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WILLAMETTE VALLEY FISH PASSAGE MONITORING VIA ROTARY SCREW TRAPS

Bi-Weekly Report: September 15, 2021 – September 30, 2021

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PROJECT SCHEDULE

SUMMARY OF ROTARY SCREW TRAP DATA

Rotary screw traps (RSTs) were operated at two locations in the southern Willamette river watershed: on the South Fork McKenzie river below Cougar Dam (Cougar), and on the North Santiam river below Big Cliff dam (Big Cliff). The location of each sampling site is depicted in Figure 1. Sampling began at the Cougar Dam site on 2021 March 24, and at the Big Cliff Dam site on 2021 May 24 (Table 1). Earlier in the year sampling took place above Fall Creek Reservoir near Dolly Varden Campground to trap and transport juvenile Chinook salmon around the Fall Creek Project. Sampling at the Fall Creek site began on 2021 March 10 and ended on 2021 May 31. Sampling also occurred below Lookout Point dam on the Middle Fork Willamette River. Sampling began at Lookout Point on 2021 March 15 and ended on 2021 July 19.

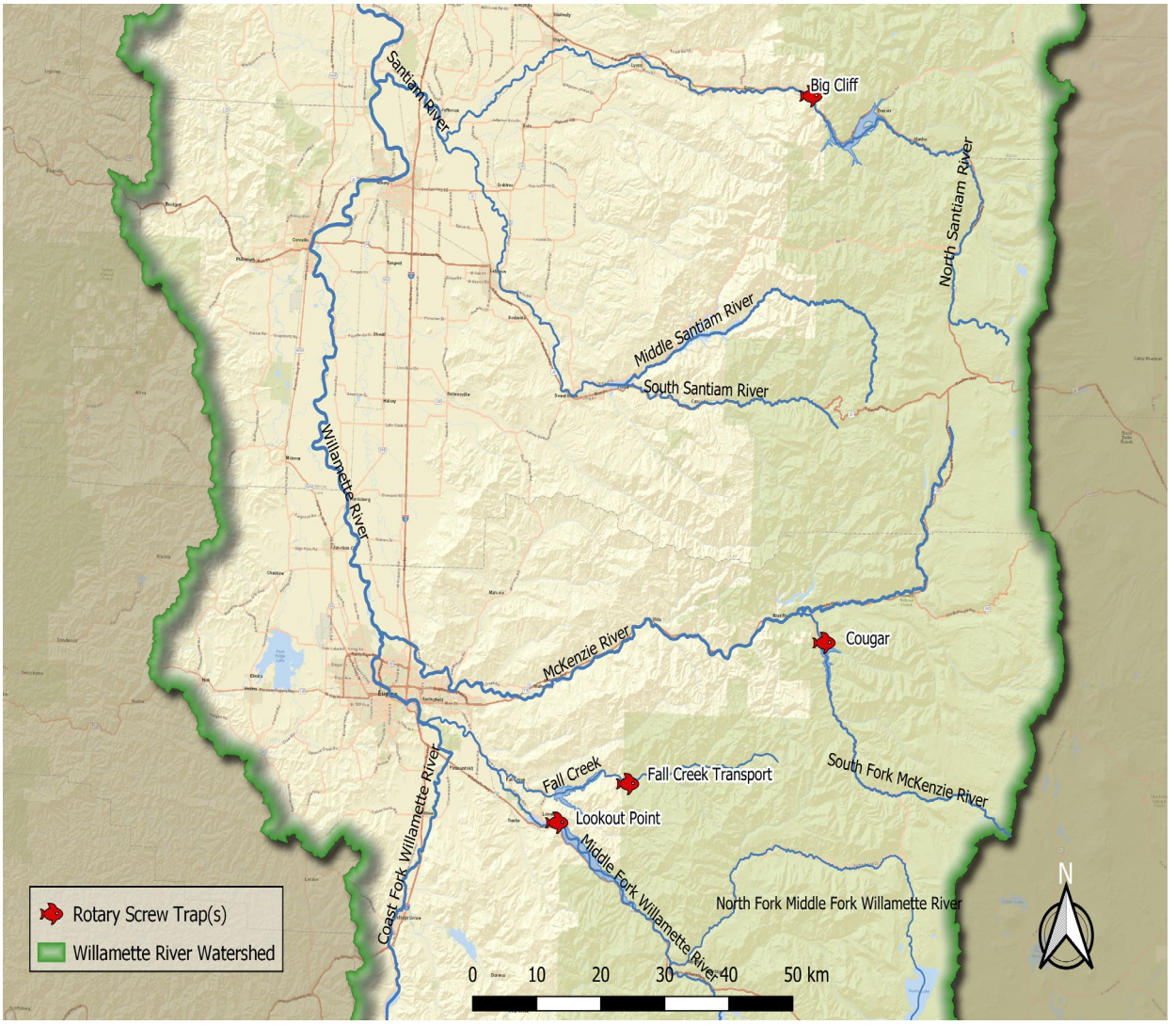

Figure 1: Sampling Locations

Table 1: Sampling Dates

Site	Total Sampling Period Start	Recent Sampling Period Start	Sampling Period End	Recent Days Sampled	Total Days Sampled
Big Cliff	2021-05-22	2021-09-15	2021-09-30	15 days	131 days
Cougar	2021-03-23	2021-09-15	2021-09-30	15 days	191 days

Table 2 summarizes the naturally produced Chinook salmon that have been captured and recaptured at each site. All naturally produced Chinook salmon that are captured are marked and released upstream of the trap. Recaptured fish are those that were caught at the trap, marked, released upstream of the trap, and subsequently recaptured. The goal of this practice is to provide trap efficiency estimates.

Table 2: Willamette Valley Rotary Screw Trap Monitoring catch summary.

Site	Species	Catch (Reporting Period)	Recaptures (Reporting Period)	Total Catch	Total Recaptures
BigCliff	CHS	20	1	518	34
Cougar	CHS	110	3	494	11

Table 3 summarizes trap efficiency trials that have been conducted with releases of ODFW hatchery reared Chinook salmon.

Table 3: Results of trap efficiency trials conducted with ODFW hatchery reared Chinook salmon.

Date	Site	Route	Species	Mean Length (mm)	Released	Recaptured	Efficiency (%)
2021-05-05	Cougar	PH	HCHS	62.5	105	37	35.2
2021-04-08	LOP	PH	HCHS	165.0	993	3	0.3
2021-05-26	BIG	PH	HCHS	159.0	543	8	1.5
2021-07-09	BIG	PH	HCHS	66.0	454	21	4.6
2021-07-13	LOP	PH	HCHS	90.4	950	1	0.1
2021-09-23	Cougar	RO	HCHS	86.4	508	22	4.3

South Fork McKenzie - Cougar Dam

Target Species

Sampling below Cougar dam from 2021-09-15 to 2021-09-30 (15 days) resulted in the capture of 110 juvenile Chinook salmon. Table 4 summarizes the catch of juvenile Chinook salmon at the Cougar site. Figure 2 illustrates the length distribution of juvenile Chinook salmon caught at the Cougar site to date.

Table 4: Descriptive statistics of target species captured at the Cougar dam site.

					Lengths (mm)				Weights (g)			
Site	Route	Species	Life Stage	n	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.
Cougar (Reporting Period)	Regulating Outlet	CHS	PARR	4	84	108	96.2	9.9	8.1	12.6	9.8	2.0
		CHS	SMOLT	106	95	297	157.7	40.0	1.0	678.0	53.6	69.7
Cougar (Total)	Powerhouse	CHS	ADULT	3					Inf	-Inf		
		CHS	FRY	61	33	57	39.7	6.8	1.5	1.5	1.5	
		CHS	PARR	122	48	177	86.2	16.4	1.5	54.1	8.3	5.5
		CHS	SMOLT	151	84	195	126.5	21.0	5.6	86.5	23.0	12.6
	Regulating Outlet	CHS	FRY	3	36	45	42.0	5.2	Inf	-Inf		
		CHS	PARR	10	84	108	93.8	8.0	6.4	13.5	9.3	2.4
		CHS	SMOLT	144	91	297	151.7	38.3	1.0	678.0	47.2	61.7

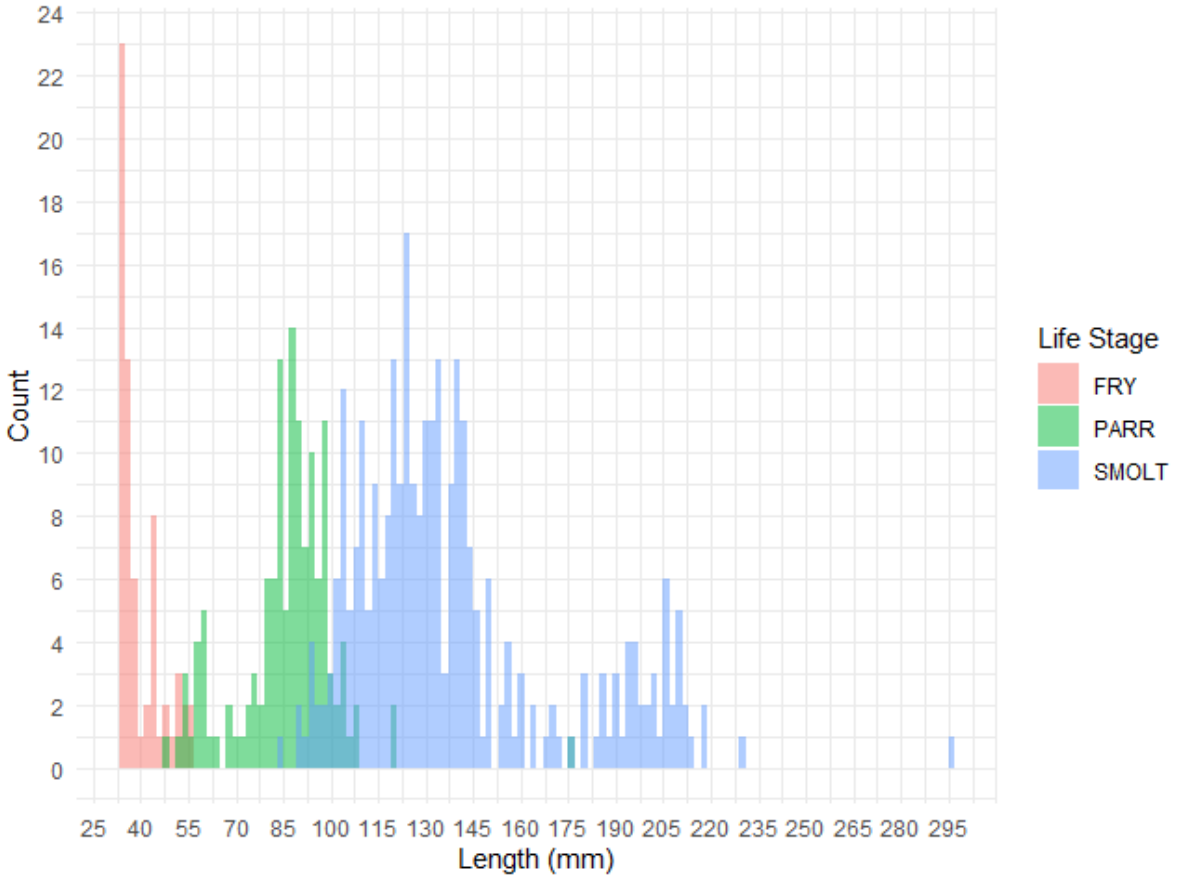

Figure 2: Length of juvenile Chinook salmon captured at the Cougar Dam site.

Dam Operations and Trap Effort

Dam operations data were downloaded from the USACE Dataquery 2.0 website. Table 5 presents the range of total discharge (outflow), powerhouse discharge, spill discharge and forebay elevation for the Cougar Dam project during the current two-week reporting period. Forebay elevation, outflow, powerhouse discharge and spill discharge are plotted along with daily catch of juvenile Chinook salmon and trapping effort in Figure 3. Trapping effort was calculated as cone rotations since the trap was last checked divided by the number of minutes expired since the trap was last checked.

Table 5: Range of total outflow (cfs), powerhouse discharge (cfs), spill discharge (cfs) and forebay elevation (ft) at Cougar dam during the current reporting period. PH, SP, and FB stand for powerhouse, spill and forebay elevation, respectively.

Site	outflow_min	outflow_max	PH_min	PH_max	SP_min	SP_max	FB_min	FB_max
Cougar	680	770	0	150	530	770	1,550.4	1,567.02

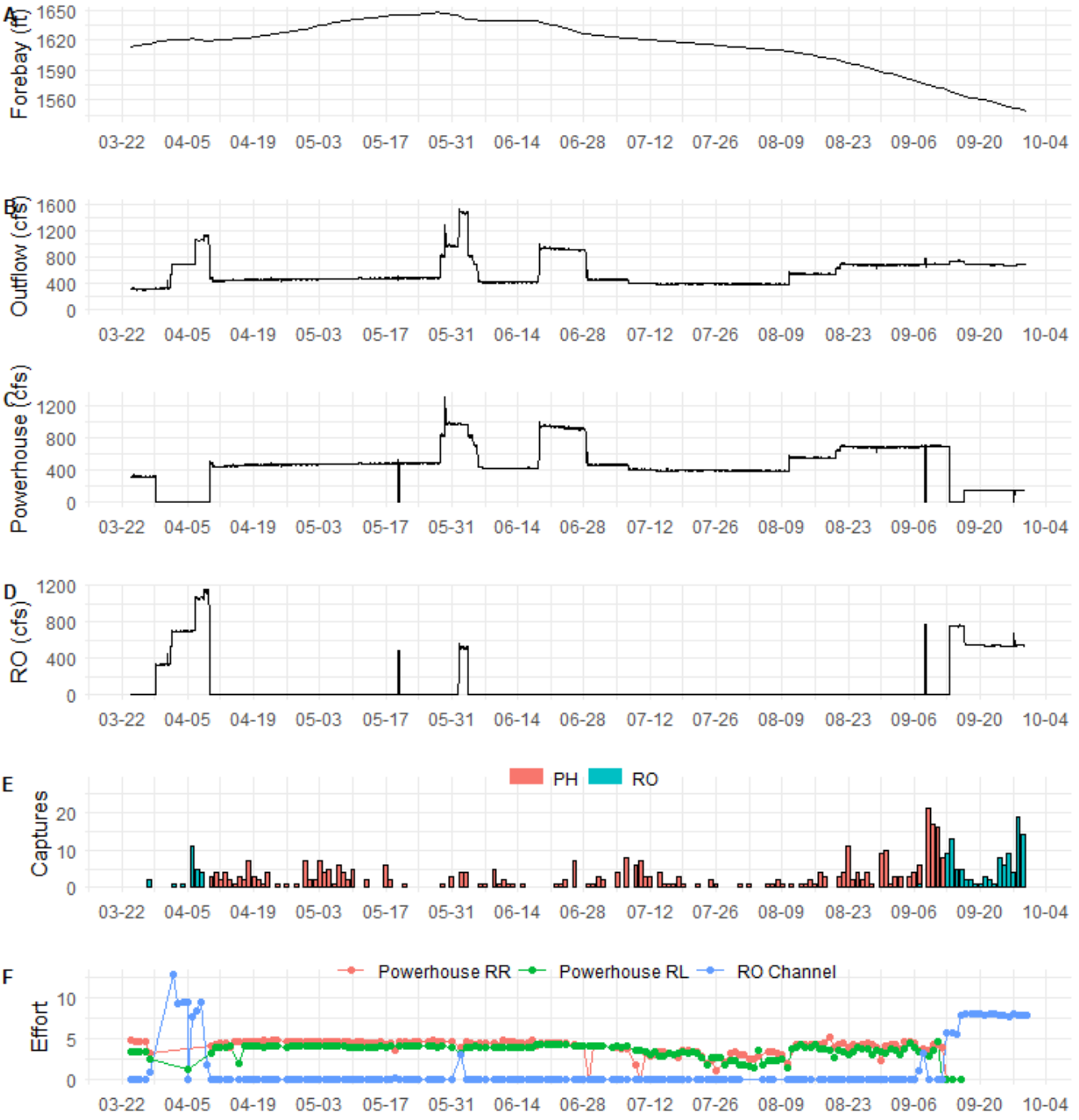

Figure 3: Forebay elevation (panel A), total outflow (panel B), powerhouse flow (panel C), spill (panel D), captured Chinook salmon (panel E), and trapping effort (panel F) below Cougar Dam. Trapping effort is calculated as trap revolutions divided by the number of minutes elapsed since the trap was last checked.RL and RR stand for river left and river right, respectively.

Injuries and Copepod Infection

Table 6 summarizes the type and number of injuries observed at the Cougar site.

Table 6: Injuries sustained by juvenile Chinook salmon captured at the Cougar site. BVT = bloody vent, DS<20 = descaling less than 20%,DS>20 = descaling greater than 20%, COP = copepods, EYB = bloody eye, FID = fin damage, FUN = fungus, HBP = hole behind pectoral fin, MORT = mortality, OPD = opercle damage, POP = pop eye, TEA = body injury (tears, scrapes, etc.)

Site	Route	Species	Life Stage	Injury Code	Reporting Period Injuries	Total Injuries
Cougar	Powerhouse	CHS	FRY	TEA	0	2
	Powerhouse			COP	0	25
	Powerhouse			EYB	0	1
	Powerhouse		PARR	FID	0	2
	Powerhouse			MORT	0	2
	Powerhouse			TEA	0	3
	Powerhouse			COP	0	113
	Powerhouse			DS<20	0	1
	Powerhouse			DS>20	0	1
	Powerhouse		SMOLT	EYB	0	1
	Powerhouse			MORT	0	2
	Powerhouse			POP	0	1
	Powerhouse			TEA	0	2
	Regulating Outlet			COP	3	8
	Regulating Outlet			DS<20	1	5
	Regulating Outlet			HBP	1	2
	Regulating Outlet		PARR	MORT	1	1
	Regulating Outlet			EYB	0	1
	Regulating Outlet			FID	0	1
	Regulating Outlet			FUN	0	1
	Regulating Outlet		SMOLT	COP	86	117
	Regulating Outlet			DS<20	43	61

Site	Route	Species	Life Stage	Injury Code	Reporting Period Injuries	Total Injuries
	Regulating Outlet			MORT	24	30
	Regulating Outlet			DS>20	18	23
	Regulating Outlet			FID	13	16
	Regulating Outlet			POP	4	4
	Regulating Outlet			EYB	4	6
	Regulating Outlet			OPD	1	3
	Regulating Outlet			TEA	1	1
	Regulating Outlet			BVT	0	1

Table 7 summarizes copepod infestation of juvenile Chinook salmon captured at the Cougar Dam site.

Table 7: Copepod infestation of target species captured at the Cougar site. Infestations are the number of fish with copepods, Rate is calculated as the number of fish with copepods divided by total catch, Gill Rate is calculated as the number of fish with copepods in their gills divided by total catch and Gill Severity is calculated as the total number of copepods observed in the gills divided by the number of fish with copepods observed in their gills (mean number of gill copepods). Fin metrics were calculated using the same method, but with copepods observed on the fins.

		Reporting Period						Overall					
Site	Species	Infestations	Rate	Gill Rate	Gill Severity	Fin Rate	Fin Severity	Infestations	Rate	Gill Rate	Gill Severity	Fin Rate	Fin Severity
Cougar	CHS	94	0.85	0.85	8.68	0.46	2	271	0.55	0.41	6.13	0.34	2.78

Non-Target Species

Non-target species that have been captured at the Cougar Dam site are summarized in Table 8.

Table 8: Non-target species captured at the Cougar site. BLG = bluegill, COT = sculpin, CUT = cutthroat trout, LSS = large-scale sucker, LND = long nose dace, MWF = mountain whitefish, RBT = rainbow trout, SMB = smallmouth bass, Newt = rough-skinned newt.

Site	Species	Reporting Period Catch	Total Catch
Cougar	LSS	0	452
	COT	0	132
	RBT	1	77
	LND	0	54
	CUT	0	35

Site	Species	Reporting Period Catch	Total Catch
	MWF	0	18
	BLG	0	4
	SMB	0	4
	LMB	0	2
	LPY	1	1
	Newt	0	1

North Santiam - Big Cliff Dam

Target Species

Sampling below Big Cliff dam from 2021-09-15 to 2021-09-30 (15 days) resulted in the capture of 20 juvenile Chinook salmon. Table 9 summarizes the catch of juvenile Chinook salmon at the Big Cliff site. Figure 4 illustrates the length distribution of juvenile Chinook salmon captured at the Big Cliff site to date. Two adult mini-jacks were captured during the most recent sampling period, one of which appeared to be post-spawn.

Table 9: Descriptive statistics of target species captured at the Big Cliff dam site.

				Lengths (mm)				Weights (g)			
Site	Species	Life Stage	n	Min	Max	Mean	S.D.	Min	Max	Mean	S.D.
Big Cliff (Reporting Period)	CHS	ADULT	2	290	290	290.0		280.5	280.5	280.5	
	CHS	SMOLT	18	117	166	144.1	14.6	19.8	51.9	35.1	10.2
Big Cliff (Total)	CHS	ADULT	2	290	290	290.0		280.5	280.5	280.5	
	CHS	FRY	1	43	43	43.0		Inf	-Inf		
	CHS	PARR	10	56	99	79.6	14.7	3.2	11.3	7.1	2.7
	CHS	SMOLT	505	92	305	132.3	23.3	7.6	153.6	27.0	15.9

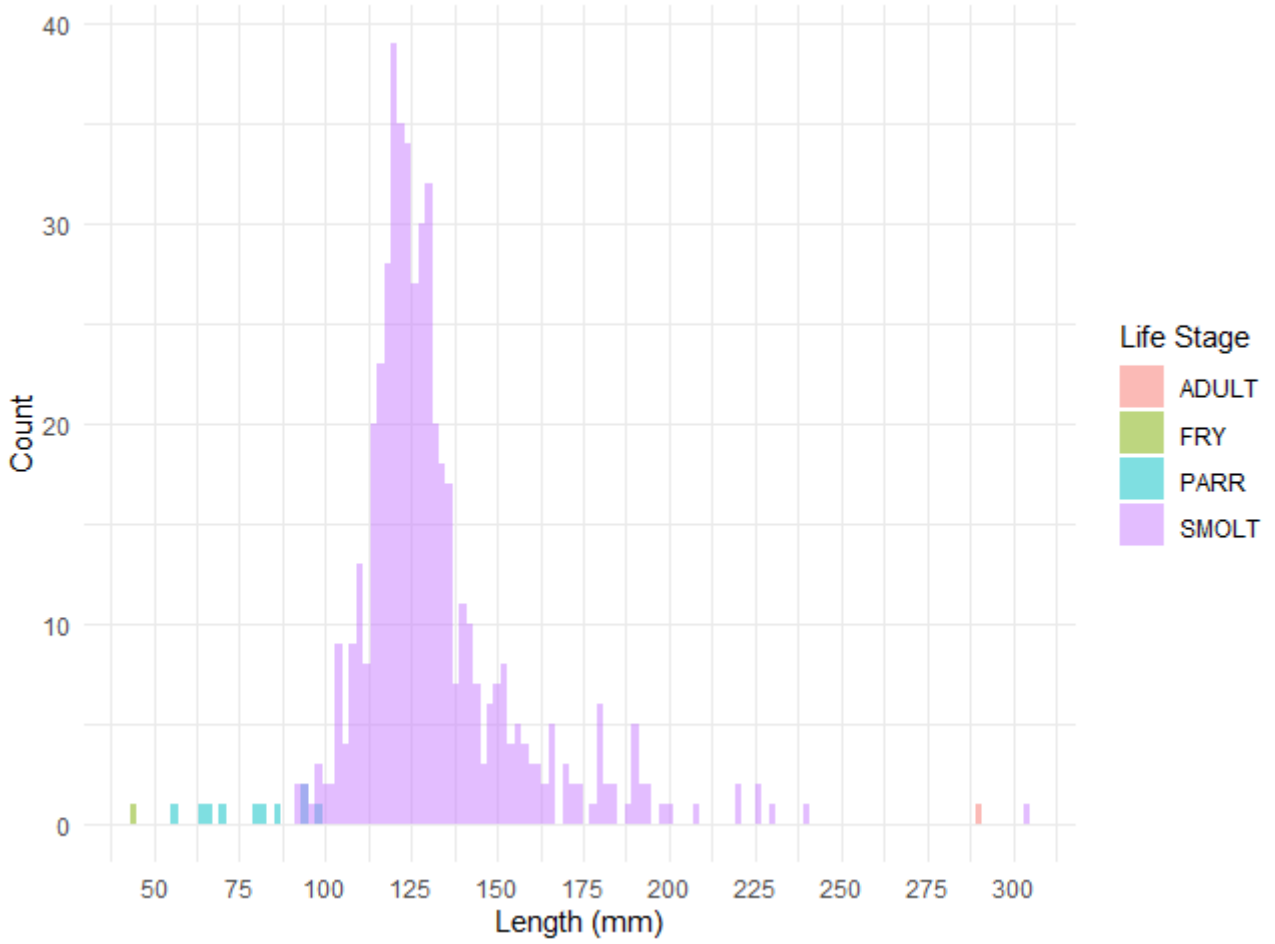

Figure 4: Length distribution of juvenile Chinook salmon captured at the Big Cliff Dam site.

Dam Operations and Trap Effort

Dam operations data were downloaded from the USACE Dataquery 2.0 website. Table 10 presents the range of total discharge (outflow), powerhouse discharge, spill discharge and forebay elevation for the Big Cliff dam project during the current two-week reporting period. Forebay elevation, outflow, powerhouse discharge and spill discharge are plotted along with daily catch of juvenile Chinook salmon and trapping effort in Figure 5. Trapping effort was calculated as cone rotations since the trap was last checked divided by the number of minutes expired since the trap was last checked. Table 11 and Figure 6 present dam operations for Detroit along with catch and effort below Big Cliff.

Table 10: Range of total outflow (cfs), powerhouse discharge (cfs), spill discharge (cfs) and forebay elevation (ft) at Big Cliff dam during the current reporting period. PH, SP, and FB stand for powerhouse, spill and forebay elevation, respectively.

Site	outflow_min	outflow_max	PH_min	PH_max	SP_min	SP_max	FB_min	FB_max
Big Cliff	1,530	2,840	1,530	2,840	0	0	1,195.99	1,199.87

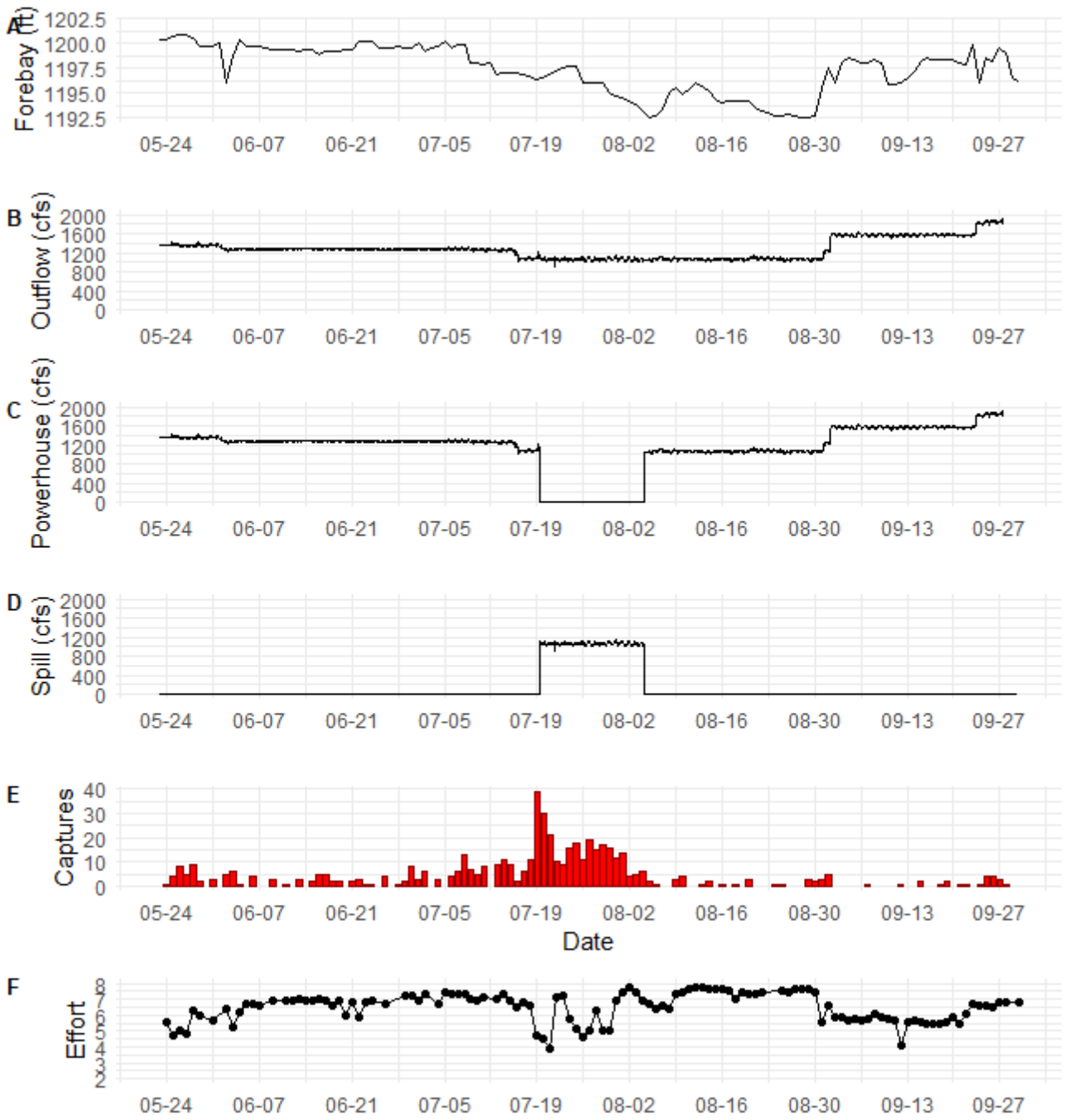

Figure 5: Forebay elevation (panel A), total outflow (panel B), powerhouse flow (panel C), spill (panel D), captured Chinook salmon (panel E), and trapping effort (panel F) below Big Cliff Dam. Trapping effort is calculated as trap revolutions divided by the number of minutes elapsed since the trap was last checked.RL and RR stand for river left and river right, respectively.

Table 11: Range of total outflow (cfs), powerhouse discharge (cfs), spill discharge (cfs) and forebay elevation (ft) at Detroit dam during the current reporting period. PH, SP, and FB stand for powerhouse, spill and forebay elevation, respectively.

Site	outflow_min	outflow_max	PH_min	PH_max	SP_min	SP_max	FB_min	FB_max
Detroit	0	4,530	0	2,770	0	1,980	1,498.5	1,510.28

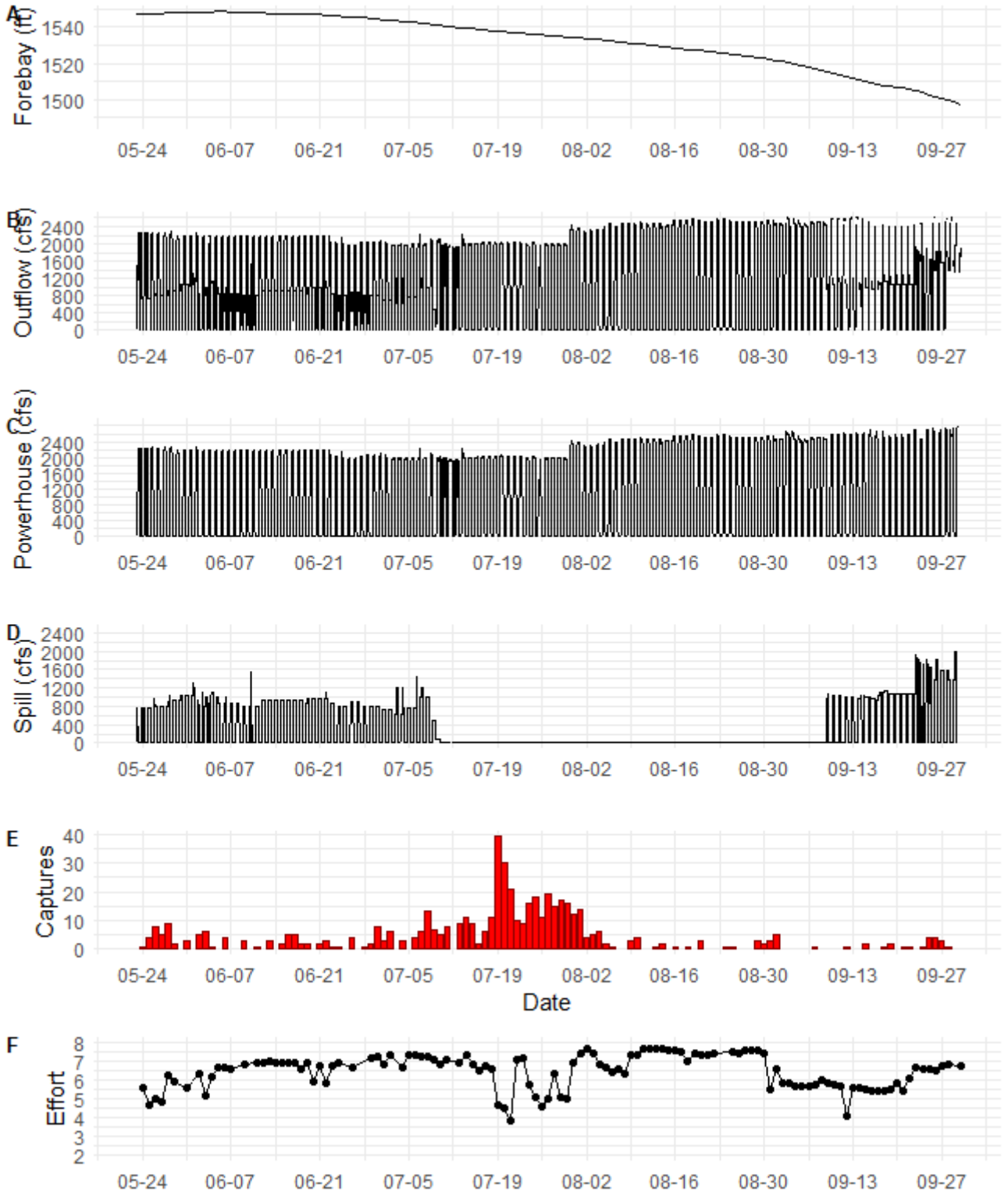

Figure 6: Forebay elevation (panel A), total outflow (panel B), powerhouse flow (panel C), and spill (panel D) at Detroit dam along with juvenile Chinook salmon catch (panel E) and trapping effort (panel F) below Big Cliff Dam. Trapping effort is calculated as trap revolutions divided by the number of minutes elapsed since the trap was last checked.RL and RR stand for river left and river right, respectively.

Injuries and Copepod Infection

Table 12 summarizes the type and number of injuries observed at the Big Cliff site.

Table 12: Injuries sustained by target species captured at the Big Cliff site.BO = body only, COP = copepods, DS<20 = descaling less than 20%, DS>20 = descaling greater than 20%, EYB = bloody eye, FID = fin damage, OPD = opercle damage, POP = pop eye, TEA = body injury (tears, scrapes, etc.)

Site	Species	Life Stage	Injury Code	Reporting Period Injuries	Total Injuries
BigCliff	CHS	ADULT	MORT	2	2
			BO	1	1
			PRD	1	1
		PARR	DS>20	0	1
		SMOLT	COP	16	414
			DS<20	5	50
			MORT	2	29
			DS>20	1	9
			TEA	1	10
			BO	0	4
			EYB	0	10
			FID	0	4
			OPD	0	4
			POP	0	3
			PRD	0	1

Table 13 summarizes copepod infestation of juvenile Chinook salmon captured at the Cougar Dam site.

Table 13: Copepod infestation of target species captured at the Big Cliff site. Infestations are the number of fish with copepods, Rate is calculated as the number of fish with copepods divided by total catch, Gill Rate is calculated as the number of fish with copepods in their gills divided by total catch and Gill Severity is calculated as the total number of copepods observed in the gills divided by the number of fish with copepods observed in their gills (mean number of gill copepods). Fin metrics were calculated using the same method, but with copepods observed on the fins.

		Reporting Period						Overall					
Site	Species	Infections	Rate	Gill Rate	Gill Severity	Fin Rate	Fin Severity	Infections	Rate	Gill Rate	Gill Severity	Fin Rate	Fin Severity
BigCliff	CHS	16	0.8	0.7	6.79	0.55	1.64	417	0.81	0.72	3.94	0.53	1.93

Non-Target Species

Table 14 summarizes the catch of non-target species at the Big Cliff site.

Table 14: Non-target species captured at the Big Cliff site. BLG = Bluegill, COT = Sculpin spp., HRBT = hatchery rainbow trout, KOK = kokanee, PKS = pumpkinseed, RBT = rainbow trout

Site	Species	Reporting Period Catch	Total Catch
BigCliff	RBT	2	91
	BLG	57	80
	HRBT	0	3
	KOK	0	3
	COT	0	2
	PKS	0	2

Issues Encountered

None.

Upcoming USACE Support Services

None.