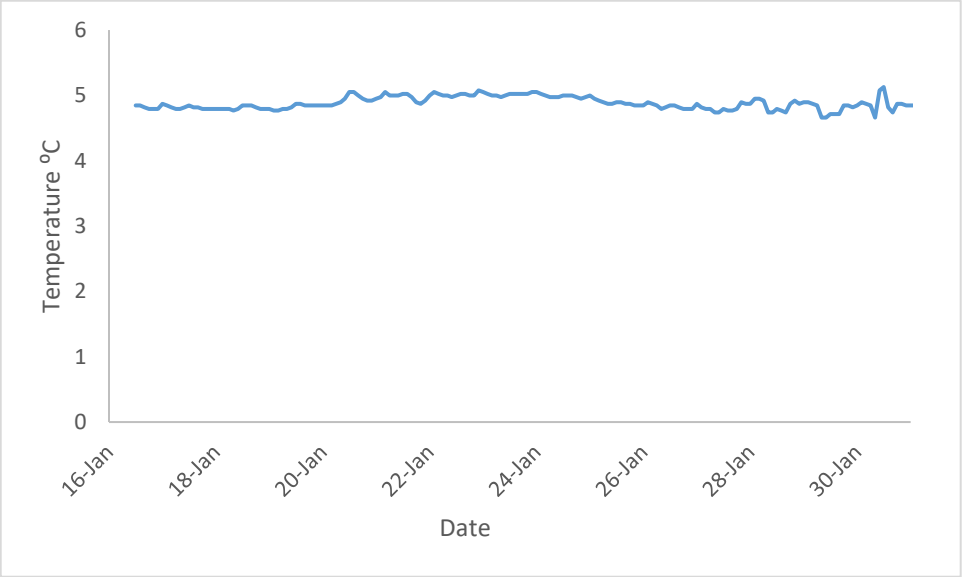


Figure 23. Temperature at RST (Fall Creek)

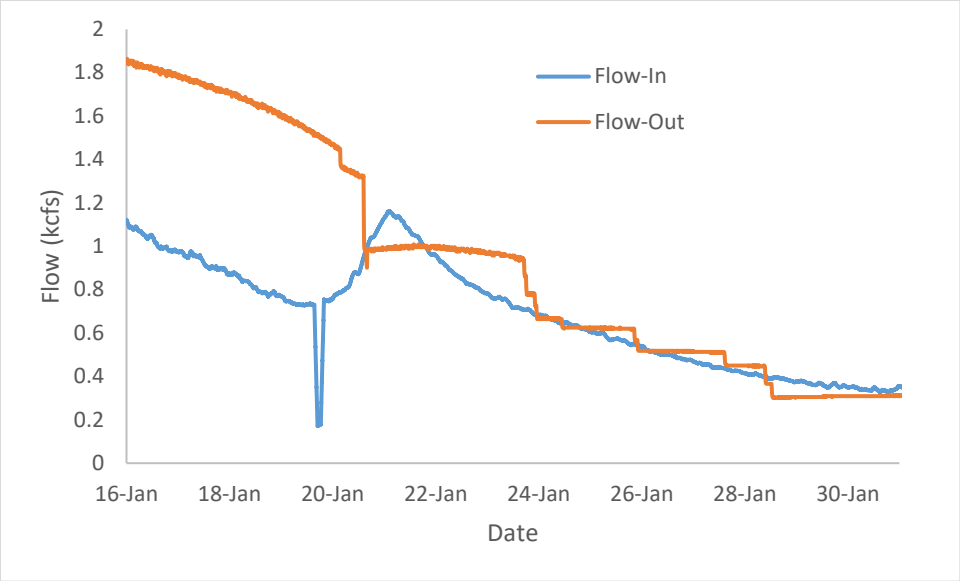


Figure 24. Hourly Flows IN vs OUT (Fall Creek Dam)

Issues Encountered

None.

Upcoming USACE Support Services

None.

Appendix A

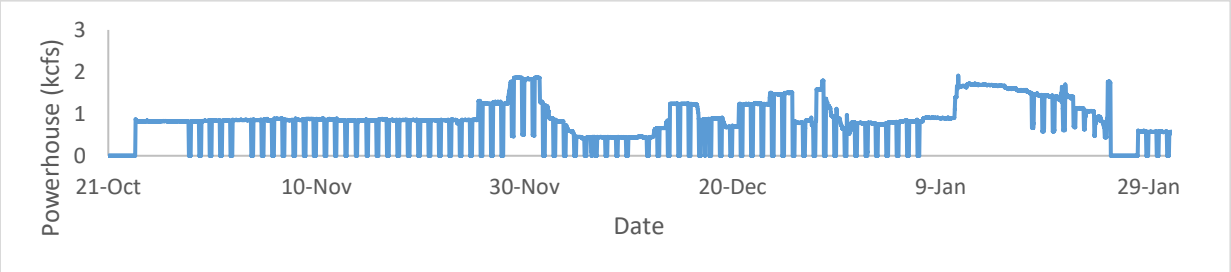
Injuries Since Project Initiation (10-21-21 to 1-31-22)																							
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Big Cliff	53		21		5	1		46	6	1	11	1			5	1	2	2	8	1			
8 ft (PH)	53		21		5	1		46	6	1	11	1			5	1	2	2	8	1			
Parr	13		3			1		8			1								1				
Smolt	40		18		5			38	6	1	10	1			5	1	2	2	7	1			
Cougar	98		36		9	1		61	13		15		2		3	1	1	2	7	3	2		1
5 ft (RO)	40		20		5			24	5		7				1	1		1	2	3	1		1
Parr	30		16		5			15	2		5				1			1	1	1			1
Smolt	10		4					9	3		2					1			1	2	1		
8 ft (PH)	58		16		4	1		37	8		8		2		2		1	1	5		1		
Parr	50		14		3	1		30	4		7		1		1		1	1	5		1		
Smolt	8		2		1			7	4		1		1		1								
Hills Creek	95		53		10			70	32		20		8	1	24	8	3	3	5	3	4		
5 ft (RO)	63		35		4			49	21		13		6		18	6	2	2	4	1	1		
Parr	6		1					1									1						
Smolt	57		34		4			48	21		13		6		18	6	1	2	4	1	1		
8 ft (PH)	32		18		6			21	11		7		2	1	6	2	1	1	1	2	3		
Parr	7		4					1	1							1				1			
Smolt	25		14		6			20	10		7		2	1	6	1	1	1	1	1	3		
Fall Creek	1		1																				
8 ft (RO)	1		1																				
Parr	1		1																				
Smolt																							

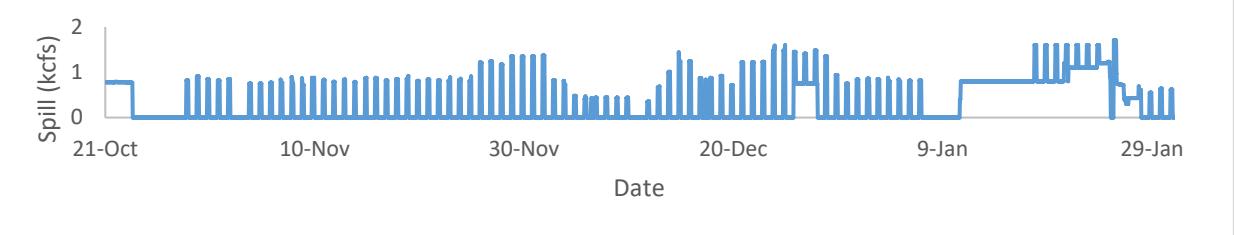
Injuries During Reporting Period (1-16-22 to 1/31/22																								
Site/Trap/Life Stage	Total Fish	MUNK	DS<2	BLO	EYB	FUN	BKD	COP	DS>2	PRD	FID	HBO	BO	HO	BVT	HBP	BRU	TEA	OPD	HIN	FVB	POP	GBD
Big Cliff	22		8		2			20	3	1	5				3	1	1		3				
8 ft (PH)	22		8		2			20	3	1	5				3	1	1		3				
Parr	5		2					4															
Smolt	17		6		2			16	3	1	5				3	1	1		3				
Cougar	55		20		7			30	7		9		2		3			1	3	1			1
5 ft (RO)	19		12		4			10	2		6				1			1	1	1			1
Parr	14		9		4			5	1		5				1			1	1				1
Smolt	5		3					5	1		1									1			
8 ft (PH)	36		8		3			20	5		3		2		2				2				
Parr	32		7		2			17	2		2		1		1				2				
Smolt	4		1		1			3	3		1		1		1								
Hills Creek	13		6		2			5	5		2				2	1				1			
5 ft (RO)	2		1					2	1		2												
Parr																							
Smolt	2		1					2	1		2												
8 ft (PH)	11		5		2			3	4						2	1				1			
Parr	7		4					1	1							1				1			
Smolt	4		1		2			2	3						2								
Fall Creek	1		1																				
8 ft (RO)	1		1																				
Parr	1		1																				
Smolt																							

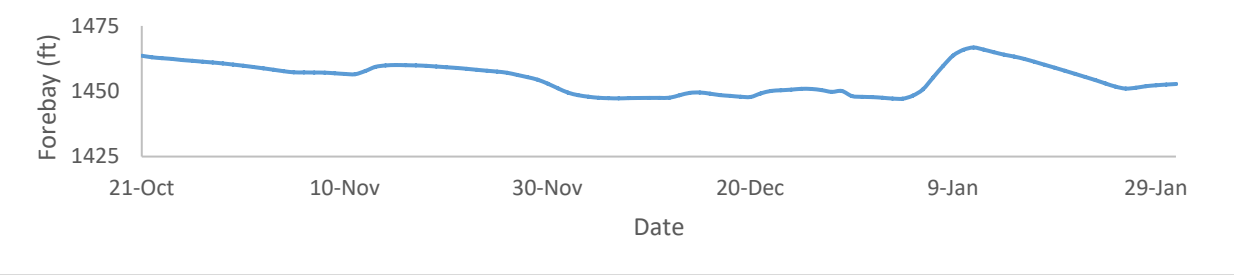
Injury Code	Description of Injury/Condition
NXI	Live fish with no external injuries
MUNK	Mortality with no external injuries
DS<2	Descaling <20%
BLO	Bloated
EYB	Bloody Eye (hemorrhage)
BVT	Bleeding from Vent
FVB	Fin Blood Vessels Broken
GBD	Gas Bubble Disease (fin ray/eye inclusions)
POP	Pop Eye (eye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

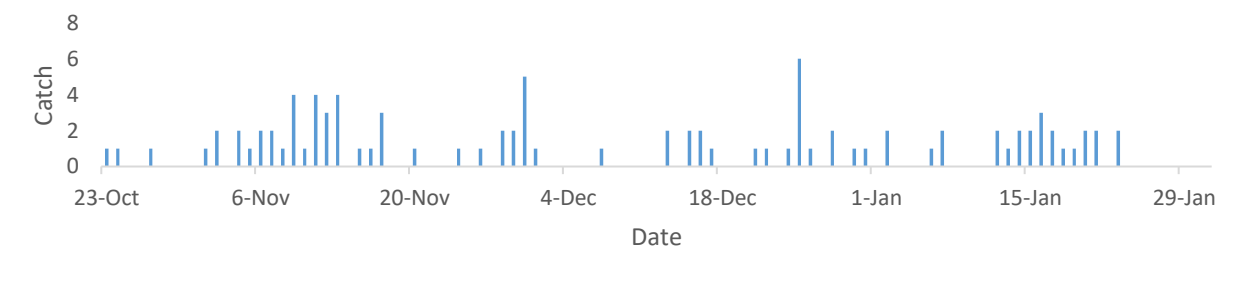
Appendix B

Hills Creek Operational and Capture Data Since Start of Monitoring

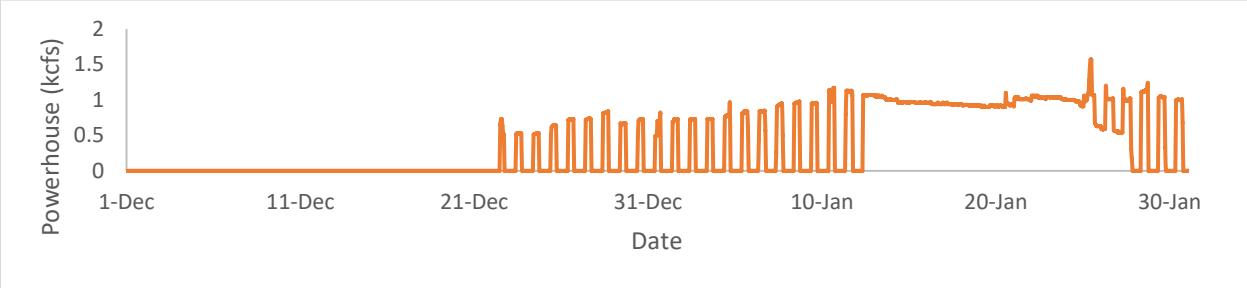


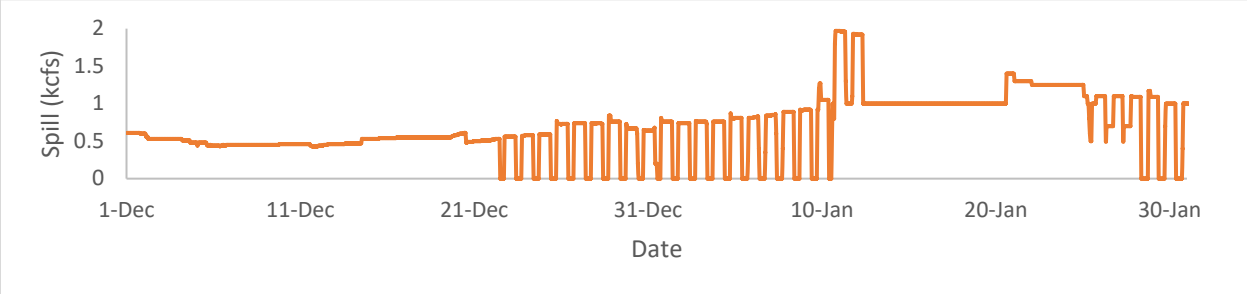


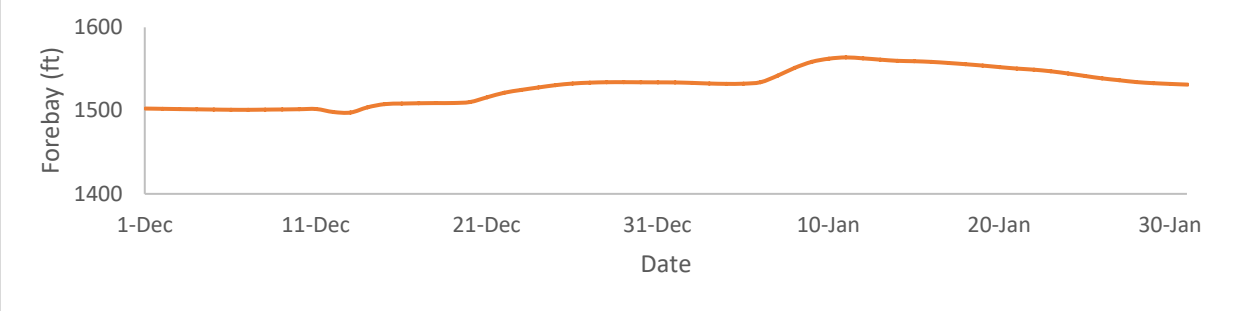


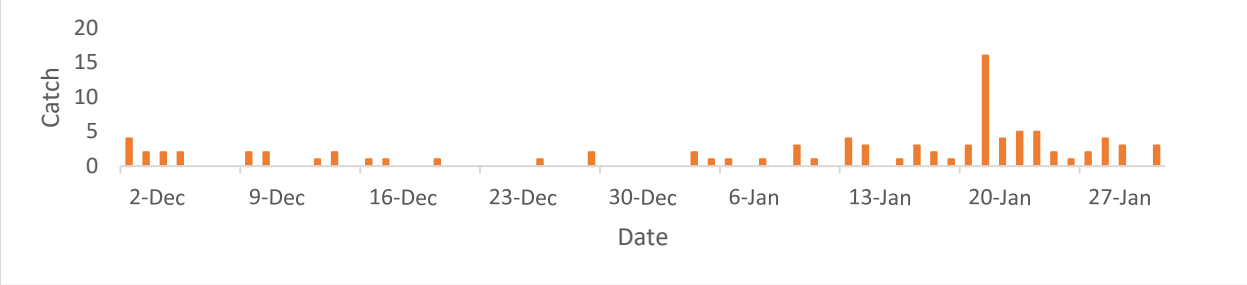


Cougar Dam Operational and Capture Data Since Start of Monitoring

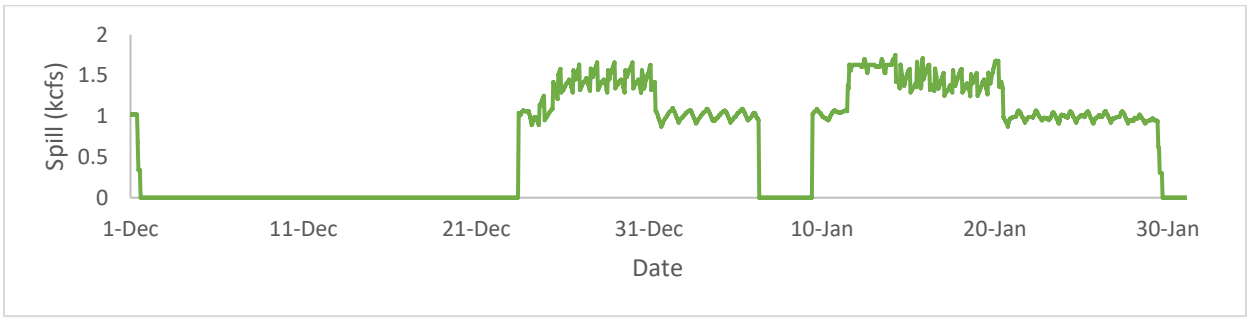


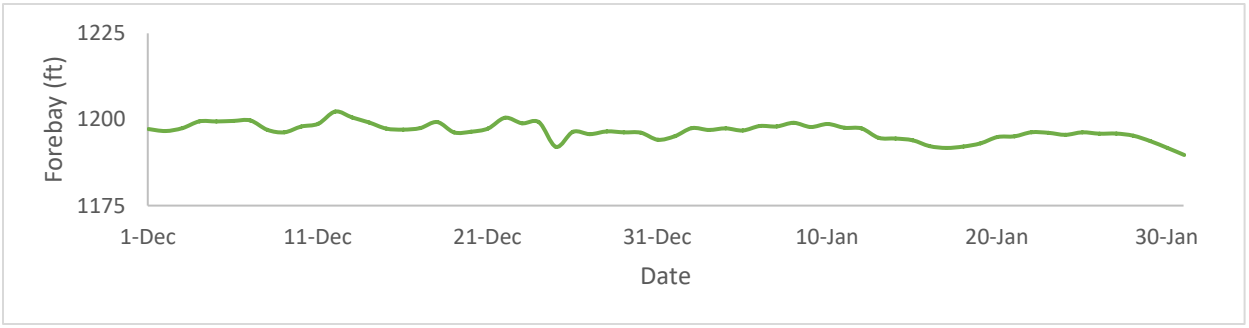


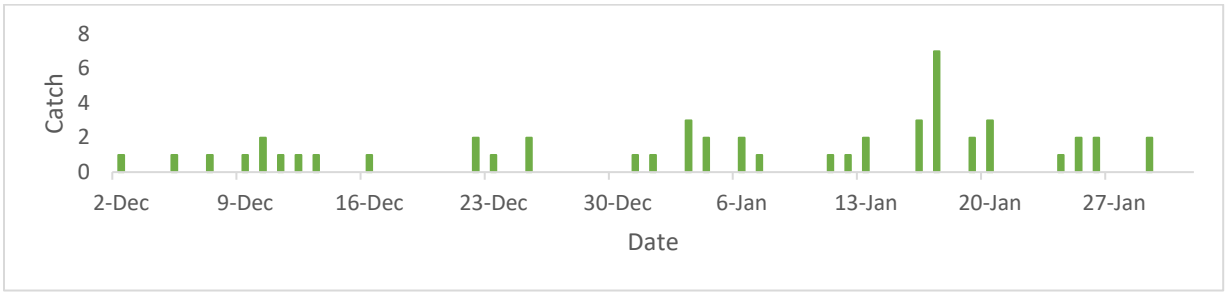




Big Cliff Dam Operational and Capture Data Since Start of Monitoring







Fall Creek Operational and Capture Data Since Start of Monitoring