

# WILLAMETTE VALLEY FISH PASSAGE MONITORING – BULK MARKING & RESERVOIR DISTRIBUTION

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Bi-Weekly Report: July 01, 2023 – July 15, 2023



*Prepared for: United States Army Corps of Engineers*

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July 25, 2023

## BULK MARKING SCHEDULE

Table 1. Tentative release schedule for brood year 2022. Green rows highlight the release groups that have been tagged and released so far this year. Orange rows highlight release groups that have been tagged but have not yet been released.

Release Year	Release Date (estimated)	Release Basin	Release Area	Release Location	Life stage	N
2023	February	North Santiam	Detroit Reservoir	Breitenbush River	fry	3750
2023	February	North Santiam	Detroit Reservoir	North Santiam River	fry	3750
2023	March	MF Willamette	Fall Creek Reservoir	Head of Reservoir	fry	5000
2023	March	MF Willamette	Lookout Point Reservoir	Head of Reservoir	fry	5000
2023	March	MF Willamette	Hills Creek Reservoir	Head of Reservoir	fry	5000
2023	March	SF McKenzie	Cougar Reservoir	Head of Reservoir	fry	5000
2023	March	SF McKenzie	Cougar Reservoir	Head of Reservoir	fry	5000
2023	March	MF Willamette	Fall Creek Reservoir	Head of Reservoir	fry	5000
2023	April	MF Willamette	Lookout Point Reservoir	Head of Reservoir	fry	5000
2023	April	North Santiam	Detroit Reservoir	Breitenbush River	fry	3750
2023	April	North Santiam	Detroit Reservoir	North Santiam River	fry	3750
2023	April	South Santiam	Green Peter Reservoir	Head of Middle Santiam Arm	fry	2500
2023	April	South Santiam	Green Peter Reservoir	Head of Quartzville Creek Arm	fry	2500
2023	April	MF Willamette	Hills Creek Reservoir	Head of Reservoir	fry	5000
2023	April	South Santiam	Green Peter Reservoir	Head of Middle Santiam Arm	fry	2500
2023	April	South Santiam	Green Peter Reservoir	Head of Quartzville Creek Arm	fry	2500
2023	August	South Santiam	Foster Reservoir	Tailrace	sub-yearling	1000
2023	August	South Santiam	Foster Reservoir	Head of Reservoir	sub-yearling	2000
2023	September	MF Willamette	Dexter Reservoir	Tailrace	sub-yearling	2000
2023	September	MF Willamette	Lookout Point Reservoir	Head of Reservoir	sub-yearling	5000
2023	September	MF Willamette	Lookout Point Reservoir	Forebay	sub-yearling	5000
2023	September	SF McKenzie	Cougar Reservoir	Head of Reservoir	sub-yearling	3000
2023	September	South Santiam	Green Peter Reservoir	Head of Middle Santiam Arm	sub-yearling	2500
2023	September	South Santiam	Green Peter Reservoir	Head of Quartzville Creek Arm	sub-yearling	2500
2023	October	North Santiam	Big Cliff Reservoir	Big Cliff Reservoir Tailrace	sub-yearling	8000
2023	October	North Santiam	Detroit Reservoir	Breitenbush River	sub-yearling	5000
2023	October	North Santiam	Detroit Reservoir	North Santiam River	sub-yearling	5000
2023	October	MF Willamette	Fall Creek Reservoir	Head of Reservoir	sub-yearling	5000
2023	October	MF Willamette	Fall Creek Reservoir	Tailrace	sub-yearling	1000
2023	October	SF McKenzie	Cougar Reservoir	Forebay	sub-yearling	5000
2023	October	SF McKenzie	Cougar Reservoir	Tailrace	sub-yearling	4000
2023	October	SF McKenzie	Cougar Reservoir	Head of Reservoir	sub-yearling	4000
2023	October	South Santiam	Green Peter Reservoir	Tailrace	sub-yearling	4000
2023	October	South Santiam	Green Peter Reservoir	Head of Middle Santiam Arm	sub-yearling	2500
2023	October	South Santiam	Green Peter Reservoir	Head of Quartzville Creek Arm	sub-yearling	2500
2023	October	South Santiam	Foster Reservoir	Tailrace	sub-yearling	4000
2023	October	South Santiam	Foster Reservoir	Head of Reservoir	sub-yearling	5000

2023	November	MF Willamette	Fall Creek Reservoir	Head of Reservoir	sub-yearling	5000
2023	November	MF Willamette	Fall Creek Reservoir	Tailrace	sub-yearling	1000
2023	November	North Santiam	Big Cliff Reservoir	Tailrace	sub-yearling	6000
2023	November	SF McKenzie	Cougar Reservoir	Forebay	sub-yearling	5000
2023	November	SF McKenzie	Cougar Reservoir	Tailrace	sub-yearling	4000
2023	November	SF McKenzie	Cougar Reservoir	Head of Reservoir	sub-yearling	4000
2023	November	MF Willamette	Hills Creek Reservoir	Head of Reservoir	sub-yearling	5000
2023	November	MF Willamette	Hills Creek Reservoir	Tailrace	sub-yearling	3000
2023	November	MF Willamette	Hills Creek Reservoir	Forebay or Mid Reservoir	sub-yearling	5000
2024	February	MF Willamette	Hills Creek Reservoir	Head of Reservoir	yearling	5000
2024	February	MF Willamette	Hills Creek Reservoir	Tailrace	yearling	3000
2024	February	MF Willamette	Hills Creek Reservoir	Forebay or Mid Reservoir	yearling	5000
2024	February	MF Willamette	Fall Creek Reservoir	Head of Reservoir	yearling	5000
2024	February	MF Willamette	Fall Creek Reservoir	Tailrace	yearling	1000
2024	March	MF Willamette	Lookout Point Reservoir	Head of Reservoir	yearling	5000
2024	March	MF Willamette	Dexter Reservoir	Tailrace	yearling	2000
2024	March	MF Willamette	Lookout Point Reservoir	Forebay	yearling	5000
2024	February	SF McKenzie	Cougar Reservoir	Forebay	yearling	2000
2024	February	SF McKenzie	Cougar Reservoir	Tailrace	yearling	1000
2024	February	SF McKenzie	Cougar Reservoir	Head of Reservoir	yearling	2000
2024	March	SF McKenzie	Cougar Reservoir	Forebay	yearling	2000
2024	March	SF McKenzie	Cougar Reservoir	Tailrace	yearling	1000
2024	March	SF McKenzie	Cougar Reservoir	Head of Reservoir	yearling	2000
2024	March	MF Willamette	Fall Creek Reservoir	Head of Reservoir	yearling	5000
2024	March	MF Willamette	Fall Creek Reservoir	Tailrace	yearling	1000
2024	March	MF Willamette	Lookout Point Reservoir	Head of Reservoir	yearling	5000
2024	March	MF Willamette	Dexter Reservoir	Tailrace	yearling	2000
2024	March	MF Willamette	Lookout Point Reservoir	Forebay	yearling	5000
2024	April	North Santiam	Big Cliff Reservoir	Tailrace	yearling	2000
2024	April	North Santiam	Detroit Reservoir	Breitenbush River	yearling	2000
2024	April	North Santiam	Detroit Reservoir	North Santiam River	yearling	2000

## BULK MARKING SUMMARY

A total of 15,195 North Santiam juvenile Chinook salmon were adipose clipped and PIT tagged at Marion Forks Hatchery between June 26, 2023 and June 29, 2023. These fish were monitored by hatchery staff while Cramer was off site from June 30, 2023 – July 3, 2023. Hatchery staff reported that the fish were healthy through the evening of July 2, 2023. Hatchery staff reported that upon arriving on site the morning of July 3 there were hundreds of mortalities amongst the group of PIT tagged fish. Over the next week a total of 2,809 PIT tagged fish would face the same fate.

All fish were tagged by highly experienced crew, water temperatures were well within safe levels, and stock anesthetic was the same batch that had been used for the last month. We suspected a pathogen and notified the state fish health officials. On July 5<sup>th</sup>, ODFW Fish Health Specialist Dr. Sarah Bjork arrived on site to examine the mortalities and take samples for culture. On July 7, 2023 her initial suspicion was validated when

bacterial cultures confirmed the presence of furunculosis. Furunculosis has been found at the Marion Forks Hatchery in the past, and typically shows up at about 12-14 degrees C.

Dr. Bjork recommended that all tagged fish be placed on medicated feed, both the fish that had been tagged already as well as any fish that were to be tagged moving forward. Our crew had to wait until medicated feed arrived on site and tagging did not resume until July 17. Results from that tagging session fall outside of this reporting period, but initial observations suggest that the tagged fish are healthy and the medicated feed is working well.

On July 13, 2023 we released the North Santiam stock “fry” that were tagged during June 13, 2023 – June 15, 2023. We had intended to release these fish on July 3, 2023 but, due to the furunculosis outbreak, had to wait until we had the go ahead from ODFW (excess mortality was not observed in this group as they were tagged prior to the outbreak). Surprisingly, we were notified by Environmental Assessment Services on July 3<sup>rd</sup> that they had recovered two PIT tagged fish in their North Santiam River rotary screw trap: one on June 16, 2023 and one on July 1, 2023. Upon learning this, we rescanned all of the fry that had been tagged and discovered that 1,251 had somehow escaped the indoor holding troughs, presumably into the effluent. The effluent from the holding troughs drains to Horn Creek approximately 100 meters upstream of the confluence with the North Santiam River at approximately river kilometer 121. We cannot be certain of exactly when these fish escaped into the North Santiam but we know that it had to be sometime between June 15<sup>th</sup> (completion of tagging) and July 13<sup>th</sup> (when the group was removed from the holding troughs and released into either the Breitenbush or the North Santiam at RKM 96).

## Recaptures

There have been four recaptures of PIT tagged fish so far this year (Table 4). One recapture occurred at the Green Peter Tailrace rotary screw trap, one fish was recaptured in an Oneida net in Lookout Point Reservoir, and two fish were recaptured at the Detroit Head of Reservoir – North Santiam River RST.

Table 2. Bulk marking summary statistics. Total number of fish marked (N), mean fork length (FL), mean weight, start date of marking, end date of marking, total mortalities from start of tagging to release, mortality percentage, total shed tags from start of tagging to release, and shed tag percentage.

Mark Group	N	Mean FL (mm)	Mean Weight (g)	Date Start	Date End	Morts	Mort. %	Sheds	Shed %
Green Peter Head of Reservoir - Middle Santiam Arm	5,071	56.1		5/15/2023	5/16/2023	74	1.46	32	0.63
Green Peter Head of Reservoir - Quartzville Creek Arm	5,203	58.5		5/17/2023	5/18/2023	18	0.35	19	0.37
Lookout Point Head of Reservoir	10,041	63.1	2.9	5/22/2023	5/24/2023	39	0.39	53	0.53
Hills Creek Head of Reservoir	10,117	64.6	2.9	5/30/2023	6/1/2023	22	0.22	9	0.09
Fall Creek Head of Reservoir	10,040	67.3	3.2	6/1/2023	6/7/2023	68	0.68	30	0.30
Detroit Head of Reservoir - Breitenbush Arm	7,530	66.9	3.6	6/13/2023	6/14/2023	TBD	TBD	TBD	TBD
Detroit Head of Reservoir - North Santiam Arm	7,528	66.9	3.6	6/14/2023	6/15/2023	TBD	TBD	TBD	TBD
Cougar Head of Reservoir	3,553	67.7	3.5	6/20/2023	6/20/2023	TBD	TBD	TBD	TBD
North Santiam Basin – Fall 2023 and Spring 2024	15,195	67.3	3.5	6/26/2023	6/29/2023	TBD	TBD	TBD	TBD

Table 3. Release summary statistics. Date of release, number of marked fish released, transport tank water temperature and the beginning and end of the transport, and water temperature at the release location.

Release Location	Release Date	N	Transport Temp Start (C)	Transport Temp End (C)	Release Site Temp (C)
Green Peter Head of Reservoir - Quartzville Creek Arm	5/22/2023 14:35	5,167	12	13.2	18
Green Peter Head of Reservoir - Middle Santiam Arm	5/22/2023 20:35	4,965	11.9	12.9	18.3
Lookout Point Head of Reservoir - Black Canyon Boat Ramp	5/30/2023 10:35	9,651	11.9	12.5	13.2
Hills Creek Head of Reservoir - Bingham Boat Ramp	6/5/2023 10:35	9,817	12.9	13.2	11.4
Fall Creek Head of Reservoir	6/12/2023 15:00	9,642	16.5	17.4	19
Lookout Point Head of Reservoir - Black Canyon Boat Ramp	6/12/2023 10:20	300	13.6	13.9	14.8
Hills Creek Head of Reservoir - Bingham Boat Ramp	6/12/2023 12:00	288	14.4	15.1	15.1
North Santiam River - Marion Forks Hatchery Escapees	6/16/2023 - 7/13/2023	1,251	NA	NA	NA
North Santiam River - Pullout at Blowout Road Bridge	7/13/2023 11:35	6,638	11.5	13.1	13

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Breitenbush River - Adult Release Facility

7/13/2023 9:45

7,002

11.5

11.8

12.5

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Table 4. PIT tag recoveries.

<b>PIT ID</b>	<b>Release Date</b>	<b>Release Location</b>	<b>Recapture Date</b>	<b>Recapture Location</b>	<b>Travel Time</b>
3D6.15348025F1	45068	Green Peter Head of Reservoir - Middle Santiam Arm	45074	Green Peter Tailrace Rotary Screw Trap	6 days
3DD.003E4BA25E	NA	Marion Forks Hatchery Escape - Horn Creek	45094	North Santiam River Rotary Screw Trap	NA
3D6.15348010F9	45076	Lookout Point Head of Reservoir	45104	Lookout Point Reservoir Trap Net	28 days
3D6.15348426D4	NA	Marion Forks Hatchery Escape - Horn Creek	45108	North Santiam River Rotary Screw Trap	NA

## Reservoir Distribution Summary

Table 5 provides the effort by trap type and reservoir for the reporting period.

Table 5. Start and end date by statistical week.

Week	Start	End	Reservoir	Net Type	Effort
24	6/11/2023	6/17/2023	Green Peter	oneida	47.7 hours
25	6/18/2023	6/24/2023	Green Peter	box minnow	746.5 hours
25	6/18/2023	6/24/2023	Green Peter	oneida	304.1 hours
26	6/25/2023	7/1/2023	Lookout Point	box minnow	682.7 hours
26	6/25/2023	7/1/2023	Lookout Point	oneida	217.1 hours
27	7/2/2023	7/8/2023	Green Peter	box minnow	689.1 hours
27	7/2/2023	7/8/2023	Green Peter	oneida	298.0 hours
28	7/9/2023	7/15/2023	Lookout Point	box minnow	642.5 hours
28	7/9/2023	7/15/2023	Lookout Point	oneida	210.6 hours

Mean surface water temperatures exceeded 20 degrees Celsius in each reservoir (Table 6).

Table 6. Mean surface water temperature measure during each trap net deployment.

Week	Reservoir	Mean Water Surface Temperature °C
24	Green Peter	20.5
25	Green Peter	21.1
26	Lookout Point	21.7
27	Green Peter	24.1
28	Lookout Point	23.3

The most abundant species in our catch were bluegill, followed by juvenile smallmouth bass, and juvenile largemouth bass. We captured a total of eight Chinook salmon, all of which were captured in Lookout Point Reservoir (Table 7).

Table 7. Summary of catch by reservoir. BLC - Black Crappie, BLG - Bluegill, CHS – Chinook salmon, CUT - Cutthroat trout, LMB - Largemouth bass, LSS - Large-scale sucker, NPM - Northern Pike Minnow, SMB - Smallmouth Bass, WAL - Walleye.

Week	Reservoir	Species	Catch
24	Green Peter	BLC	1
24	Green Peter	BLG	128
24	Green Peter	SMB	2
25	Green Peter	BLC	1
25	Green Peter	BLG	220
25	Green Peter	CUT	1
25	Green Peter	LMB	52
25	Green Peter	NPM	1
25	Green Peter	SMB	6

26	Lookout Point	BLG	8,587
26	Lookout Point	CHS	9
26	Lookout Point	LMB	1
26	Lookout Point	LSS	1
26	Lookout Point	SMB	283
26	Lookout Point	WAL	19
27	Green Peter	BLC	1
27	Green Peter	BLG	253
27	Green Peter	CUT	2
27	Green Peter	LMB	2
27	Green Peter	NPM	2
27	Green Peter	SMB	25

No target species were captured in Green Peter during the reporting period. A total of eight Chinook salmon were captured in the upper zone of Lookout Point (Table 8; Appendix B - Figure 6).

Table 8. Detailed catch summary of target species.

Week	Reservoir	Zone	Species	Catch	length_min	length_mean	length_max
26	Lookout Point	MIDDLE	CHS	4	80	87.2	92
26	Lookout Point	UPPER	CHS	5	73	83.6	95
28	Lookout Point	UPPER	CHS	8	77	84.8	100

## Appendix A. Release Site Maps

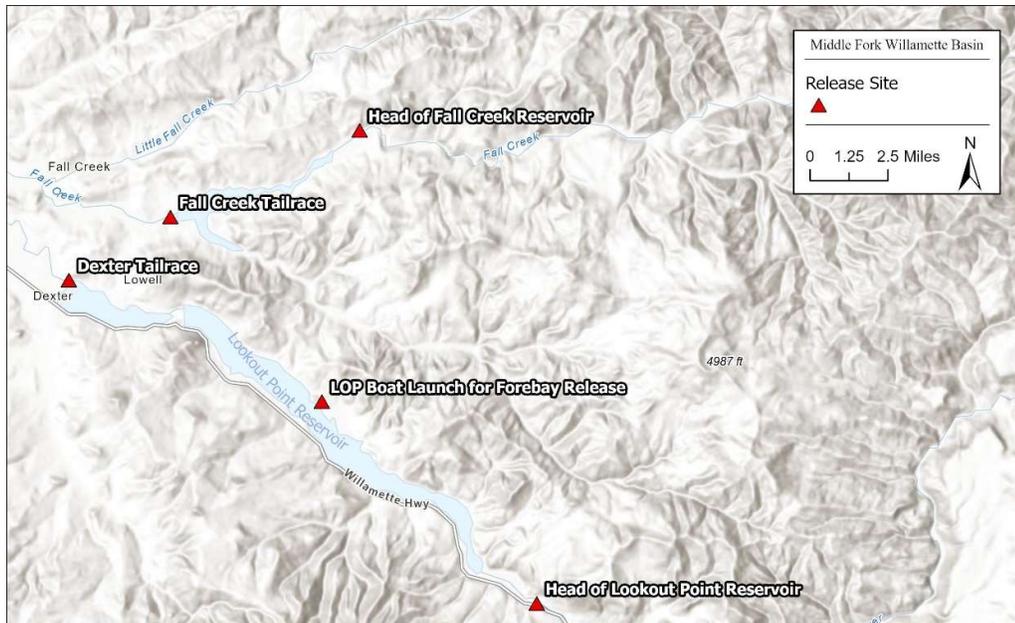


Figure 1. Map of Lookout Point, Dexter tailrace and Fall Creek release locations within the Middle Fork Willamette Basin.

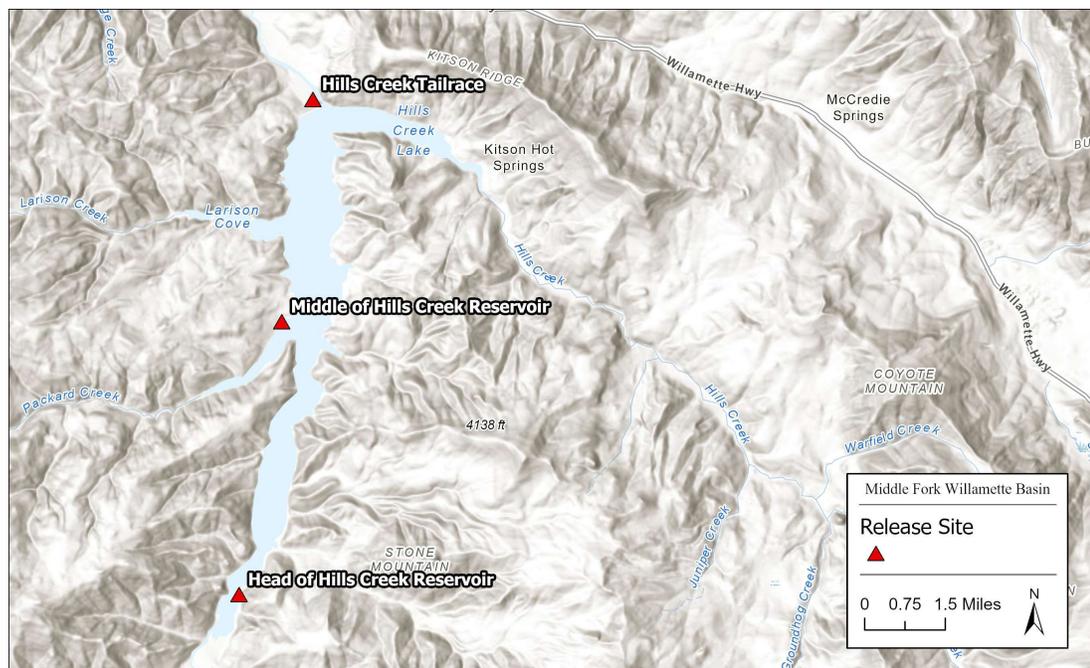


Figure 2. Map of Hills Creek Reservoir release locations within the Middle Fork Willamette Basin.

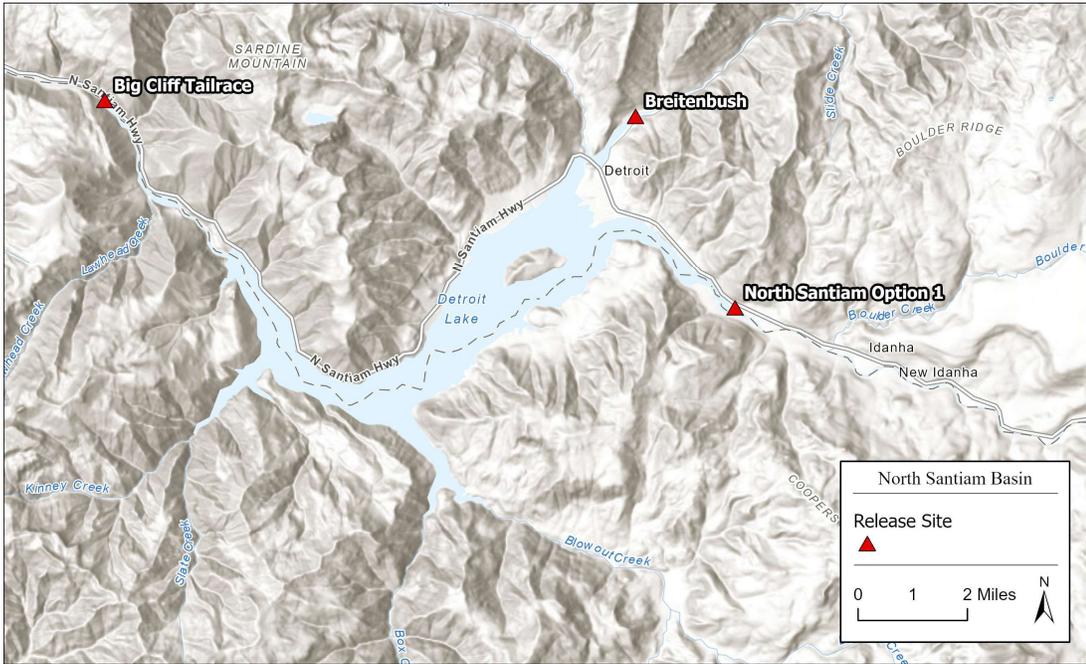


Figure 3. Map of release locations within the North Santiam Basin.

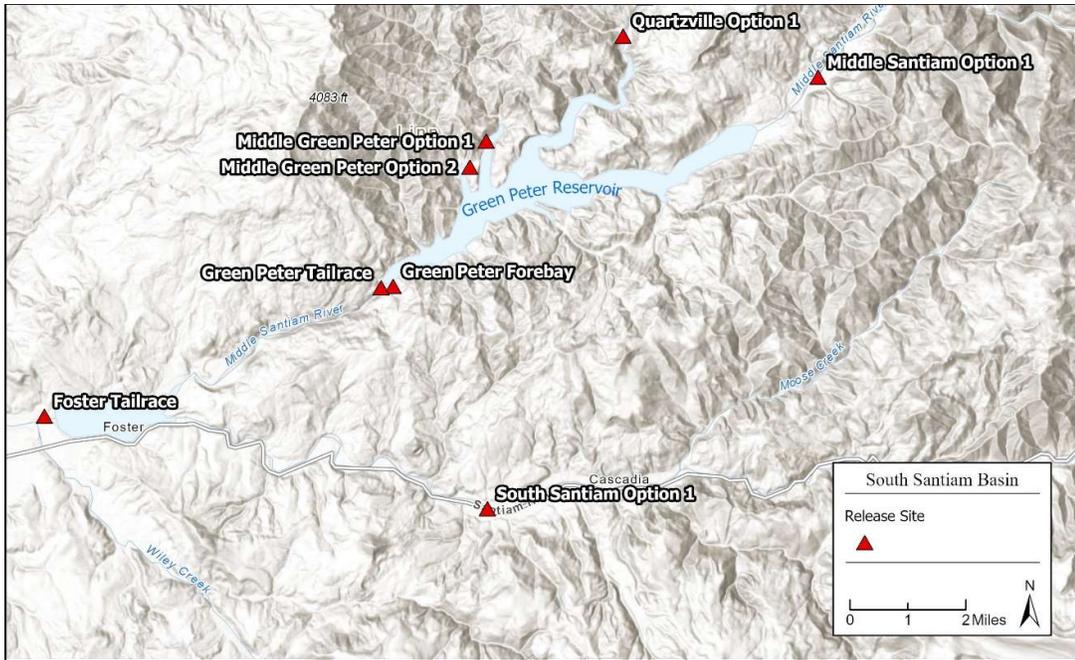


Figure 4. Map of release locations in the Middle/South Santiam basin including Green Peter Reservoir.

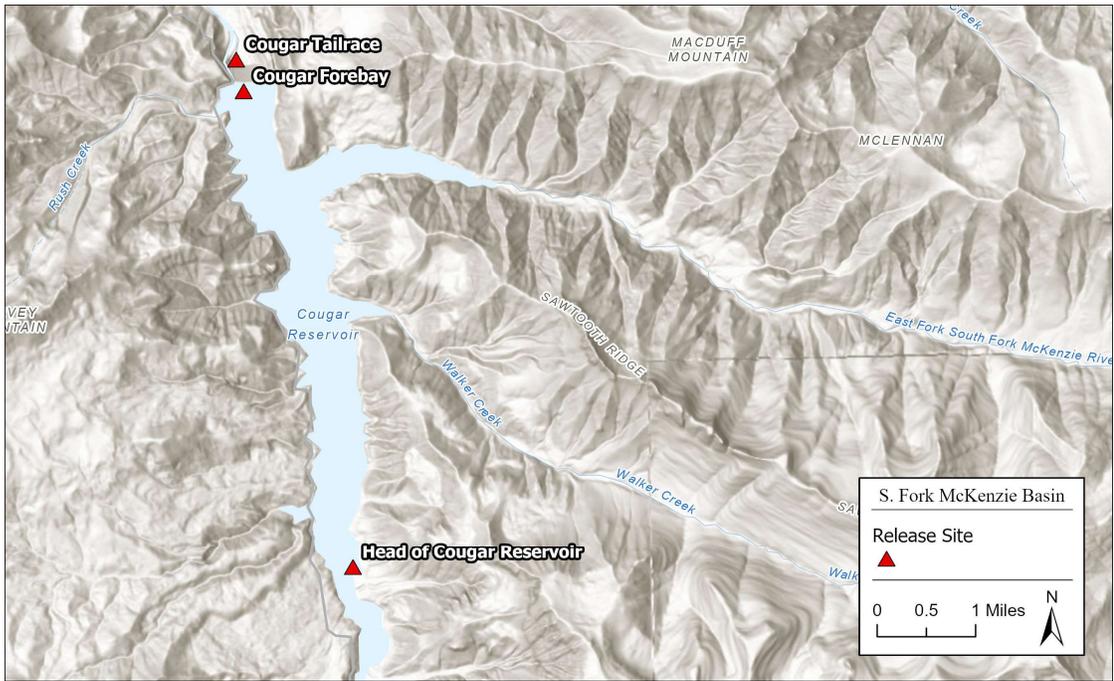


Figure 5. Map of release locations at Cougar Reservoir.

## Appendix B. Reservoir Sampling Zones

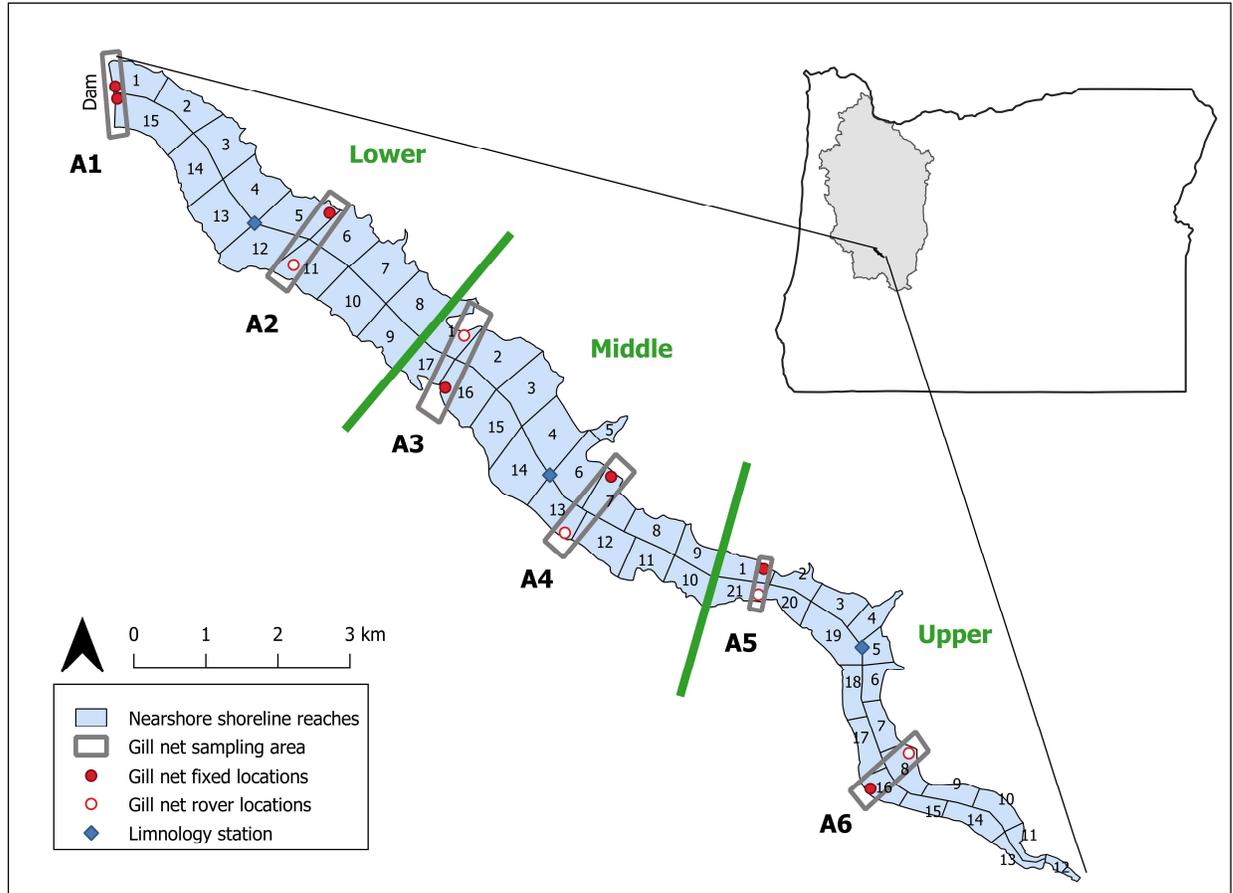


Figure 6. Map of Lookout Point Reservoir nearshore shoreline reaches, reservoir zones (lower, middle and upper), gill netting sampling areas and limnological stations.

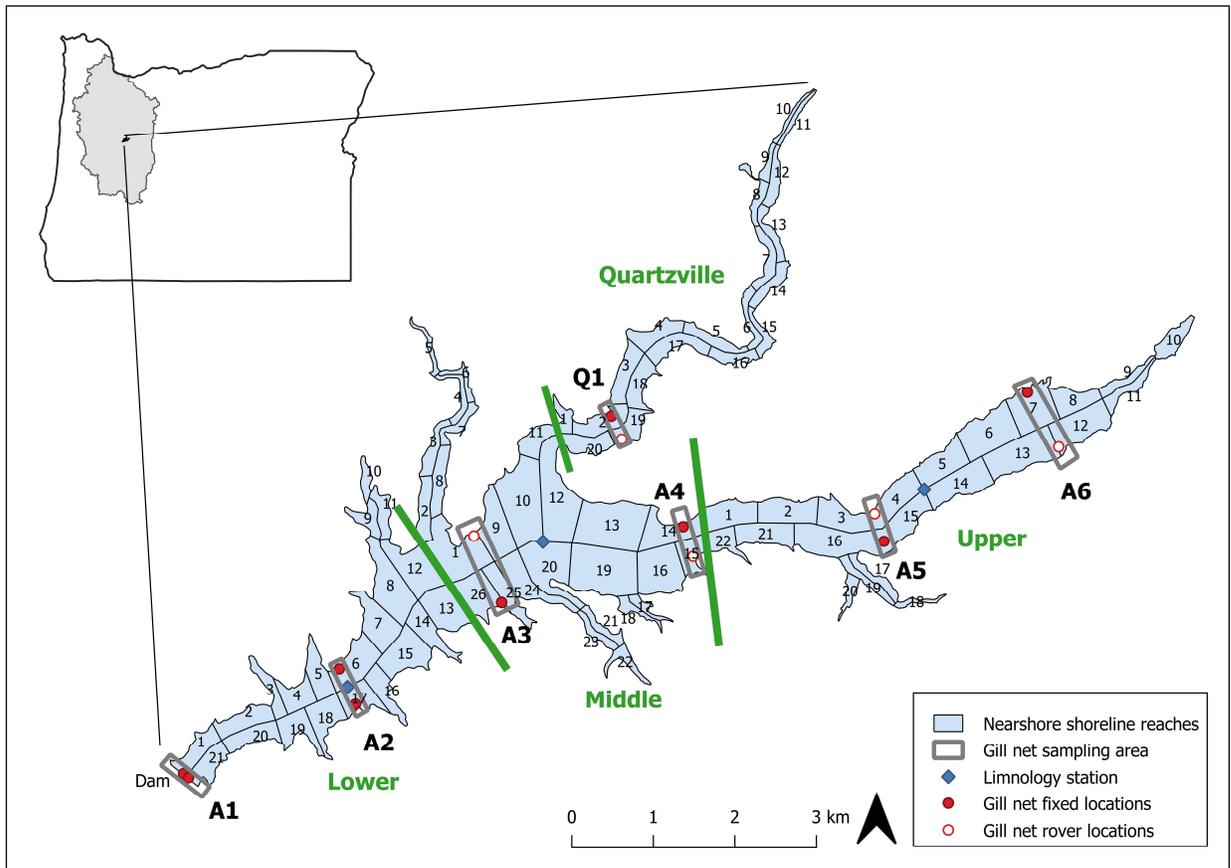


Figure 7. Map of Green Peter Reservoir nearshore shoreline reaches, reservoir zones (lower, middle and upper), gill netting sampling areas and limnological stations.