

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

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Bi-Weekly Report: June 15, 2023 – June 30, 2023



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## 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

We started PIT tagging and adipose clipping juvenile Chinook salmon at Leaburg Hatchery on June 20, 2023, aiming to tag 10,000 fish. However, on the first day, we noted high mortality rates among both tagged fish and those waiting in the staging trough. Out of the 3,553 salmon tagged, 93 died by day's end, a rate of 2.3%. This was unusual, considering our average mortality rate during tagging is typically 0.62%. We also found 10 dead fish in the staging trough. While we don't usually record data for fish in raceways or staging troughs, mortalities in these groups are normally quite rare

Despite maintaining water temperatures within two degrees Celsius of the fish's holding environment, which averaged a favorable 10.4 C, and using the same MS-222 stock solution as previously, mortality rates were high. The experienced crew ensured proper marking techniques were followed.

Of note, the group of 10,000 fish that we were tagging had been raised separately from the rest of the brood year 2022 McKenzie River Chinook salmon at the hatchery. This particular subgroup did not receive antibiotic feed treatment at the same time as the rest of the McKenzie stock, which took place in late April/early May. This knowledge raised some concern that fish may be battling a pathogen, and the additional stress of handling and marking was pushing them past the limit of what they could endure. We reached out to the state pathologist, Aimee Reed, and she agreed that there was a high possibility that these fish could be battling a pathogenic disease. The pathologist informed us that she was currently running tests on fish from Leaburg but that the results would not be available for several days. In the meantime, we were advised to halt all marking activities. We are still awaiting results from pathology at this time.

After disinfecting our tagging trailer and working out the logistics of which hatchery could accommodate us next, we moved locations back to Marion Forks Hatchery. Our goal at Marion Forks was to tag the remaining brood year 2022 North Santiam stock ( $n = 30,000$ ) for releases scheduled during the fall of 2023 (sub-yearlings) and the spring of 2024 (yearlings). We adipose clipped and PIT tagged a total of 15,195 juvenile Chinook salmon between June 26, 2023 and June 29, 2023.

## **Recaptures**

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

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	Fish Released	Transport Temp Start	Transport Temp End	Release Site Temp
Green Peter Head of Reservoir - Quartzville Creek Arm	5/22/2023	5,203	12	13.2	18
Green Peter Head of Reservoir - Middle Santiam Arm	5/22/2023	5,071	11.9	12.9	18.3
Lookout Point Head of Reservoir	5/30/2023	9,741	11.9	12.5	13.2
Hills Creek Head of Reservoir	6/5/2023	9,817	12.9	13.2	11.4
Fall Creek Head of Reservoir	6/12/2023	9,642	16.5	17.4	19.0

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>
3D6.15348025F1	5/22/2023	Green Peter Head of Reservoir - Middle Santiam Arm	5/28/2023	Green Peter Tailrace Rotary Screw Trap
3D6.15348010F9	5/30/2023	Lookout Point Head of Reservoir	6/27/2023	Lookout Point Reservoir Trap Net

## Reservoir Distribution Summary

We finally received our first shipment of nets during the 24<sup>th</sup> week of the year (June 11 – June 17, 2023), and immediately conducted test deployments in Green Peter to work out any issues with net configurations and logistics associated with the deployment and operation of the trap nets.

Sampling began in earnest the following week when we were able to set a total of three Oneida and nine box minnow traps throughout Green Peter Reservoir. 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

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	Water Surface Temperature °C
24	Green Peter	20.5
25	Green Peter	21.1
26	Lookout Point	21.7

The most abundant species in our catch were bluegill, followed by juvenile smallmouth bass, and juvenile largemouth bass. We captured a total of nine 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

The nine Chinook salmon were all captured in either the upper (n = 5) or middle (n=4) zones of Lookout Point reservoir (Appendix B, Figure 6). The Chinook had a mean fork length of 87.2 mm and 83.6 mm in the middle and upper zones, respectively (Table 8).

Table 8. Detailed catch summary of target species.

<b>Week</b>	<b>Reservoir</b>	<b>Zone</b>	<b>Species</b>	<b>Catch</b>	<b>length_min</b>	<b>length_mean</b>	<b>length_max</b>
26	Lookout Point	MIDDLE	CHS	4	80	87.2	92
26	Lookout Point	UPPER	CHS	5	73	83.6	95

## Appendix A. Release Site Maps

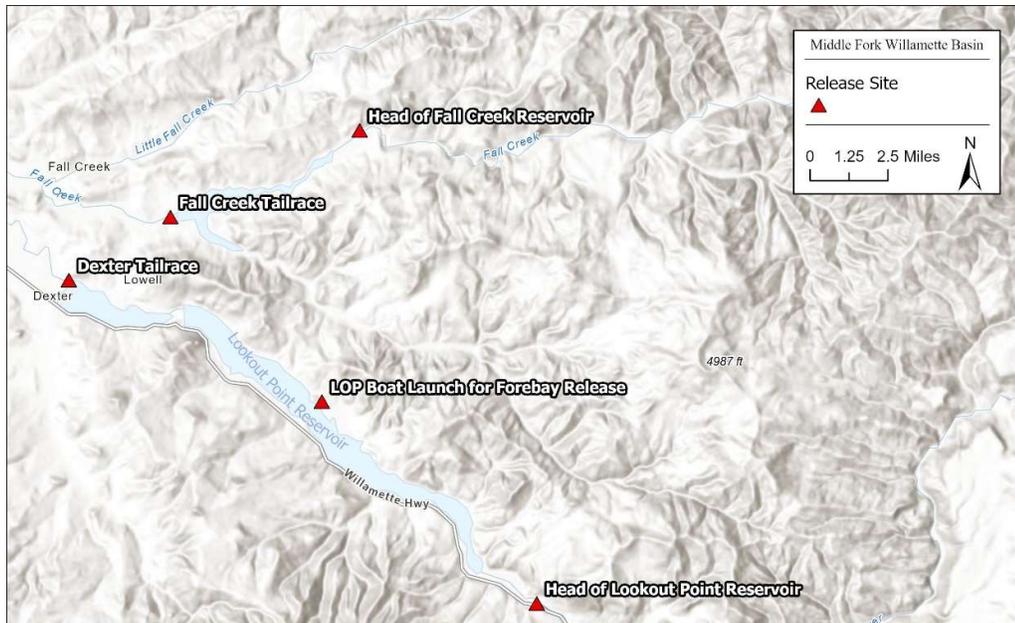


Figure 1. Map of Lookout Point, Dexter tailrace and Fall Creek release locations within the Middle Fork Willamette Basin.

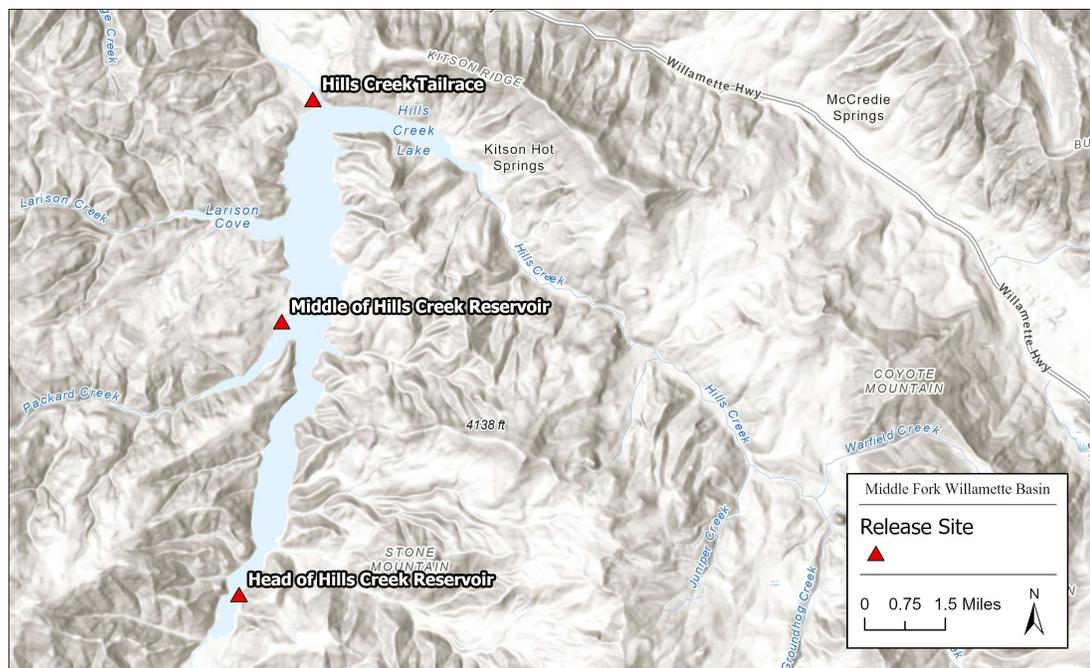


Figure 2. Map of Hills Creek Reservoir release locations within the Middle Fork Willamette Basin.

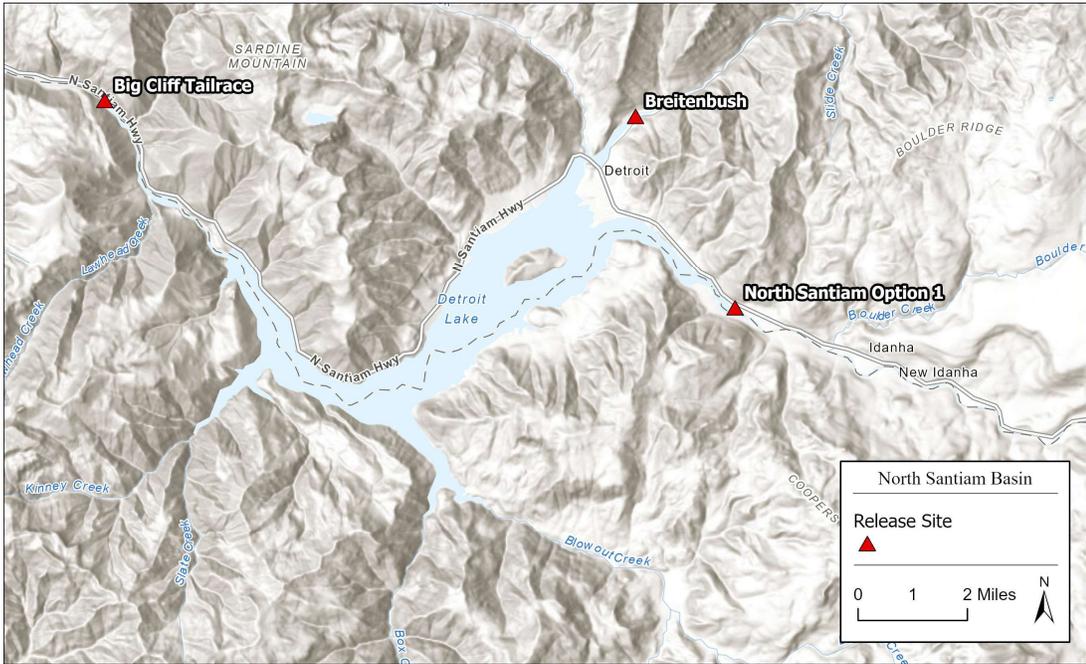


Figure 3. Map of release locations within the North Santiam Basin.

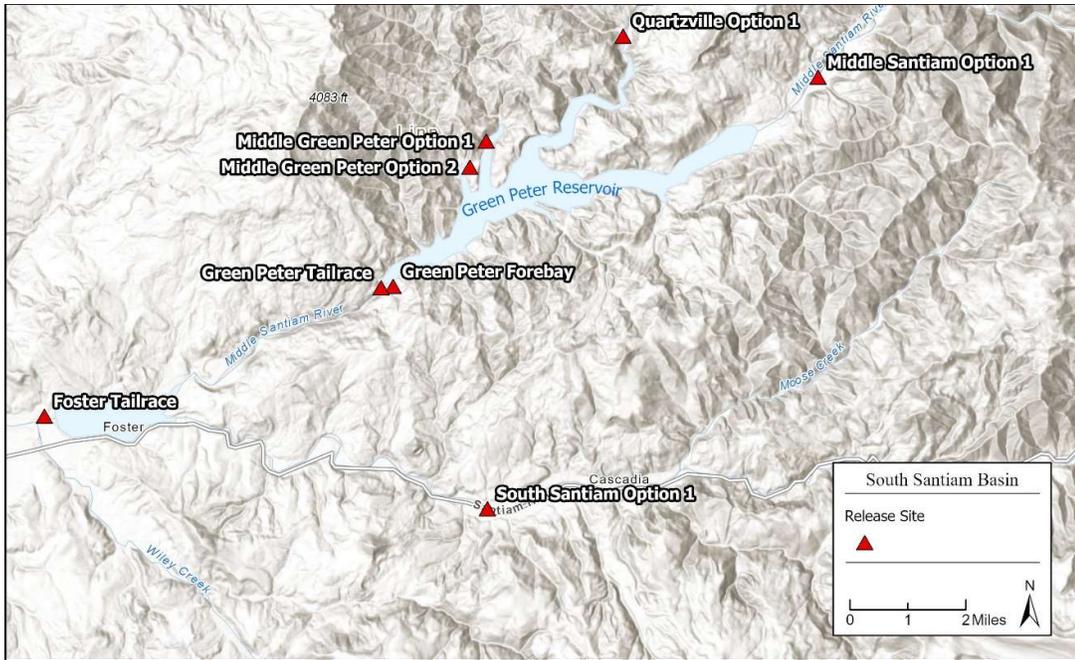


Figure 4. Map of release locations in the Middle/South Santiam basin including Green Peter Reservoir.

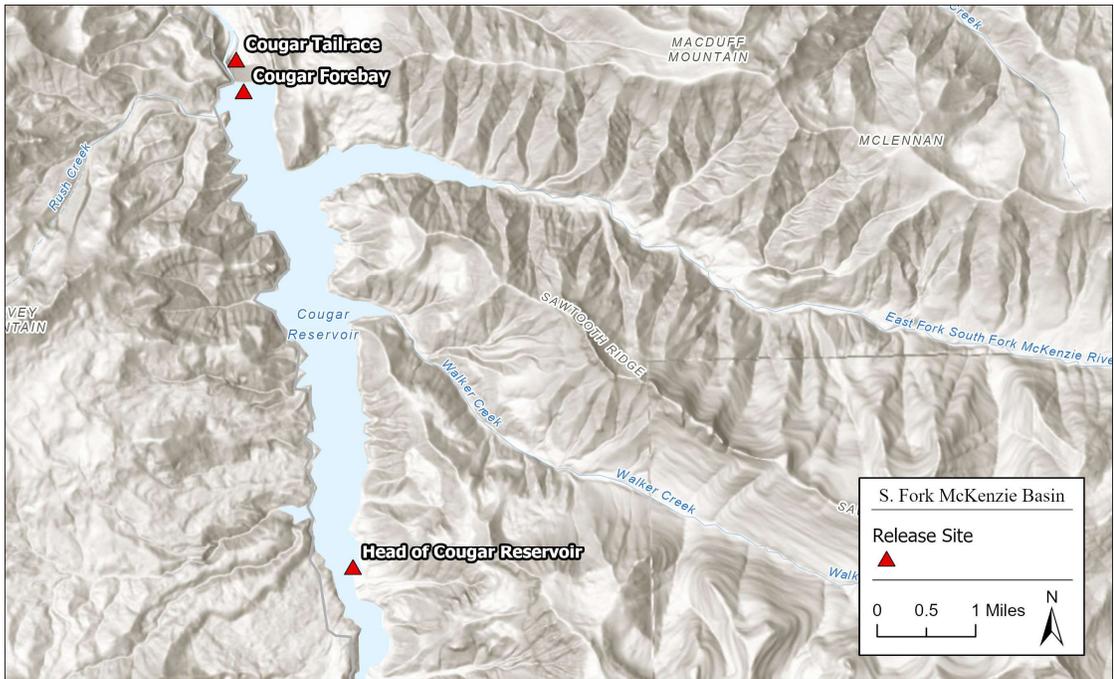


Figure 5. Map of release locations at Cougar Reservoir.

## Appendix B. Reservoir Sampling Zones

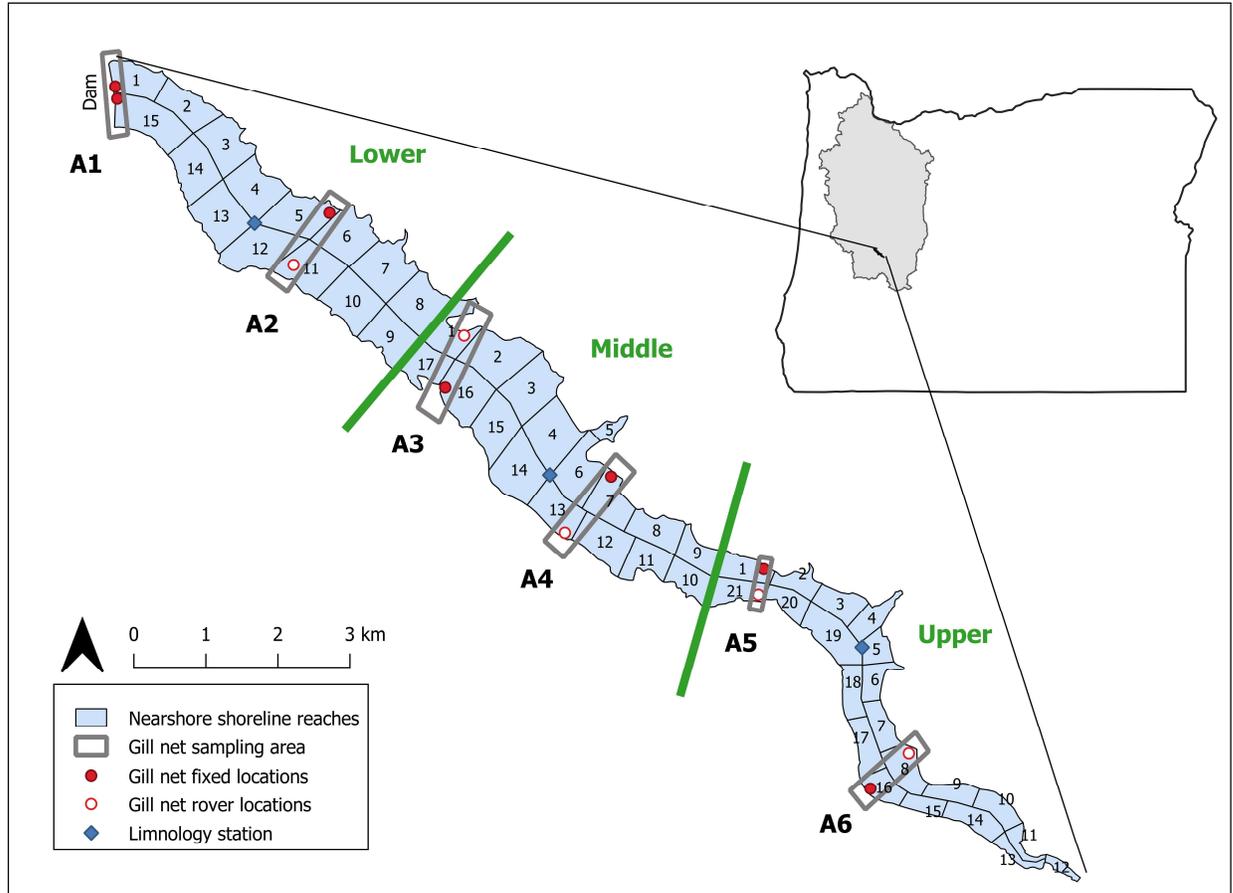


Figure 6. Map of Lookout Point Reservoir nearshore shoreline reaches, reservoir zones (lower, middle and upper), gill netting sampling areas and limnological stations.

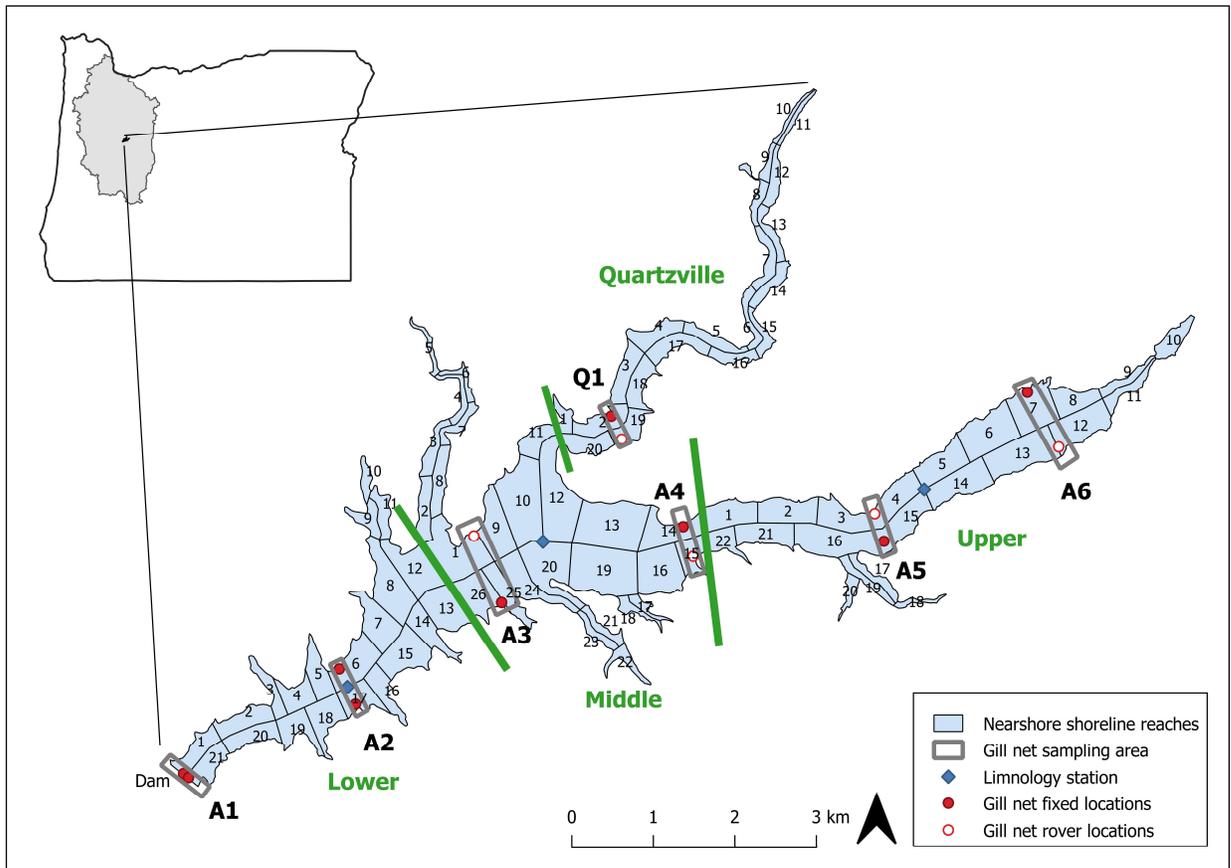


Figure 7. Map of Green Peter Reservoir nearshore shoreline reaches, reservoir zones (lower, middle and upper), gill netting sampling areas and limnological stations.