



Willamette Valley Downstream Fish Passage Monitoring

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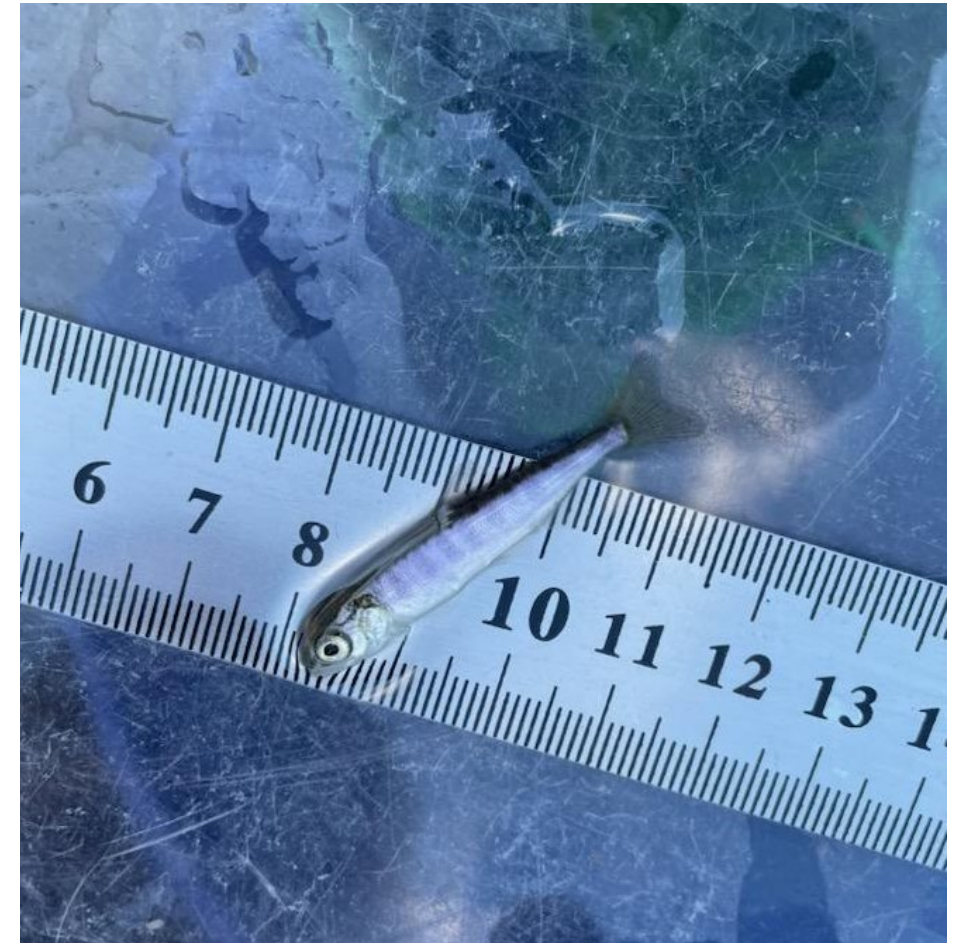
EAS ENVIRONMENTAL
ASSESSMENT
SERVICES



Wholly Owned Subsidiary of Natives of Kodiak

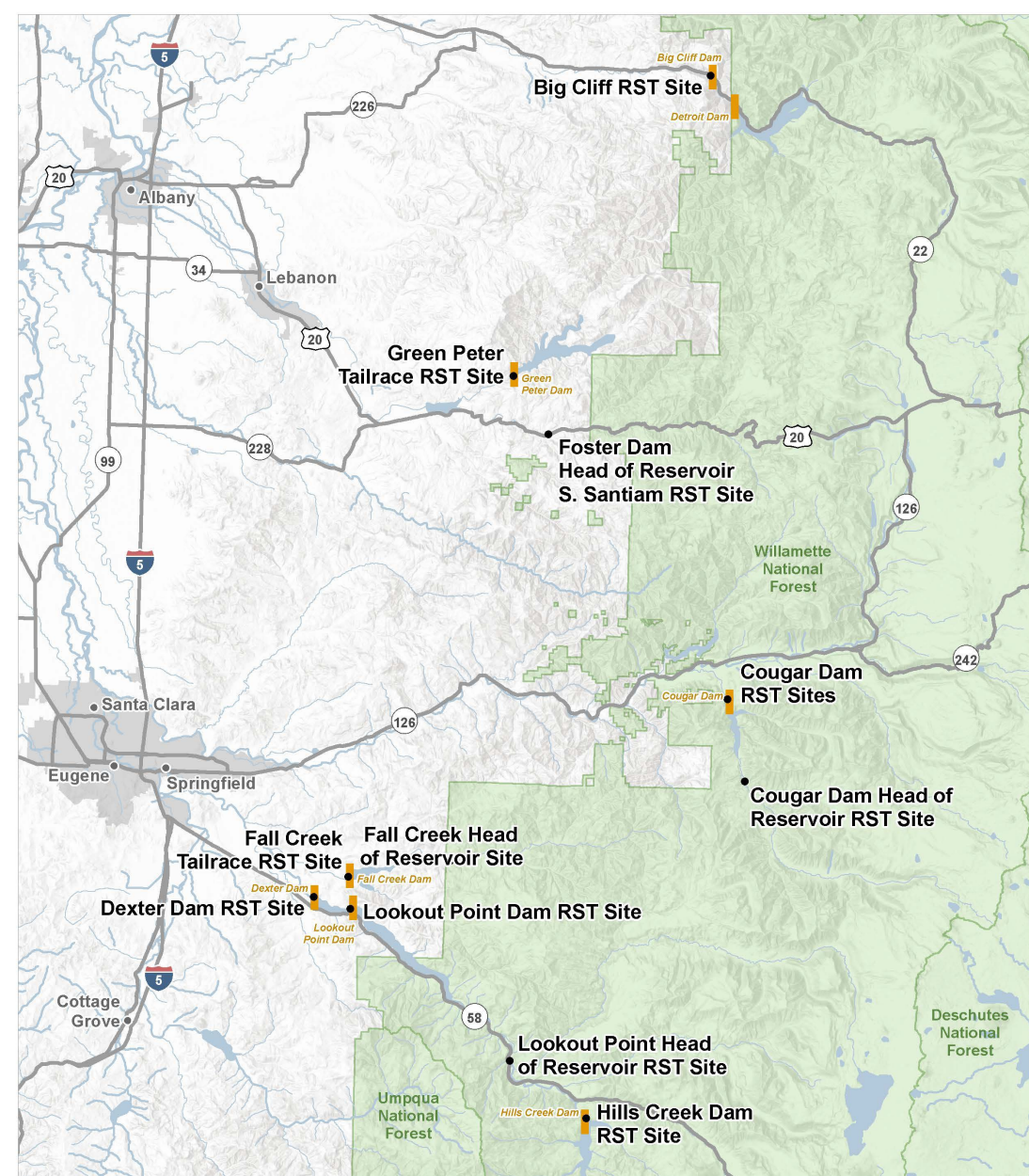
Objectives

- Passage Estimates of Juvenile Salmonids
 - Provide passage estimates by site and route of passage, where sufficient data allows
- Migration Timing, Age Class, and Size of Juvenile Salmonids
 - Provide data on migration/passage timing and size/age class of fish entering and exiting Willamette Valley Reservoirs
- Injuries and Mortality
 - Provide injury data on juvenile salmonids associated with passage through CORPs Willamette Valley Projects



Monitoring Sites

- 11 Monitoring sites across three river systems:
 - Santiam (North, Middle, and South Santiam)
 - McKenzie
 - Middle Fork Willamette
- 16 Rotary screw traps (RSTs)
- Fall 2021 to December 31, 2022



Rotary Screw Trap Locations

- RST Locations
- ▬ USACE Dams



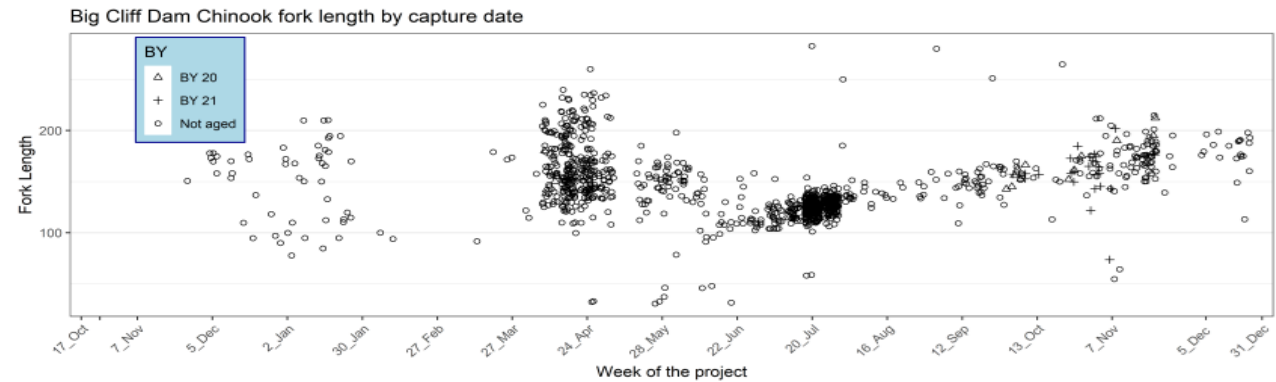
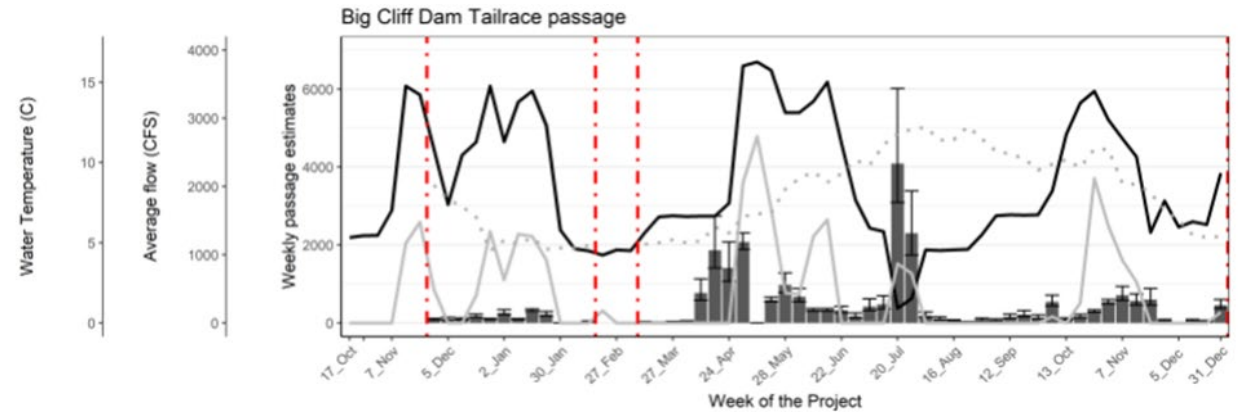
North Santiam - Big Cliff Dam

- Trap sampled 355 days between December 1, 2021 and December 31, 2022.
- Captured 1,255 juvenile Chinook and 107 juvenile *O. mykiss*
- Captured 4,575 non-target fish. Most common non-targets were bluegill, pumpkinseed, and kokanee.



Big Cliff Dam - Catch

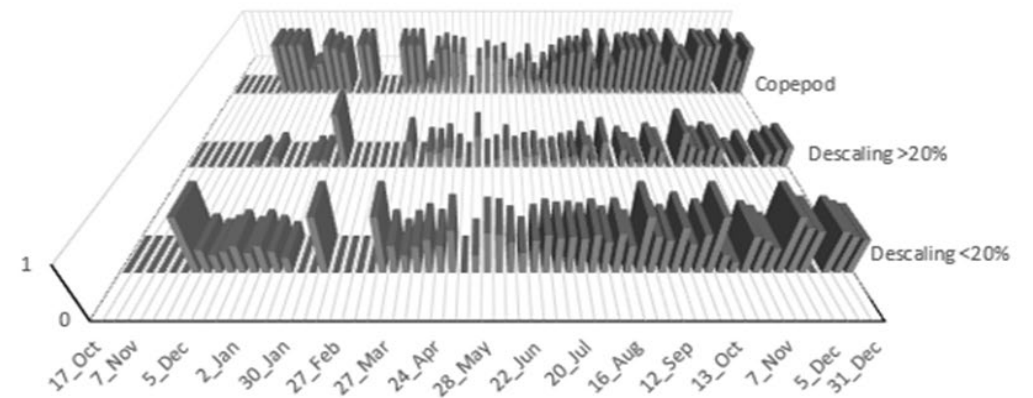
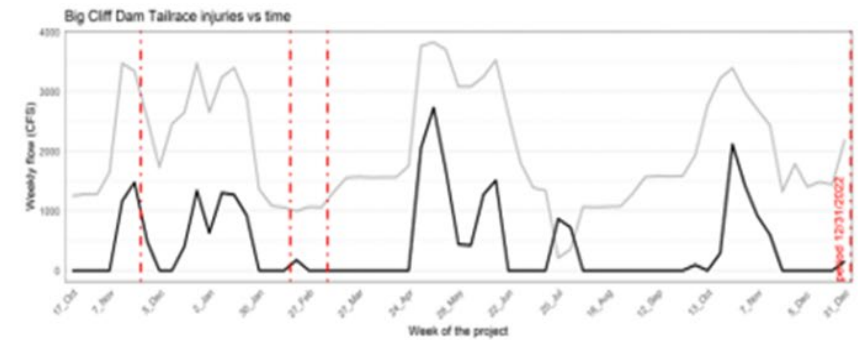
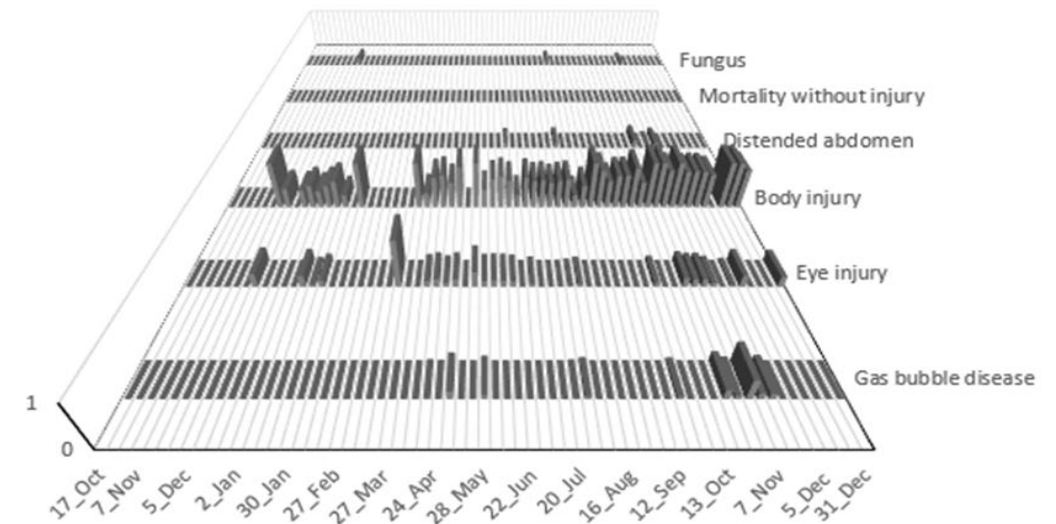
- Estimated passage of 23,617 (95% CI: 18,854 to 32,245) juvenile Chinook
- Peak passage occurred in July (n=526, 41.9% of total chinook capture)
- Yearlings comprised a majority of the catch from December 2021 thru May 2022.
- Sub-yearlings comprised a majority of the catch from July 2022 to the end of 2022.
- 543 Chinook were PIT tagged and released. 1 Chinook was redetected downstream on the TWX- Estuary Towed Array



Brood Year	Time Period	Number Captured	Median Size
2020 (Yearlings)	December 1, 2021 to May 31, 2022	290	FL: 160 mm Weight: 38.1 g
2020 and 2021	June 1, 2022 to December 31, 2022	897	FL: 131 mm Weight: 26.2 g

Big Cliff Dam - Injuries

- 1,209 juvenile Chinook (96.3%) displayed injury other than copepods.
- 974 juvenile Chinook (77.6%) were infected with copepods at time of capture.
- 162 juvenile Chinook (12.9%) were dead at time of capture.
- The highest observed mortality in juvenile Chinook occurred in April and May (n=111, 28.6% of total capture for April and May).



Foster Dam Head of Reservoir - South Santiam

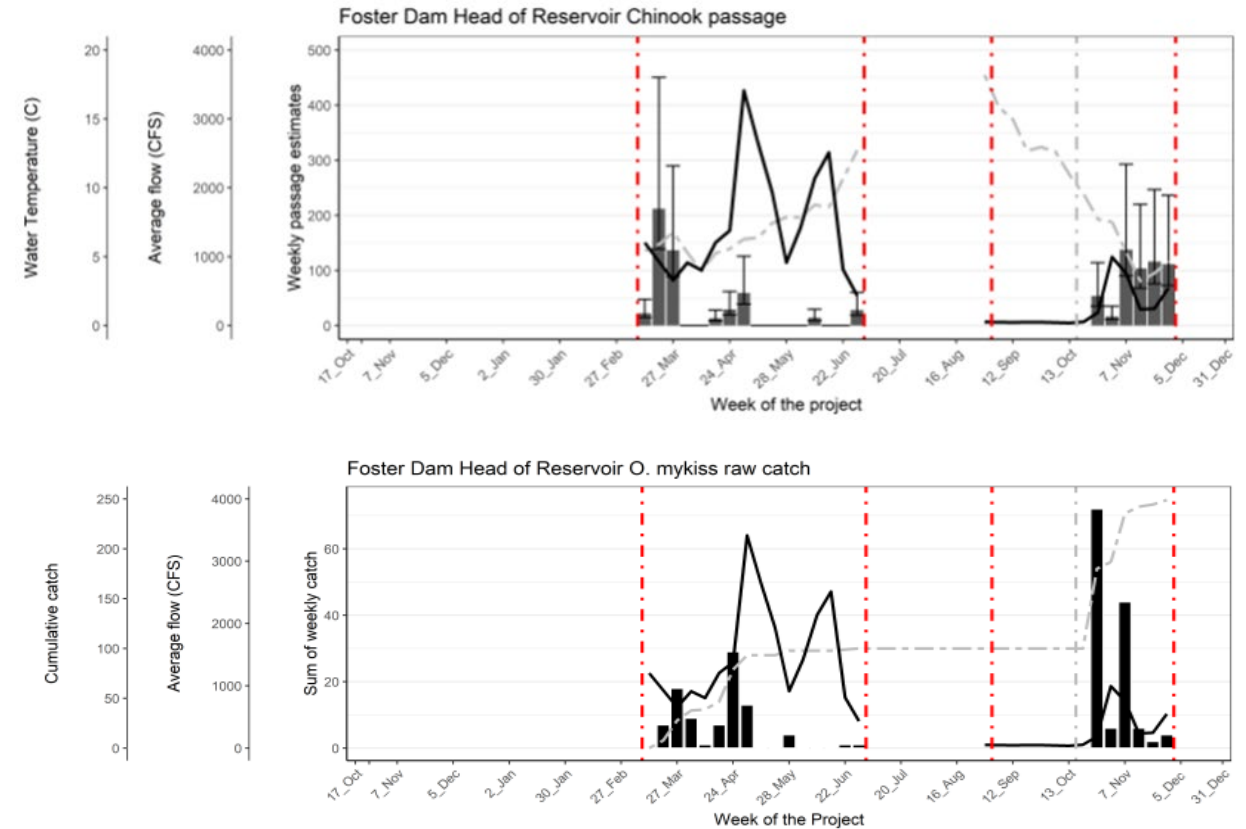


- Trap sampled 183 days between March 7 to June 30, 2022 and September to November 30, 2022.
- Captured 128 juvenile Chinook and 224 juvenile *O. mykiss*.
- Captured 433 non-target fish. Most common non-targets were Dace and Cutthroat trout.



Foster Dam Head of Reservoir - South Santiam - Catch

- Estimated passage of 1,054 (95% CI: 689 to 2,238) juvenile Chinook
- Peak passage of juvenile Chinook occurred in October and November (n=62, 48.4%).
- Peak passage of juvenile *O. mykiss* occurred in late October and November (n=134, 59.8%).
- Fall *O. mykiss* passage consisted of primarily age 1 fish (n=68, 50.7% of total fall catch) and age 0 fish (n=65, 48.5% of total fall catch).
- 73 Chinook and 192 *O. mykiss* were PIT tagged and released. 1 *O. mykiss* was redetected downstream on the LD2-Lebanon Dam North Ladder array.



Brood Year (<i>O. mykiss</i>)	Time Period	Number Captured	Median Size
2020	March 7, 2022 to June 30, 2022	42	FL: 170 mm Weight: 50.0 g
2021	March 7, 2022 to June 30, 2022	16	FL: 111 mm Weight: 13.4 g
2021	September 2, 2022 to November 30, 2022	68	FL: 205 mm Weight: 31.7 g
2022	September 2, 2022 to November 30, 2022	65	FL: 85 mm Weight: 7.6 g

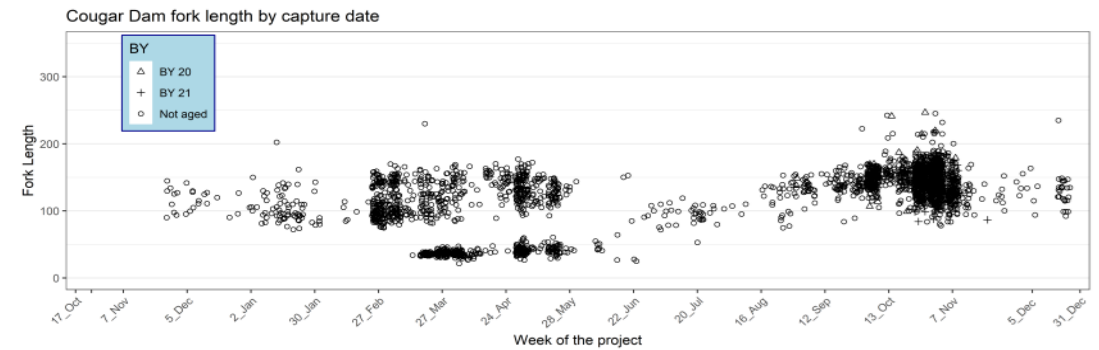
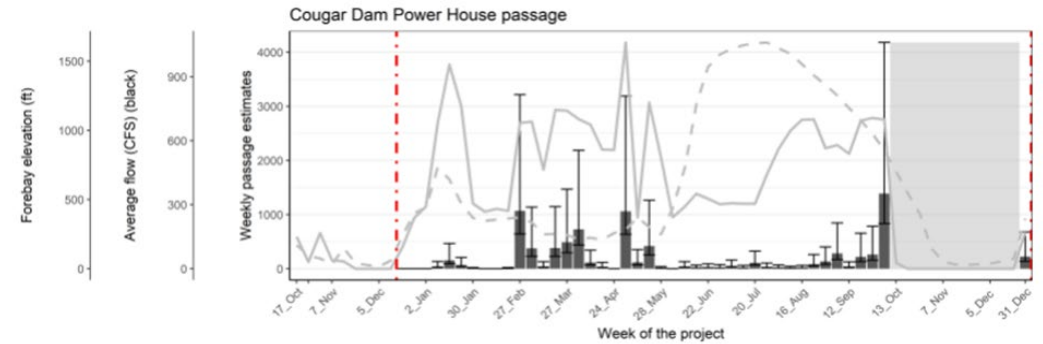
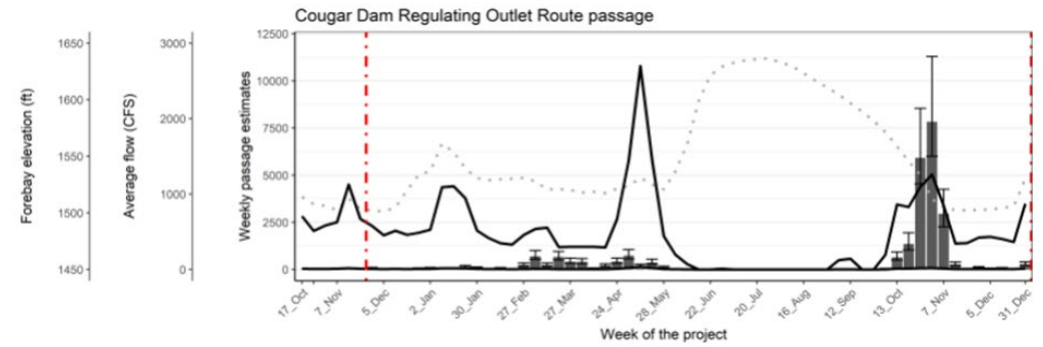
SF McKenzie - Cougar Dam

- Powerhouse traps (two 8-foot traps) sampled 307 days between December 1, 2021 and December 31, 2022.
- RO trap (one 5-foot trap) sampled 394 days between December 1, 2021 and December 31st 2022.
- Captured 2,996 juvenile Chinook, 1,193 (39.8%) in the powerhouse traps and 1,803 (60.2%) in the RO trap.
- Captured 3,294 non-target fish. Most common non-targets were dace, O. mykiss, and sculpin.



Cougar Dam - Catch

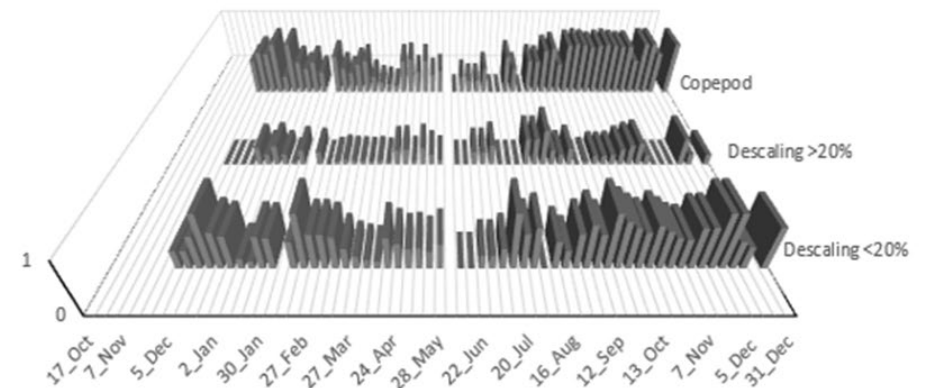
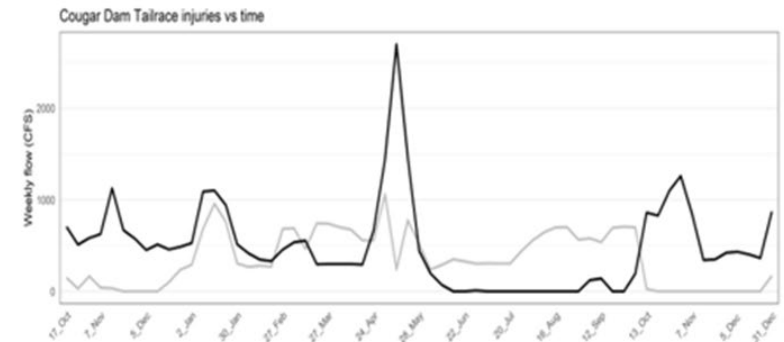
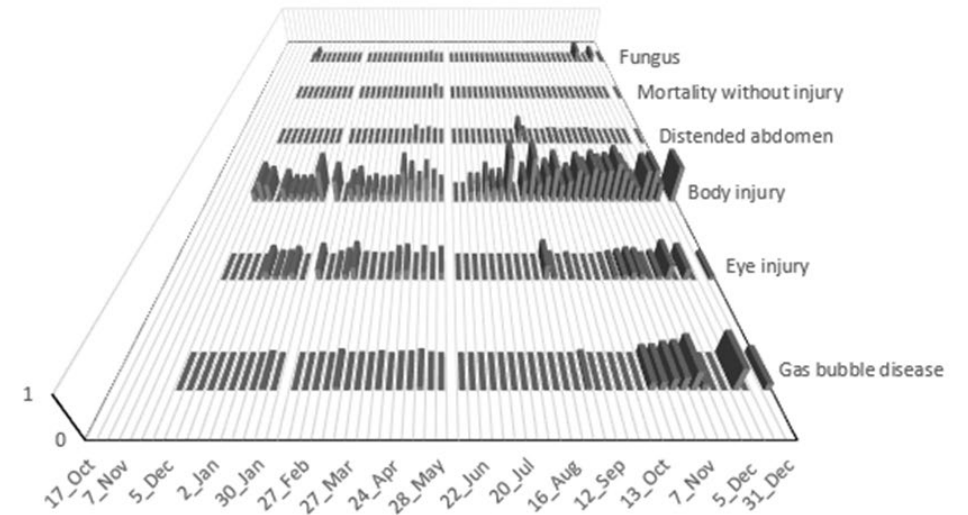
- Estimated passage 32,868 (95% CI: 23,838 to 59,830). Powerhouse passage estimated at 7,912 and RO passage at 24,956.
- Peak passage through the powerhouse occurred February through May (n=735, 60.2% of total powerhouse catch).
- Peak passage through the RO occurred in October and November (n=1,393, 77.3% of total RO catch).
- Peak passage of yearlings occurred in April.
- Sub-yearlings comprised a majority of the catch from March through December.
- 1,369 Chinook were PIT tagged and released. 2 Chinook were redetected downstream on the TWX-Estuary Towed Array.



Brood Year	Time Period	Number Captured	Median Size
2020	December 1, 2021 to June 30, 2022	290	FL: 160 mm Weight: 38.1 g
2021	March 5, 2022 to June 30, 2022	408	FL: 37 mm
2020 and 2021	July 1, 2022 to December 31, 2022	1,802	FL: 144 mm Weight: 31.9 g

Cougar Dam - Injury

- 2,568 juvenile Chinook (85.7%) displayed injury other than copepods. 1,775 RO captured fish and 793 powerhouse captured fish
- 2,185 juvenile Chinook (72.9%) were infected with copepods at time of capture.
- 437 juvenile Chinook (14.6%) were dead at time of capture. 119 from the powerhouse traps (10.0% of powerhouse capture) and 318 from the RO trap (17.6% of RO capture).
- The highest observed mortality in juvenile Chinook occurred in August through November (n=334, 19.3% of total capture August thru November).



Cougar Dam Head of Reservoir

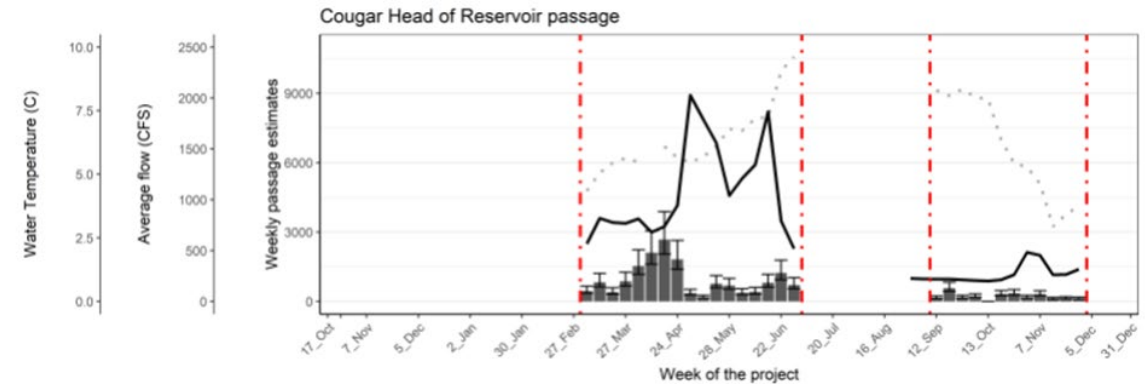


- Trap sampled 164 days between March 7, 2022 and November 30, 2022.
- Captured 710 juvenile Chinook.
- Captured 443 non-target fish. Most common non-targets were *O. mykiss*, and Cutthroat Trout.
- Captured 11 Bull Trout.



Cougar Dam Head of Reservoir - Catch

- Estimated passage of 18,952 (95% CI: 14,462 to 27,482) juvenile Chinook
- Peak passage of juvenile Chinook occurred in March and April (n=329, 46.3%).
- Sub-yearling comprised a majority of catch throughout the year (n= 676, 95.2%)
- Yearling catch occurred in March and April (n=34, 4.8%)
- 156 Chinook were PIT tagged and 33 were VIE marked and released. An additional 3,223 hatchery Chinook were PIT tagged and released for trapping efficiency. 38 PIT tagged fish were redetected downstream at Cougar Dam.



Brood Year	Time Period	Number Captured	Median Size
2020 (Yearlings)	March 7, 2022 to June 30, 2022	34	FL: 76 mm Weight: 8.2 g
2021	March 7, 2022 to June 30, 2022	542	FL: 37 mm
2021	September 16, 2022 to November 30, 2022	134	FL: 78 mm Weight: 5.3 g

Summary of Additional Sites

Site	Days Sampled	Catch	Passage Estimate	Mortalities at time of Capture
Green Peter Dam	54	6 Juvenile O. mykiss	N/A	0
Fall Creek Dam	173	1 Juvenile Chinook (yearling)	N/A	0
Fall Creek Head of Reservoir	131	7 Juvenile Chinook (6 BY 20, 1 BY 19)	N/A	0
Dexter Dam	282	99 Juvenile Chinook	724 (95% CI: 515 to 1,220) through Spill March- June	10 (10.1% of total catch)
Lookout Dam	Powerhouse Traps: 262 days Spill Trap: 260 days	78 Juvenile Chinook 40 in Powerhouse Traps 38 in Spill Trap	N/A	15 (19.2% of total catch)
Lookout Point Head of Reservoir	250	108	N/A	0
Hills Creek	242	140 Juvenile Chinook 56 in Powerhouse Traps 84 in Spill Trap	6,262 (95% CI: 3,865 to 16,561) 1,923 through Powerhouse 4,339 through RO	74 (30.6% of total catch)



Acknowledgements

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