REPORT ON THE PREDATION INDEX, PREDATOR CONTROL FISHERIES, AND PROGRAM EVALUATION FOR THE COLUMBIA RIVER BASIN NORTHERN PIKEMINNOW SPORT REWARD PROGRAM

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Executive Summary

This report presents results for year thirty-five of the basin-wide Northern Pikeminnow Management Program (NPMP), which targets Northern Pikeminnow[1] (*Ptychocheilus oregonensis*) for removal and monitors Northern Pikeminnow, Walleye (*Sander vitreus*), Smallmouth Bass (*Micropterus dolomieu*), and Channel Catfish (*Ictalurus punctatus)* for compensatory effects in the Columbia and Snake Rivers.

The NPMP is implemented through a cooperative effort among the Pacific States Marine Fisheries Commission (PSMFC), Oregon Department of Fish and Wildlife (ODFW), and Washington Department of Fish and Wildlife (WDFW). The roles and responsibilities of each cooperator are as follows.

> WDFW (Section 1): Implement a system-wide (i.e. Columbia River below Priest Rapids Dam and Snake River below Hells Canyon Dam) sport-reward fishery and operate a system for collecting and disposing of harvested Northern Pikeminnow.
>
> PSMFC (Section 2): Provide technical, contractual, fiscal and administrative oversight for the program. In addition, PSMFC processes and provides accounting for the reward payments to participants in the sport-reward fishery.
>
> ODFW (Section 3): Evaluate exploitation rate and size composition of Northern Pikeminnow harvested in the various fisheries conducted. Estimate reductions in predation on juvenile salmonids resulting from Northern Pikeminnow harvest and update information on year-class strength of Northern Pikeminnow.
>
> WDFW (Section 4): Implement dam angling at The Dalles and John Day dams.

In 2025, the Sport-Reward Fishery (SRF; Section 1, WDFW) remained open at most stations through September 30th but was also extended at select stations until October 12th to take advantage of favorable river/angling conditions along with high angler catch per unit effort to improve the SRF's 2025 exploitation estimate, which had been near the lower end of the 10-20% target. A total of 150,456 qualifying Northern Pikeminnow (>228 mm) and 2,066 sub-legal fish were removed during the 2025 SRF (Section 1; WDFW). Participation included 1,501 anglers contributing 12,836 angler-days, with a catch rate of 11.72 fish per angler day. These removals resulted in an estimated 11.6% exploitation rate, within the program's target range (Section 3; ODFW). Anglers were compensated using a tiered structure of $6 (1–25 fish), $8 (26–200 fish), and $10 (201+ fish), with additional rewards of $500 for externally tagged fish and $200 for PIT-tag-only fish. The total payout for 2025 was $1,445,450, including base rewards, tag bonuses, and incentives (Section 2; PSMFC).

[1] *The common name of the northern squawfish was changed by the American Fisheries Society to Northern Pikeminnow at the request of the Confederated Tribes and Bands of the Yakama Indian Reservation.*

ODFW continued using a PIT tag-only protocol for its 2025 biological evaluation (Section 3), while WDFW conducted opportunistic external tagging for promotional purposes (Sections 1–2). The 2025 ODFW biological evaluation (Section 3; ODFW) confirmed continued program effectiveness. Exploitation of 11.6% (95% CI: 9.1–14.6%) is projected to reduce Northern Pikeminnow predation on juvenile salmonids by approximately 25% in 2026 relative to pre-program conditions. Long-term monitoring shows declining Northern Pikeminnow abundance and shifts in population structure, alongside increasing trends in Smallmouth Bass and Walleye. Evidence of localized compensatory responses underscores the need for continued monitoring and adaptive management. The 2025 Dam Angling program (Section 4; WDFW) targeted fish in boat-restricted zones at The Dalles and John Day dams from April 30 through October 10, 2025. Crews harvested 3,125 Northern Pikeminnow over 1,123.5 hours, achieving a catch rate of 2.8 fish per angler hour, complementing the SRF by targeting high-density areas inaccessible to the public. Program enhancements during 2025 included expanded functionality of the online WDFW registration system, initially deployed during the 2023 Sport-Reward Fishery incorporating, to include an electronic version of the biological exit interview, conducted by a WDFW technician, when anglers return their fish to receive a payment voucher (Sections 1–2; WDFW and PSMFC).

Program oversight and coordination were provided by PSMFC (Section 2), with implementation and evaluation conducted collaboratively with WDFW (Sections 1 and 4) and ODFW (Section 3). The Adaptive Management Committee (AMC), formally established in 2021 following recommendations from the Northwest Power and Conservation Council and ISRP review, continued to guide program refinement. During 2025, the AMC met twice: on August 5, 2025, where discussions focused on funding prioritization, tagging strategies, incentive structures, and the effectiveness of the online registration system; and on January 12, 2026, where partners reviewed 2025 program results and planned logistics for the 2026 season (Program-wide; PSMFC, WDFW, ODFW). Monthly coordination meetings among BPA, ODFW, WDFW and PSMFC were held most months for pre-season, in-season, and post-season coordination.

The NPMP was initiated in 1990 in response to research conducted during the 1980s that identified Northern Pikeminnow as a major predator of juvenile salmonids in Columbia and Snake River reservoirs. Early studies, particularly in John Day Reservoir (1982–1988), demonstrated that Northern Pikeminnow predation accounted for a substantial proportion of juvenile salmonid mortality and suggested that removing 10–20% of larger, predatory individuals could reduce predation by up to 40%. To test this hypothesis, pilot removal fisheries were implemented in 1990, including a sport-reward fishery, a commercial long-line fishery, and targeted hook-and-line efforts near dam tailraces (for details see Report A of our 1990 annual report (Vigg et al. 1990).

Based on this pilot, the program continued with a sport-reward fishery and a dam-angling fishery component starting in 1992, but the tribal long-line fishery above Bonneville Dam was discontinued. Subsequent investigation during 1992 into implementing a commercial long-line fisheries below Bonneville Dam demonstrated that this approach was infeasible due to low catch efficiency and high implementation costs. Throughout the early 1990s, the program explored additional harvest techniques to contribute to achieving the 10-20% removal target, including modified Merwin trapnets (1991 and 1992) at specific locations where concentrations of

Northern Pikeminnow were known or suspected to occur during the spring season (i.e., March through early June), and floating trapnets (1993),While effective in localized areas, these methods proved impractical for system-wide application.

During 1994 the program invested in a concerted effort to increase public participation in the sport-reward fishery through expanded outreach, promotional activities, and financial incentives. Based on the favorable results, these efforts were further improved in 1995, 1996, and 1997. At the same time, dam-angling efforts were refined to exploit high-density predator areas in boat-restricted zones near hydroelectric facilities.

Over the subsequent decades, the NPMP has continued to evolve, such as now using PIT Tag-only protocols for biological evaluations and refined exploitation modeling approaches. Collectively, these efforts have resulted in sustained reductions in Northern Pikeminnow abundance and predation pressure on juvenile salmonids, while also providing critical insights into predator-prey dynamics and compensatory responses among other piscivorous species. Now in its 35th year, the NPMP represents a long-standing, science-driven management strategy that integrates targeted harvest, adaptive management, and interagency collaboration to protect out-migrating salmonids in the Columbia and Snake River systems.

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1.2 ABSTRACT

We are reporting on the progress of the Northern Pikeminnow Sport-Reward Fishery (NPSRF) implemented by the Washington Department of Fish and Wildlife (WDFW) on the Columbia and Snake Rivers from April 14 through October 12, 2025. The objectives of this project were to (1) implement a recreational fishery that rewards recreational anglers for harvesting Northern Pikeminnow > 228 mm (9 inches) total length (TL), (2) collect, compile, and report data on angler participation, catch rates, and harvest of Northern Pikeminnow and other fish species during the NPSRF season, (3) examine collected Northern Pikeminnow for the presence of external tags, fin clips, and signs of tag loss, (4) collect biological data on Northern Pikeminnow and other fish species returned to registration stations, (5) scan Northern Pikeminnow for the presence of Passive Integrated Transponder (PIT) tags implanted into Northern Pikeminnow by ODFW, and/or from Northern Pikeminnow containing consumed salmonids with PIT tags, and (6) survey non-returning NPSRF participants targeting Northern Pikeminnow in order to obtain catch and harvest data on Northern Pikeminnow and other species from this segment of NPSRF participants.

A total of 150,456 Northern Pikeminnow > 228 mm fork length (FL) and 2,066 Northern Pikeminnow < 228 mm TL were harvested during the 2025 NPSRF season. There were 1,501 different individual anglers who spent 12,836 angler days of effort participating in the NPSRF during the 2025 season. Catch per unit effort for combined returning and non-returning anglers was 11.72 fish/angler day. The Oregon Department of Fish and Wildlife (ODFW) estimated that the Northern Pikeminnow harvest activities from the 2025 NPSRF resulted in an overall exploitation rate of 11.6% (Snauer et al. 2025).

Anglers submitted 13 Northern Pikeminnow with external spaghetti or Floy tags, 4 of which also retained internal ODFW PIT tags. There were 143 Northern Pikeminnow with ODFW PIT tags only. Additionally, 40 PIT tags were recovered from Northern Pikeminnow that had ingested juvenile salmonids during the 2025 NPSRF.

Peamouth *Mylocheilus caurinus*, Smallmouth Bass *Micropteris dolomieui*, and Sculpin *Cottoidea Spp*, were the fish species most frequently caught by NPSRF anglers targeting Northern Pikeminnow during the 2025 NPSRF. The incidental catch of salmonids *Oncorhynchus spp*, by participating anglers targeting Northern Pikeminnow continued to remain below established limits for the Northern Pikeminnow Management Program (NPMP).

1.3 INTRODUCTION

Mortality of juvenile salmonids *Oncorhynchus spp*. migrating through the Columbia River system is a major concern of the Columbia Basin Fish and Wildlife Program, and predation is an important component of mortality (Northwest Power Planning Council 1987a). Northern Pikeminnow *Ptychocheilus oregonensis,* formerly known as Northern Squawfish (Nelson et al. 1998), are the primary piscine predator of juvenile salmonids in the Lower Columbia and Snake River Systems (Rieman et al. 1991). Rieman and Beamesderfer (1990) predicted that predation on juvenile salmonids could be reduced by up to 50% with a sustained exploitation rate of 10-20% on Northern Pikeminnow > 275 mm TL (11 inches total length). The Northern Pikeminnow Management Program (NPMP) was created in 1990, with the goal of implementing fisheries to achieve the recommended 10-20% annual exploitation on Northern Pikeminnow > 275 mm TL within the program area (Vigg and Burley 1989). In 2000, NPMP administrators reduced the minimum size for eligible (reward size) Northern Pikeminnow to 228 mm TL (9 inches total length) in response to recommendations contained in a Council review of NPMP justification, performance, and cost-effectiveness (Hankin and Richards 2000). Beginning in 1991, the Washington Department of Fish and Wildlife (WDFW) was contracted to conduct the NPSRF component of the NPMP (Burley et al. 1992). The NPSRF enlists recreational anglers to harvest reward sized (>9" total length) Northern Pikeminnow from within program boundaries on the Columbia and Snake Rivers using a monetary reward system. Since 1991, NPSRF anglers have harvested over 5.9 million reward sized Northern Pikeminnow and spent over 1 million angler days of effort to become the NPMP's most successful component for achieving the annual 10-20% exploitation rate on Northern Pikeminnow within the program boundaries (Klaybor et al. 1994, Friesen and Ward 1999).

Reward levels included a base reward of $6 per fish for the first 25, $8 per fish for #26-200, and $10 per fish for each fish above 200. Anglers were rewarded a higher amount for returning Northern Pikeminnow with external tags ($500 for spaghetti or Floy type) and a lesser amount ($200) for fish with only PIT tags implanted by the Oregon Department of Fish and Wildlife (ODFW) as part of the NPMP's biological evaluation. Catch and harvest data were collected from both returning anglers and a sub-sample of non-returning anglers in order to continue to monitor the total effects of the NPSRF on other Columbia basin fishes.

The objectives of the 2025 NPSRF were to (1) implement a public fishery that rewards recreational anglers for harvesting Northern Pikeminnow > 228 mm (9 inches) total length, (2) collect, compile, and report data on angler participation, catch rates and harvest of Northern Pikeminnow and other fish species during the season, (3) examine collected Northern Pikeminnow for the presence of external tags, fin-clips, and signs of tag loss, (4) collect biological data on Northern Pikeminnow and other fish species returned to registration stations, (5) scan Northern Pikeminnow for the presence of Passive Integrated Transponder (PIT) tags implanted into Northern Pikeminnow by ODFW, and/or from Northern Pikeminnow containing consumed salmonids with PIT tags, and (6) survey non-returning NPSRF participants targeting Northern Pikeminnow in order to obtain catch and harvest data on Northern Pikeminnow and other species from this segment of NPSRF participants.

1.4 METHODS OF OPERATION

1.4.1 Fishery Operation

1.4.1.a. Boundaries and Season

The 2025 NPSRF season started with an early opener on April 14th at The Dalles registration station and April 21st at the Columbia Point and Umatilla stations in order to take advantage of favorable early-season river and angling conditions. Most other registration stations opened May 1st (excluding satellite stations as described below). The Fishery was conducted on the Columbia River from the mouth to the boat-restricted zone below Priest Rapids Dam, and on the Snake River from the mouth to the boat-restricted zone below Hells Canyon Dam as done annually since 1991 (Figure 1.1). In addition to mainstem areas, anglers were also allowed to harvest (and submit for payment) Northern Pikeminnow caught in backwaters, sloughs, and up to 400 feet from the mouth of tributaries within the program area. The 2025 NPSRF remained open at most stations through September 30th but was also extended at select stations until October 12th to take advantage of favorable river/angling conditions along with high angler CPUE to improve the SRF's 2025 exploitation estimate, which had been near the lower end of the 10-20% target.

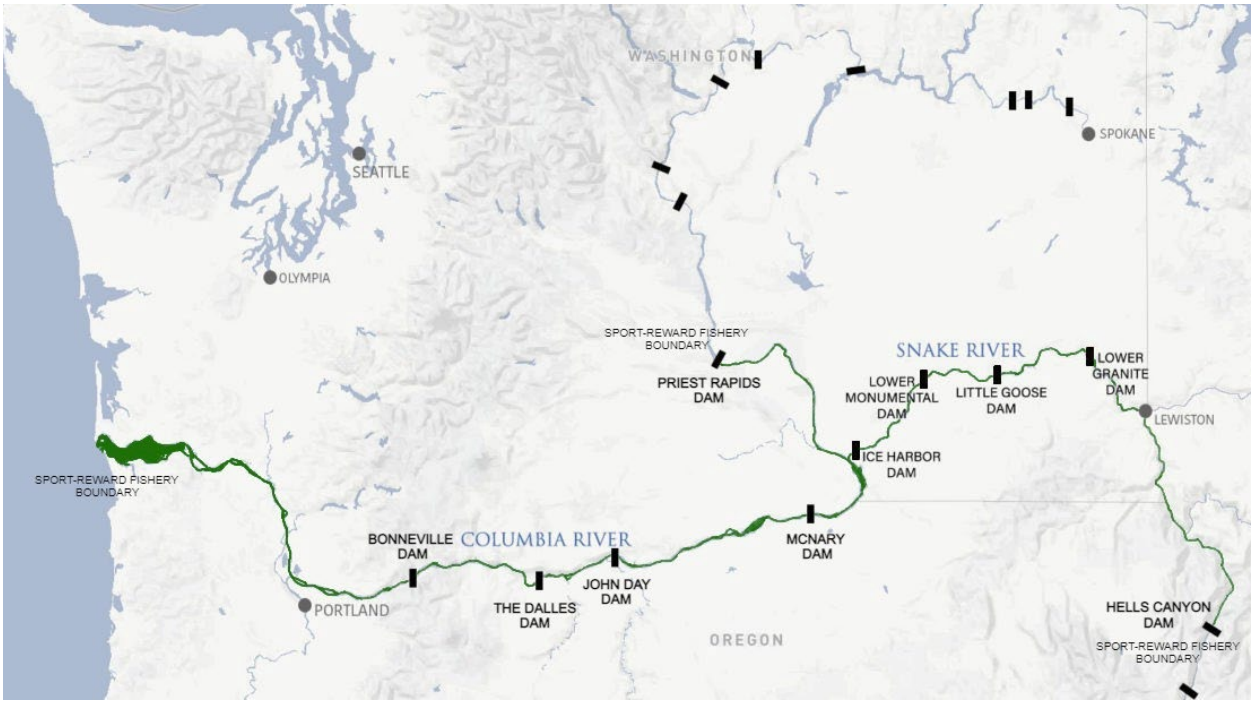


Figure 1.1. Northern Pikeminnow Sport-Reward Fishery Program Area

1.4.1.b. Registration Stations

Twenty-one registration stations (Figure1.2) were located along the Columbia and Snake Rivers within these boundaries to provide anglers with access to the Northern Pikeminnow Sport-Reward Fishery. There were 15 "Core" Registration stations, which operated the entire May through September field season, and 6 "Satellite stations" which operated less than the standard 5-month season (Smith et al. 1994). WDFW technicians set up registration stations daily (seven days a

week) at designated locations (normally public boat ramps or parks) during the designated season and were available to anglers at specified times of between 1.5 and 5.5 hours per day. Technicians assisted in registering anglers and compiling data for registered anglers participating in the NPSRF, collected angler creel information, issued pay vouchers to anglers returning with eligible Northern Pikeminnow, recorded biological data, scanned Northern Pikeminnow for the presence of PIT tags, and provided angling advice and Sport-Reward Fishery information to the public. Self-registration boxes were also located at each station so anglers could self-register when WDFW technicians were not present.

1.4.1.c. Smartphone registration application

Pikeminnow anglers continued to have the option of using the Pikeminnow phone application (App) for registering to participate in the 2025 NPSRF. The smartphone App, created and developed by WDFW, was available to the public for free download via one of the App Stores (Apple) or Google Play (Android). Phone App registration allowed anglers to register for participation in the 2025 NPSRF without registering at the physical registration station using a paper registration prior to fishing. The intent of the phone App option was to increase angler effort (and increase actual time spent fishing) by making the registration process quicker and more convenient. Additional functionality is in the process of being developed to allow for electronic angler exit interviews (used with limited success in 2025), as well as planning for electronic tag recovery data capture, and biological data collection in future years.

1. Cathlamet Marina 8:30 am -12:30 pm
2. Willow Grove 1:30 pm - 4:00 pm
3. Rainier Marina 12:00 pm – 2:00 pm
4. Kalama Marina 2:30 pm – 4:30 pm
5. Ridgefield Marina 8:00 am – 11:00 am
6. Gleason Boat Ramp 11:00 am – 12:30 pm
7. Chinook Landing 8:30 am – 10:30 am
12. The Dalles 11:00 am – 4:30 pm
13. Giles French 8:00 am – 10:30 am
14. Umatilla 9:30 am – 11:30 am
15. Columbia Point 4:00 pm – 6:00 pm
16. Vernita 1:00 pm – 3:00 pm
17. Hood Park 1:00 pm – 3:00 pm
18. Windust Park 1:00 pm – 3:00 pm
19. Boyer Park 12:30 pm – 3:30 pm
20. Greenbelt 9:30 am – 11:00 am
21. Swallow's Park 5:00 pm – 6:30 pm

8. Washougal 1:00 pm – 4:00 pm

9. Stevenson 11:00 am – 4:00 pm

10. Cascade Locks 2:00 pm – 4:00 pm

11. Bingen 8:00 am – 10:30 am

Figure 1.2. 2025 Northern Pikeminnow Sport-Reward Fishery registration stations and hours of operation

1.4.1.d. Reward System

The 2025 NPSRF rewarded anglers for harvesting Northern Pikeminnow > 228mm TL (9 inches TL) using a tiered reward system first implemented in 1995 (Hisata et al. 1996), which paid anglers a higher reward per fish once they had reached designated harvest tier levels over the course of the season. To receive payment, anglers returned their catch (daily) to the location where they had registered. WDFW technicians verified fish species (and that anglers had caught their fish in accordance with NPSRF Rules and Regulations) and then issued a payment voucher for the total number of eligible Northern Pikeminnow submitted for payment. Anglers mailed payment vouchers to the Pacific States Marine Fisheries Commission (PSMFC) for redemption. Anglers returning with Northern Pikeminnow that were spaghetti or Floy tagged by ODFW as part of the biological evaluation of the NPSRF (Vigg et al. 1990), or by WDFW as angler incentives, were issued separate tag payment vouchers that were mailed to ODFW for tag verification before payment was made to the angler by PSMFC.

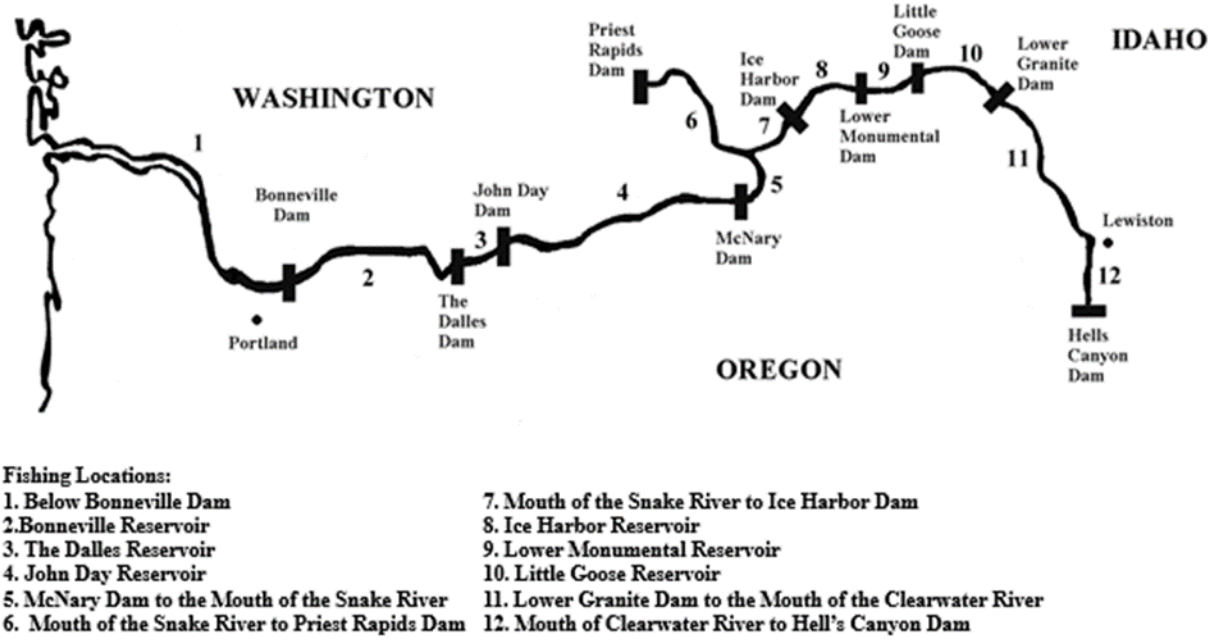
The tiered reward system used during the 2025 season was originally developed and implemented in 1995 (Hisata et al. 1996) and reflects multiple changes made to the rewards and/or tier levels to address trends of declining angler participation. The tiered reward system paid anglers higher rewards per fish based on achieving designated harvest levels. In 2025, Tier 1 paid anglers $6 each for their first 25 Northern Pikeminnow, Tier 2 paid anglers $8 each for fish numbers 26-200, and Tier 3 paid anglers $10 each for all fish over 200. The current reward payment tier levels have been in effect since 2022.

Although ODFW discontinued externally tagging Northern Pikeminnow in 2022, anglers continued to be paid $500 for each Northern Pikeminnow retaining a valid external tag (spaghetti or Floy) used by ODFW for the biological evaluation of the NPMP (prior to 2022). In addition, all verified external Floy or Spaghetti tags placed in Northern Pikeminnow by WDFW as an angler promotional activity since 2022 are also worth $500. NPSRF anglers continued to be paid $200 for each Northern Pikeminnow without an external tag but containing an ODFW PIT tag (formerly referred to as tag-loss) in 2025.

1.4.1.e. Angler Sampling

Angler data and creel data for the NPSRF were compiled from angler registration forms. One registration form represented one angler day. Angler data consisted of name, date, fishing license number, phone number, and city, state, zip code of participating angler. Creel data recorded by WDFW technicians included fishing location (Figure 1.3), and primary species targeted. Anglers were asked if they specifically fished for Northern Pikeminnow at any time during their fishing

trip. A "No" response ended the exit interview. A "Yes" response prompted technicians to ask the angler (and record data), how many of each species of fish were caught, harvested or released while targeting Northern Pikeminnow. A fish was considered "caught" when the angler touched the fish, whether it was released or harvested. Fish returned to the water alive were defined as "released". Fish that were retained by the angler or not returned to the water alive were considered "harvested".



Fishing Locations:

1. Below Bonneville Dam
2. Bonneville Reservoir
3. The Dalles Reservoir
4. John Day Reservoir
5. McNary Dam to the Mouth of the Snake River
6. Mouth of the Snake River to Priest Rapids Dam
7. Mouth of the Snake River to Ice Harbor Dam
8. Ice Harbor Reservoir
9. Lower Monumental Reservoir
10. Little Goose Reservoir
11. Lower Granite Dam to the Mouth of the Clearwater River
12. Mouth of Clearwater River to Hell's Canyon Dam

Figure 1.3. Fishing Location codes used for the 2025 Northern Pikeminnow Sport-Reward Fishery

1.4.1.f. Returning Anglers

Technicians interviewed all returning anglers at each registration station to obtain any missing angler data, and to record creel data from each participant's angling day. Creel data from caught and released fishes were recorded from angler recollection and identification. Creel data from all retained fish species were recorded from visual observation.

1.4.1.g. Non-Returning Anglers

Non-returning angler data were compiled from the pool of anglers who had registered for the NPSRF and targeted Northern Pikeminnow but did not return to a registration station to participate in an exit interview. WDFW surveyed a minimum of 20% of the NPSRF's non-returning anglers using a telephone survey to obtain creel data from that segment of the NPSRF's participants. To obtain the 20% sample, non-returning anglers were randomly selected from each registration station for each data week. A technician called anglers from each random sample until the 20% sample was attained. Non-returning anglers were surveyed with the same exit interview questions used for returning anglers. Anglers were asked: "did you specifically fish for Northern Pikeminnow at any time during your fishing trip?" With a "Yes" response, anglers were asked to report the number and species of adult and/or juvenile salmonids, and the number of reward size Northern Pikeminnow that were caught and harvested/released while they targeted Northern

Pikeminnow. Angler catch and harvest data were not collected from non-returning anglers who did not target Northern Pikeminnow on their fishing trip. Non-returning angler catch and harvest data for salmonids and non-salmonid species were collected in 2025 per NPSRF protocol (Fox et al. 2000).

1.4.2. Northern Pikeminnow Handling Procedures

1.4.2.a. Biological Sampling

Technicians examined all fishes returned to registration stations and recorded basic biological data such as species and number of fish per species. Fork lengths and sex of Northern Pikeminnow (as well as for any other harvested fish species) were recorded whenever possible. Technicians also checked all Northern Pikeminnow for the presence of external tags (spaghetti, Floy, dart, etc.), fin-clip marks, and/or signs of tag-loss. All externally tagged Northern Pikeminnow had complete biological data collected, whether the fish had a spaghetti tag as used by the NPMP since 1991, or with Floy type anchor tags used by ODFW from 2019-21. Data collected from externally tagged Northern Pikeminnow included Fork Length (FL), tag number, sex (determined by evisceration), and scale samples (if specified). Data from tagged Northern Pikeminnow were recorded both on corresponding tag voucher and on WDFW data form. The external tag was then removed from the Northern Pikeminnow and placed in a tag envelope, stapled to the tag voucher and given to the angler to submit by mail to ODFW for verification. All tagged Northern Pikeminnow carcasses were then processed or labeled and frozen for data verification and/or PIT tag recovery at a later date.

1.4.2.b. PIT Tag Detection

All Northern Pikeminnow collected during the 2025 NPSRF (100%) were scanned for Passive Integrated Transponder (PIT) tags. PIT tags (prior to 2022) had been used by ODFW as a secondary mark in all Northern Pikeminnow fitted with external, spaghetti or Floy, tags as part of the NPMP's biological evaluation activities (Takata and Koloszar 2004). Beginning in 2022, ODFW discontinued use of external Floy or Spaghetti tags and exclusively used PIT tags for conducting the biological evaluation of the NPMP (Waltz et al. 2023). Northern Pikeminnow harvested by anglers participating in the NPSRF have also been found to ingest juvenile salmonids that have been PIT tagged by other studies within the basin (Glaser et al. 2001). WDFW technicians were required to scan 100% of all Northern Pikeminnow returned to registration stations for PIT tags using PIT tag "readers". Northern Pikeminnow submitted for payment to the NPSRF were scanned using Biomark portable transceivers (model #HPR.PLUS.04V1) to record information from PIT tag detections for submission to the Columbia Basin PIT tag information System (PTAGIS). Scanning began on the first day of the NPSRF season and continued at all stations throughout the entire season. Technicians individually scanned all reward sized Northern Pikeminnow for PIT tag presence, and complete biological data were recorded from all Northern Pikeminnow with positive readings. All PIT tagged Northern Pikeminnow were processed on site, or labeled and preserved for later dissection and PIT tag recovery. All data were verified by WDFW tag lead biologist after recovery of PIT tags and all PIT tag recovery data were provided to ODFW and the PIT Tag Information System (PTAGIS-PSMFC 2025) on a regular basis. Anglers were eligible for an additional $200 reward from PSMFC for ODFW PIT tagged (formerly

"tag-loss") fish, which were defined as Northern Pikeminnow with no external tags, but retaining ODFW PIT tags used as part of the NPMP biological evaluation.

1.4.2.c. Northern Pikeminnow Processing

During biological sampling, all Northern Pikeminnow were either caudal clipped, or dissected to recover PIT tags as an anti-fraud measure to eliminate the possibility of previously processed Northern Pikeminnow being resubmitted for payment. Sampled Northern Pikeminnow were iced and transported to cold storage facilities from which they were ultimately delivered to rendering facilities for final disposal.

1.5 RESULTS AND DISCUSSION

1.5.1 Northern Pikeminnow Harvest

During the 2025 NPSRF, anglers harvested a total of 150,456 reward size Northern Pikeminnow (> 228 mm TL) over the course of a 26-week field season (Figure 1.4). Harvest was below mean 1991-2024 NPSRF harvest of 169,668 fish and was 25,989 fish less than in 2024 despite the fact that the 2025 season was 4 weeks longer (with the early season opener and the season extension) (Shirley et al. 2025). In addition to harvesting 150,456 reward size Northern Pikeminnow, anglers participating in the 2025 NPSRF also harvested 2,066 Northern Pikeminnow < 228 mm TL. ODFW estimated that the 2025 NPSRF harvest equaled an exploitation rate of 11.6% (Snauer et al. 2025).

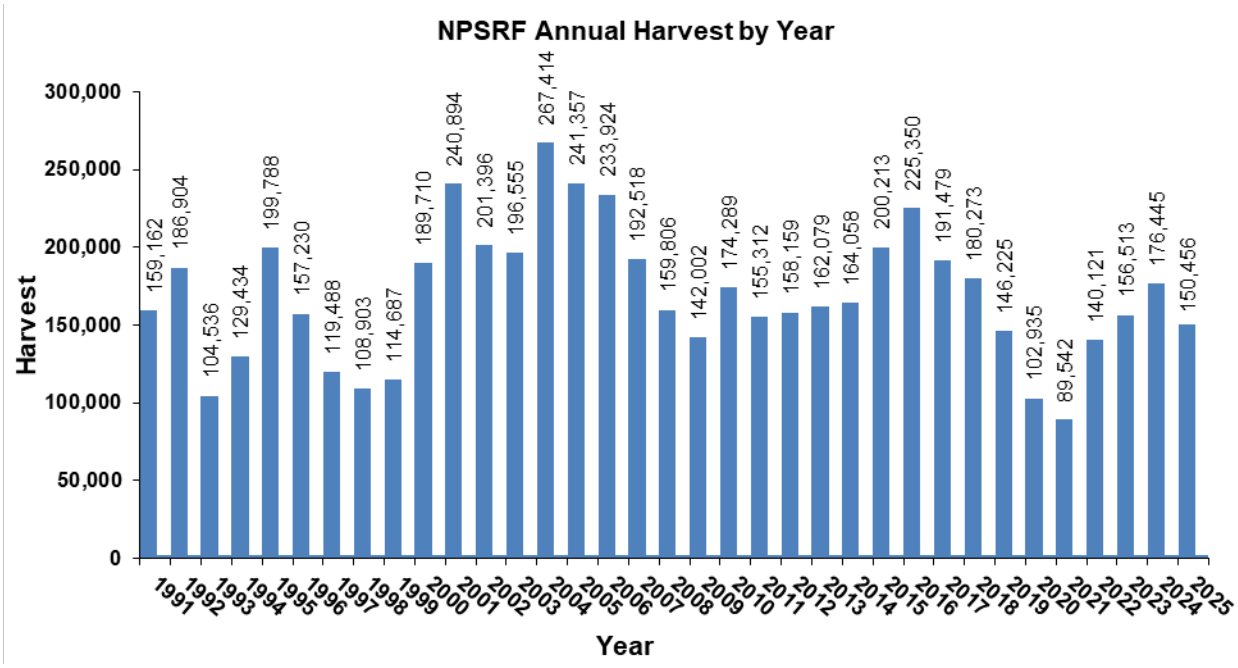


Figure 1.4. Annual harvest totals for the Northern Pikeminnow Sport-Reward Fishery

1.5.1.a. Harvest by Week

Peak weekly harvest in 2025 was 9,249 fish in week 23 (Figure 1.5), although a second peak in week 37 was nearly equal. Total harvest during the 2025 SRF was 2,241 fish lower than the peak harvest week in 2024 (11,490) (Figure 1.6) despite the fact that the 2025 SRF was 4 weeks longer. Harvest collected during the 2025 early pre-season opener (8,164) and season extension (9,212), allowed total 2025 season harvest to be near the historical NPSRF average. Mean weekly harvest was also lower in 2025 (5,787) than in 2024 (8,020) and total weekly harvest exceeded 2024 weekly harvest for only 3 of the 22 comparable weeks of the season (Shirley et al. 2025). Compared to the 1991-2024 historical NPSRF weekly harvest, only 9 of the 26 weeks were above average (Figure 1.7) and there were no weekly harvests >10,000 fish/week in 2025, which is typically needed to achieve harvest above the historical season average of 169,668.

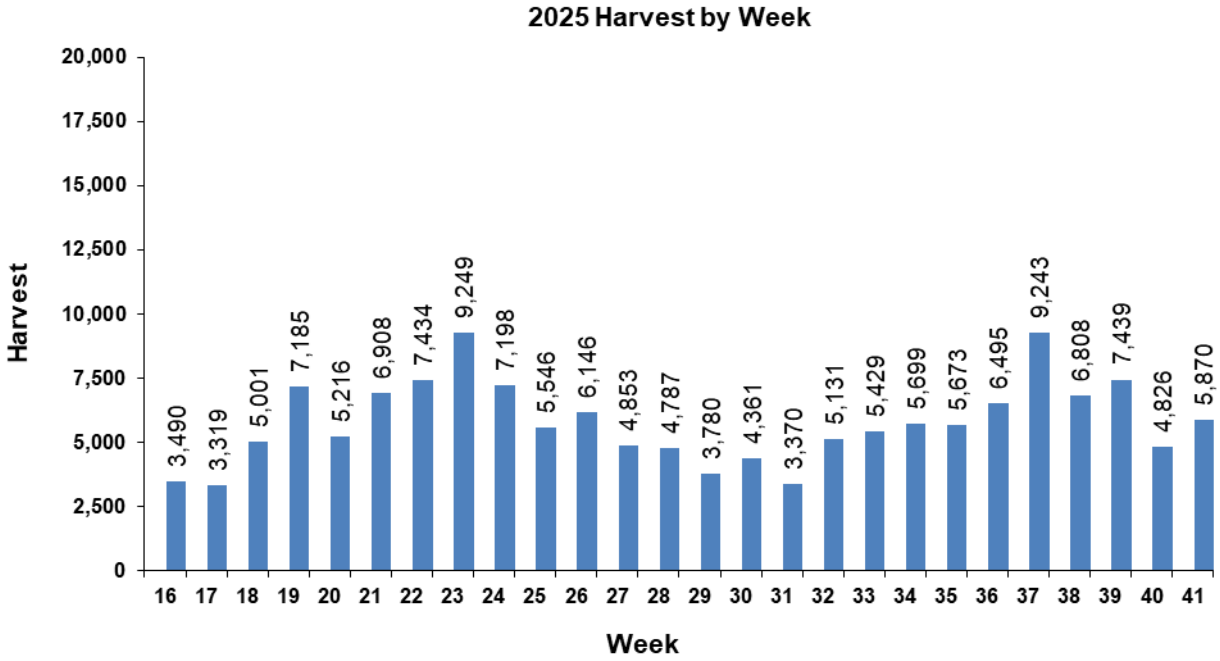


Figure 1.5. 2025 Weekly Northern Pikeminnow Sport-Reward Fishery harvest

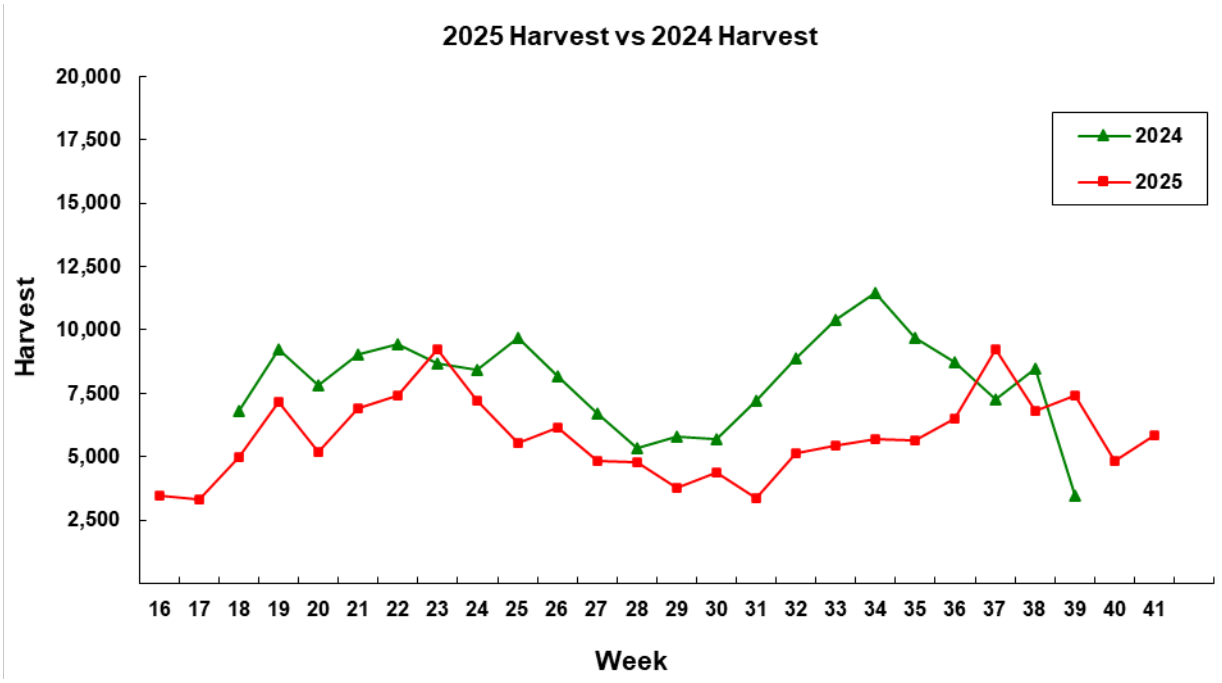


Figure 1.6. 2025 Weekly NPSRF harvest vs 2024 weekly harvest

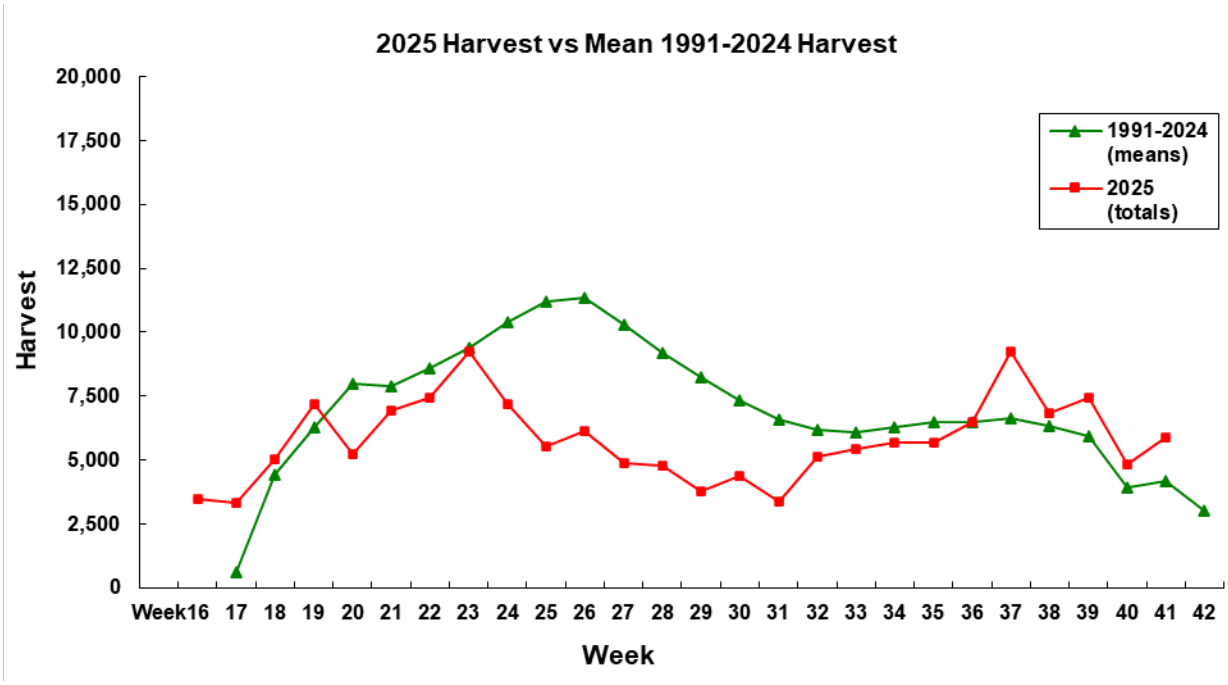


Figure 1.7. Comparison of 2025 NPSRF weekly harvest to 1991-2024 mean weekly harvest

1.5.1.b. Harvest by Fishing Location

The mean harvest by fishing location for the 2025 NPSRF was 12,538 Northern Pikeminnow (compared to 14,704 in 2024) and ranged from 86,757 reward size Northern Pikeminnow in fishing location 01 (Below Bonneville Dam) to 17 Northern Pikeminnow from fishing location 9 (Lower Monumental Reservoir) (Figure 1.8). Harvest from fishing location 01 (the Columbia River below Bonneville Dam) declined slightly from 58.3% of total NPSRF harvest in 2024 to 57.7% of total NPSRF harvest in 2025. Fishing location 01 remained the highest producing SRF fishing location in 2025, as it has been for all but one of the preceding 34 NPSRF seasons (Shirley et al. 2025). Bonneville Reservoir (Fishing Location 02) remained the second highest producing area accounting for 29.8% of total 2025 NPSRF harvest.

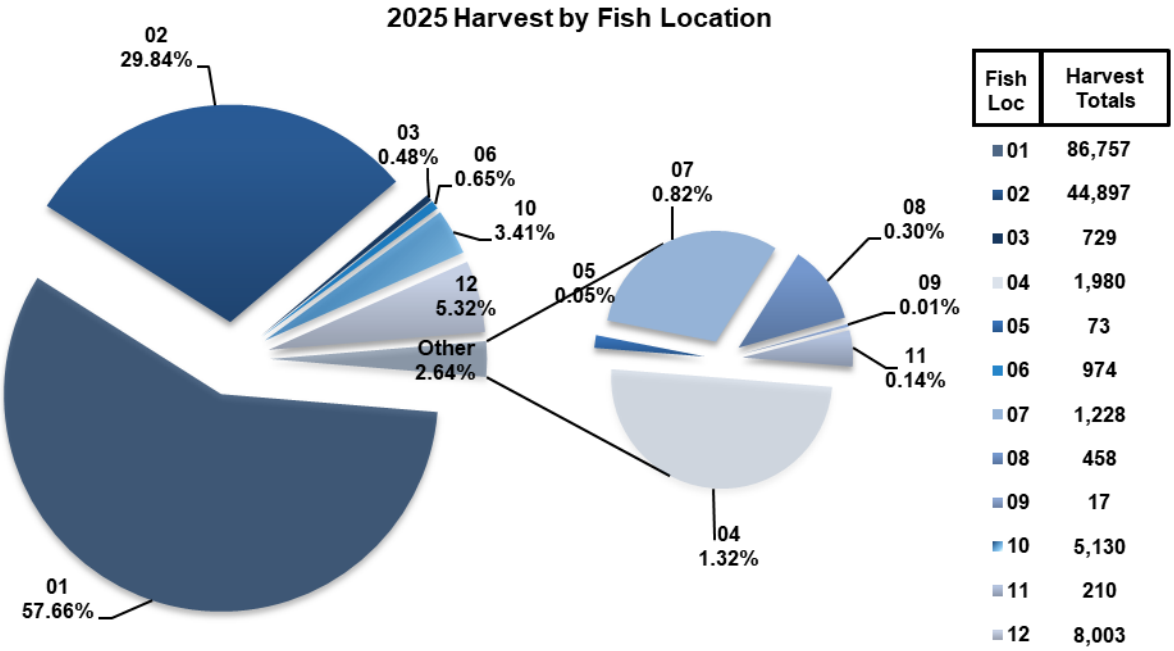


Figure 1.8. 2025 Northern Pikeminnow Sport-Reward Fishery harvest by fishing location*
*Fishing Location Codes for **Columbia River**; 01 = Below Bonneville Dam, 02 = Bonneville Reservoir, 03 = The Dalles Reservoir, 04 = John Day Reservoir, 05 = McNary Dam to the mouth of the Snake River, 06 = Mouth of the Snake River to Priest Rapids Dam. **Snake River;** 07 = Mouth of the Snake River to Ice Harbor Dam, 08 = Ice Harbor Reservoir, 09 = Lower Monumental Reservoir, 10 = Little Goose Reservoir, 11 = Lower Granite Dam to the mouth of the Clearwater River, 12 = Mouth of the Clearwater River to Hells Canyon Dam.

1.5.1.c. Harvest by Registration Station

Harvest in 2025 was higher than in 2024 at 7 of the 21 registration stations. The Dalles registration station was the NPSRF's top producing station in 2025, where anglers harvested 32,974 Northern Pikeminnow, equaling 21.9% of total NPSRF harvest (Figure 1.9). The Washougal registration station finished with the second highest total of 25,201 Northern Pikeminnow (16.7% of total) harvested, and the Cathlamet station finished third with 19,458 harvested fish. Average harvest per registration station was 7,165 reward size Northern Pikeminnow, down from 8,020 per station

in 2024 (Shirley et al. 2025). The registration station with the least harvest was Hood Park (a satellite station with a limited season) where anglers harvested 0 Northern Pikeminnow during the 2025 season.

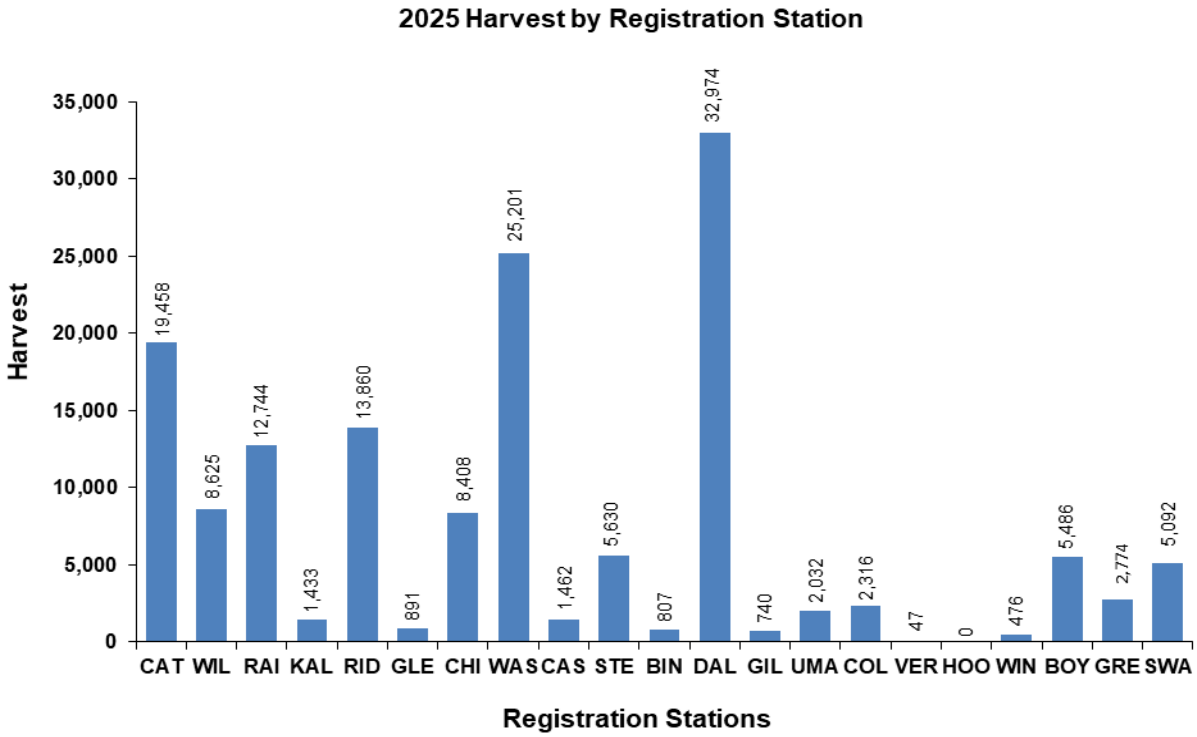


Figure 1.9. 2025 Northern Pikeminnow Sport-Reward Fishery harvest by registration station CAT-Cathlamet, WIL-Willow Grove, RAI-Rainier, KAL-Kalama, RID-Ridgefield, GLE-Gleason, CHI-Chinook, WAS-Washougal, CAS-Cascade Locks, STE-Stevenson, BIN-Bingen, DAL- The Dalles, GIL-Giles, UMA-Umatilla, COL-Columbia Point, VER-Vernita, HOO-Hood Park, WIN-Windust, BOY-Boyer Park, GRE-Greenbelt, SWA-Swallows.

1.5.1.d. Harvest by Species/ Incidental Catch

Returning anglers

In addition to catching Northern Pikeminnow, returning anglers participating in the 2025 NPSRF also reported that they incidentally caught the salmonid species listed in Table 1.1. Incidental salmonid catch by returning NPSRF anglers consisted mostly of Cutthroat trout and unknown trout.

Table 1.1. Catch and harvest of Salmonids by returning anglers targeting Northern Pikeminnow in 2025

Salmon			
Species	**Caught**	**Harvest**	**Harvest Percent**
Cutthroat (Unknown)	44	2	4.5%
Trout (Unknown)	36	6	16.67%

Chinook (Juvenile)	24	0	0%
Chinook (Adult)	16	3	18.75%
Steelhead Juvenile (Hatchery)	7	0	0%
Chinook (Jack)	5	3	60%
Steelhead Adult (Wild)	3	0	0%
Steelhead Adult (Hatchery)	3	0	0%
Steelhead Juvenile (Wild)	2	0	0%
Coho (Juvenile)	2	0	0%

Anglers reported that all juvenile salmonids caught during the 2025 NPSRF were released. Per NPSRF protocol, technicians recorded all juvenile steelhead caught by NPSRF anglers as "wild" (except those specifically reported as missing an adipose fin). Harvested adult salmonids that were caught incidentally during the 2025 NPSRF were only retained during legal salmonid fisheries. NPSRF protocol is to immediately report anglers illegally harvesting any salmonids (whether juvenile or adult) to the appropriate enforcement entity for action.

Other fish species incidentally caught by returning NPSRF anglers targeting Northern Pikeminnow in 2025 were mostly Peamouth, Smallmouth Bass, and Sculpin (Table 1.2).

Table 1.2. Catch and harvest of non-Salmonids by returning anglers targeting Northern Pikeminnow in 2025

Non-Salmonid Species	**Caught**	**Harvest**	**Harvest Percent**
Northern Pikeminnow >228mm	150,457	150,456	100%
Northern Pikeminnow <228mm	20,330	2,066	10.16%
Peamouth	16,196	8,277	51.11%
Smallmouth Bass	10,275	1,732	16.86%
Sculpin (unknown)	6,094	3,420	56.12%
Walleye	2,202	1,272	57.77%
Channel Catfish	1,206	150	12.44%
Yellow Perch	1,205	378	31.37%
White Sturgeon	933	0	0%
Sucker (unknown)	638	99	15.52%
Catfish (unknown)	522	195	37.36%
Bullhead (unknown)	522	113	21.65%
Starry Flounder	194	8	4.12%
Chiselmouth	145	46	31.72%
Bluegill	104	18	17.31%
Carp	99	12	12.12%
Largemouth Bass	97	4	4.12%

Pumpkinseed	27	4	14.81%
American Shad	16	7	43.75%
Crappie (unknown)	13	0	0%
Whitefish	1	0	0%

Non-Returning Anglers Catch and Harvest Estimates

As in past years, telephone interviews were conducted to randomly survey non-returning participants at each of the NPSRF's 21 stations in order to determine and record their catch and/or harvest of reward sized Northern Pikeminnow and other incidentally caught fish species. In 2025, there were 3,502 non-returning angler days recorded, and a total of 707 calls were completed to non-returning anglers (20.2% of all non-returning anglers). Surveyed non-returning anglers targeting Northern Pikeminnow reported that they caught and/or harvested the fish species listed in column 1 of Table 1.3 during the 2025 NPSRF. A simple estimator was applied to the catch and harvest totals obtained from the surveyed anglers to obtain Total Catch and Total Harvest estimates for non-returning anglers participating in the 2025 NPSRF. Estimated totals are listed in columns 5 and 6 of Table 1.3.

Table 1.3. 2025 NPSRF non-returning angler phone survey results with total catch & harvest estimates

Species	Caught	Harvest	%Harvested	Estimated Total Catch	Estimated Total Harvest
Smallmouth Bass	211	26	12.3%	1045	129
Walleye	91	87	95.6%	451	431
Northern Pikeminnow <228 mm	61	8	13.1%	302	40
Yellow Perch	57	17	29.8%	282	84
Peamouth	46	15	32.6%	228	74
Catfish (unknown)	36	6	16.7%	178	30
Northern Pikeminnow > 228 mm	27	27	100%	134	134
American Shad	24	22	91.7%	119	109
Trout (Unknown)	12	0	0%	59	0
Carp	10	0	0%	50	0
Sculpin (Unknown)	8	0	0%	40	0
Sucker (Unknown)	7	2	28.6%	35	10
Bluegill	4	0	0%	20	0
Whitefish	4	0	0%	20	0
Crappie	2	0	0%	10	0
Pumpkinseed	2	0	0%	10	0
Chinook Salmon (Adult)	2	0	0%	10	0

Chinook Salmon (Juvenile)	1	0	0%	5	0
Bullhead (Unknown)	1	0	0%	5	0
Starry Flounder	1	0	0%	5	0
White Sturgeon	1	0	0%	5	0

N=3,502 n=707

Fork Length Data

The length frequency distribution for harvested Northern Pikeminnow (> 200 mm) from the 2025 NPSRF is presented in Figure 1.10. Fork length data from 64,313 Northern Pikeminnow > 200 mm FL (42.7% of total harvest) were taken during the 2025 NPSRF. The mean fork length for all measured Northern Pikeminnow (> 200 mm) in the 2025 NPSRF was 275 mm (SD= 55.95 mm), which was an increase from the 261 mm mean fork length for the NPSRF in 2024 (Shirley et al. 2025). Mean fork length for the 2025 NPSRF was also less than mean fork length for the 2025 Pikeminnow Dam Angler component of 368 mm (Werlau et al. 2026).

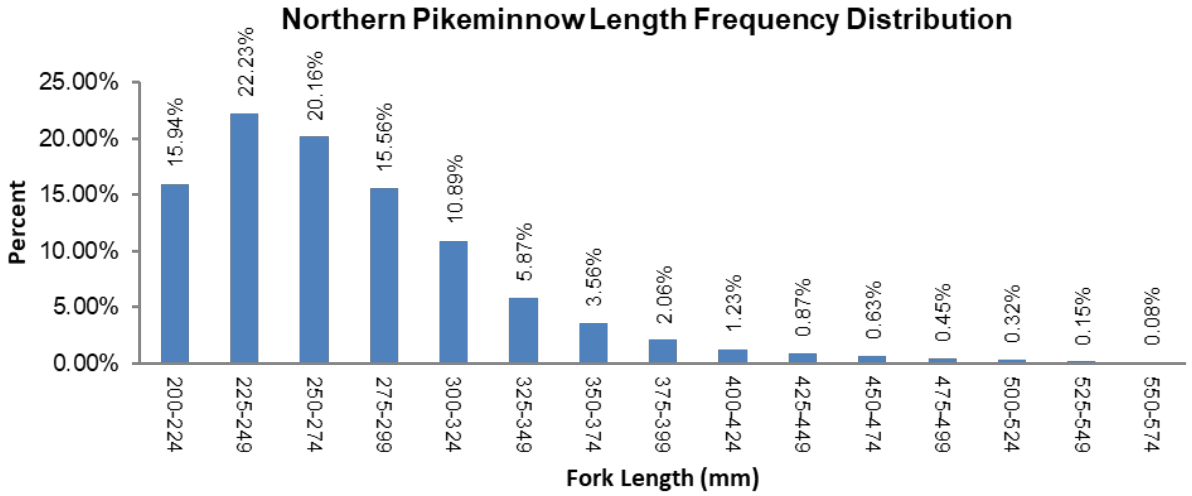


Figure 1.10. Length frequency distribution of Northern Pikeminnow ≥ 200 mm FL from 2025 NPSRF. n=64,313

1.5.2. Angler Effort

The NPSRF recorded total angler effort of 12,836 angler days spent during the 2025 season, an increase of 458 angler days from 2025 (Shirley et al. 2025) (Figure 1.11). If not for effort added from the early season opener combined with the season extension accounted, which accounted for 1,167 angler days, effort would have been 709 days less than 2024. When total effort is divided into returning and non-returning angler days, 9,334 angler days (72.7%) were recorded by returning anglers, and 3,502 angler days (27.3%) were spent by non-return anglers. The percentage of returning anglers in 2025 (72.7%) was slightly lower than the 2024 (73.5%) season (Shirley et al. 2025). Sixty-six-point three percent (66.3%) of total effort, and 91.2% of returning angler effort (8,508 angler days), was attributed to successful anglers who harvested at least one Northern

Pikeminnow in 2025 and were issued a pay voucher. There were 4,614 angler registrations using the Pikeminnow phone app, accounting for 36% of angler registrations in 2025 (Shirley et al, 2025).

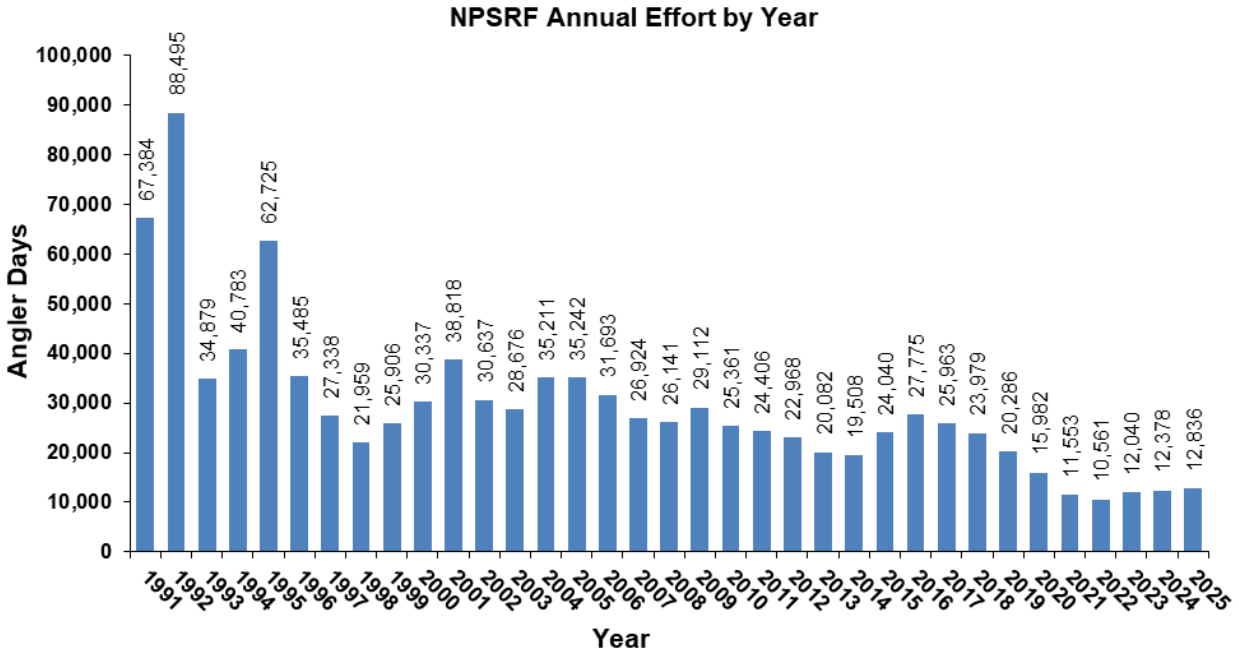


Figure 1.11. Annual Northern Pikeminnow Sport-Reward Fishery effort

1.5.2.a. Effort by Week

Peak weekly angler effort occurred in week 21 (Figure 1.12), which was two weeks later than in 2024. The week 21 peak was also different from the pattern for recent years, where peak effort had occurred near the first full week of the season (first identified in 2015). The effort pattern change in 2015 had coincided with the NPMP decision to lower NPSRF angler tier levels, which resulted in anglers expending additional effort at the start of the season as a way to reach higher tier levels earlier in the year as well as incentivizing anglers to continue fishing later in the season in order to maximize seasonal earnings (Winther et al. 1996). The 2025 weekly effort pattern was also different from the historical 1991-2015 seasonal effort pattern (Winther et al. 2016) where peak weekly effort had typically occurred during the same week as peak harvest (Figure 1.14). When we compare weekly effort totals between the past two seasons, weekly effort totals for only 5 of the 22 comparable weeks in 2025 increased from those of 2024 (Shirley et al. 2025) (Figure 1.13). Overall, mean weekly effort for the 2025 NPSRF was 494 angler days per week, down from 563 angler days in 2024 (Shirley et al. 2025). Weekly effort first exceeded the mean in the week 18 (April 28th – May 4th) and was then above the mean for 11 of the next 12 weeks.

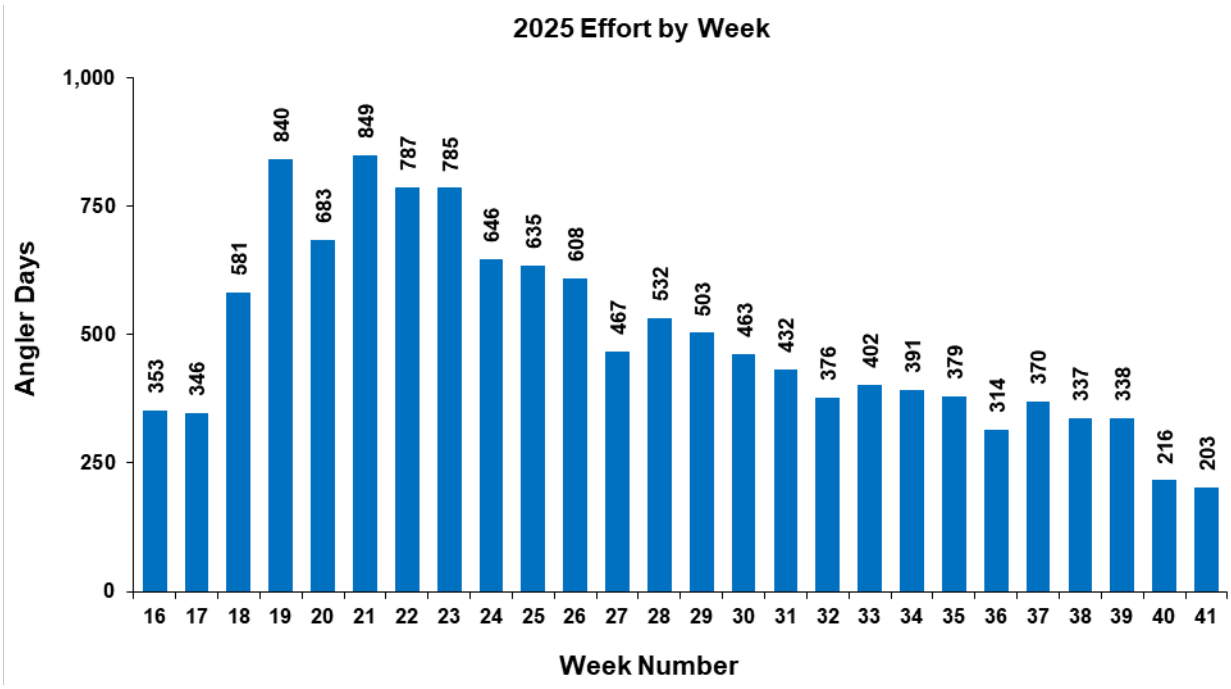


Figure 1.12. 2025 Weekly Northern Pikeminnow Sport-Reward Fishery angler effort

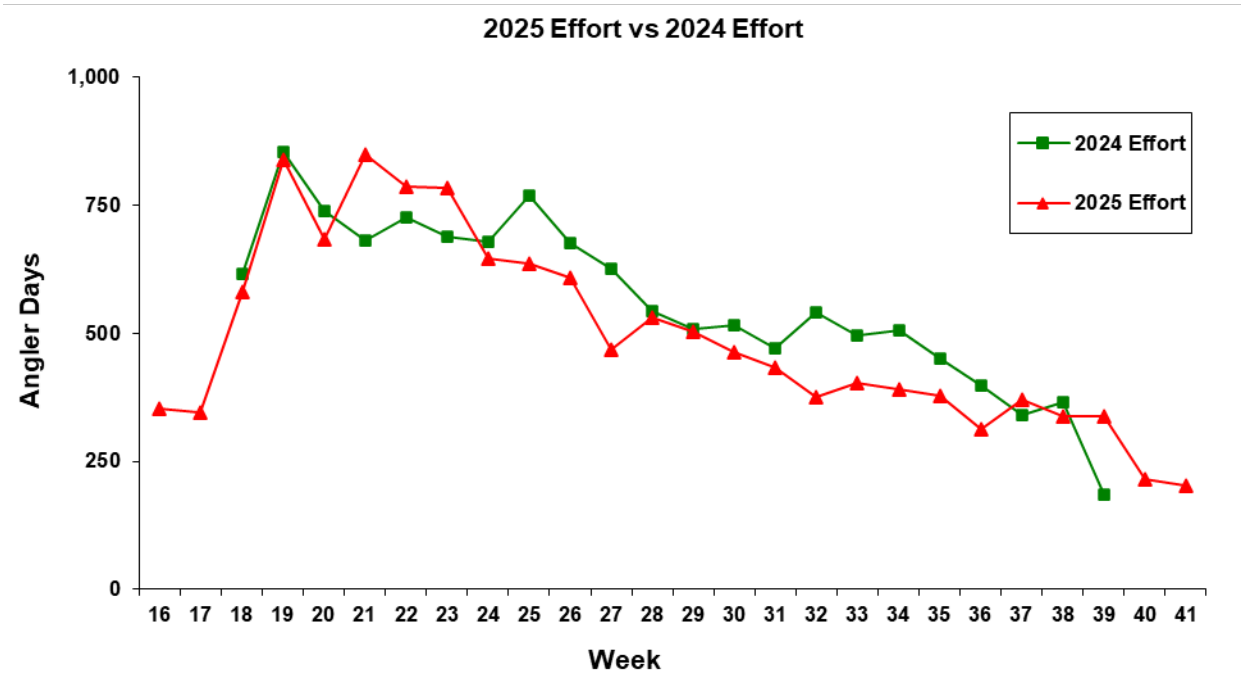


Figure 1.13. Effort 2025 Northern Pikeminnow Sport-Reward Fishery effort vs 2024 effort

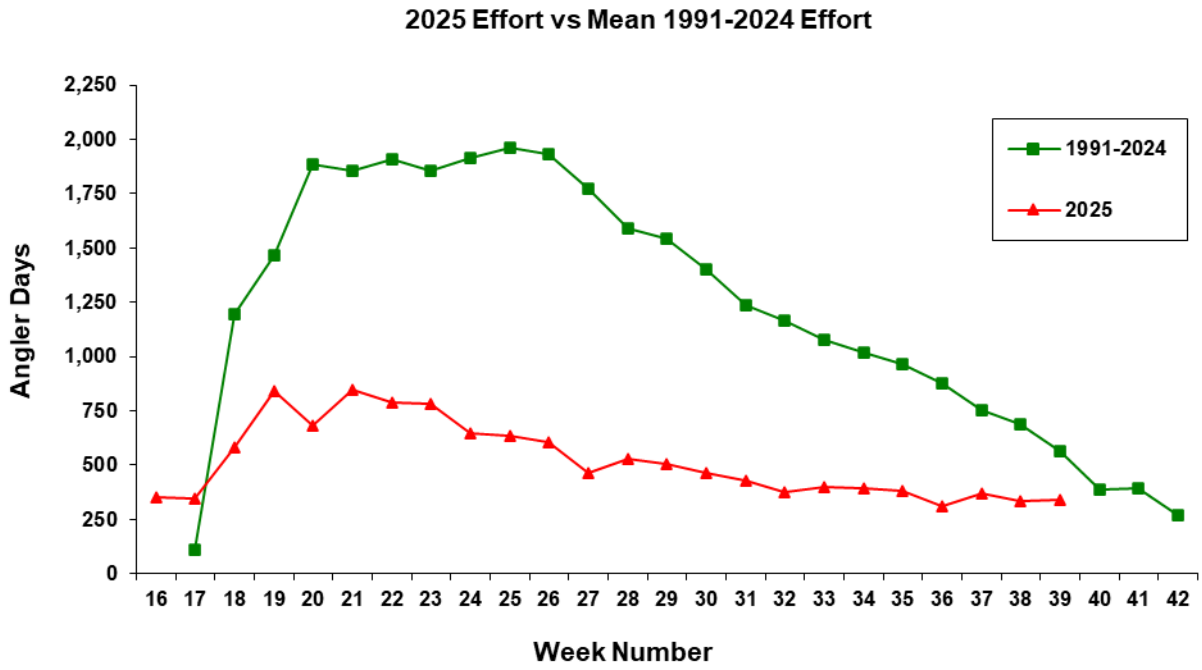


Figure 1.14. 2025 NPSRF weekly effort vs mean 1991-2024 effort

1.5.2.b. Effort by Fishing Location

Mean annual effort by fishing location for the 2025 NPSRF increased from 1,032 angler days in 2024 (Shirley et al. 2025) to 1,070 angler days in 2025. Effort totals ranged from 4,986 angler days spent in fishing location 01 (below Bonneville Dam) to 1 angler day spent in fishing location 09 on the Snake River (Lower Monumental Reservoir) (Figure 1.15). Seven of the 12 NPSRF fishing locations recorded an increase in angler effort (from 2024) during the 2025 season.

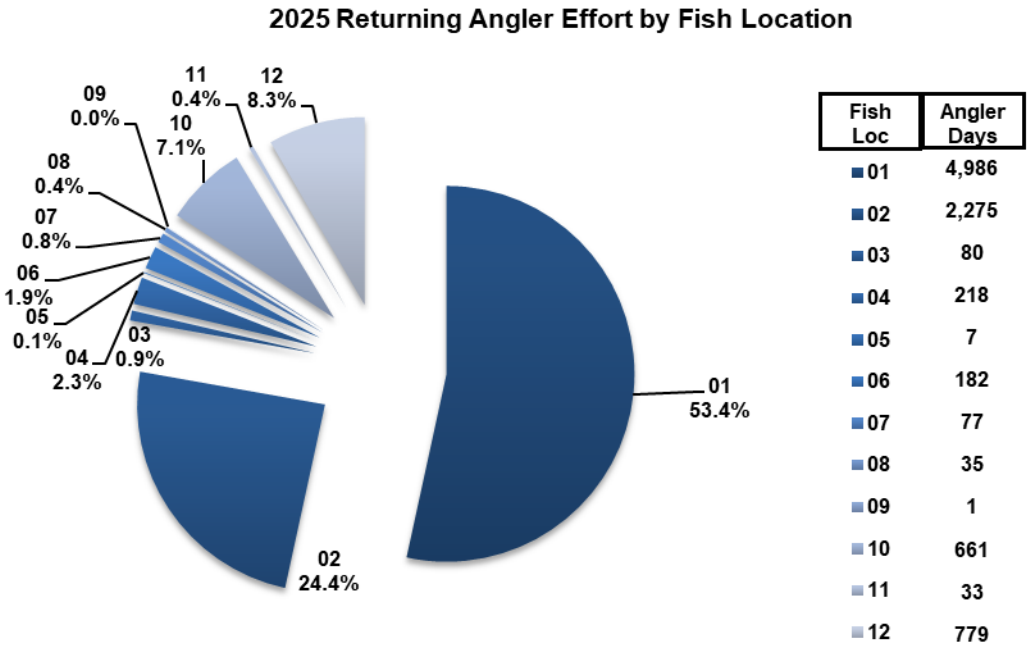


Figure 1.15. 2025 NPSRF angler effort by fishing location* (returning anglers only).
*Fishing Location Codes for **Columbia River**; 01 = Below Bonneville Dam, 02 = Bonneville Reservoir, 03 = The Dalles Reservoir, 04 = John Day Reservoir, 05 = McNary Dam to the mouth of the Snake River, 06 = Mouth of the Snake River to Priest Rapids Dam. **Snake River**; 07 = Mouth of the Snake River to Ice Harbor Dam, 08 = Ice Harbor Reservoir, 09 = Lower Monumental Reservoir, 10 = Little Goose Reservoir, 11 = Lower Granite Dam to the mouth of the Clearwater River, 12 = Mouth of the Clearwater River to Hells Canyon Dam.

1.5.2.c. Effort by Registration Station

Effort totals ranged from a high of 2,567 angler days at The Dalles station to a low of 2 angler days at the Hood Park station (Figure 1.16). Mean effort per registration station during the 2025 NPSRF was 611 angler days compared to 563 angler days in 2024 (Shirley et al. 2025). Effort increased at 9 of the 21 registration stations with notable increases in angler effort at The Dalles and Cathlamet registration stations in 2025.

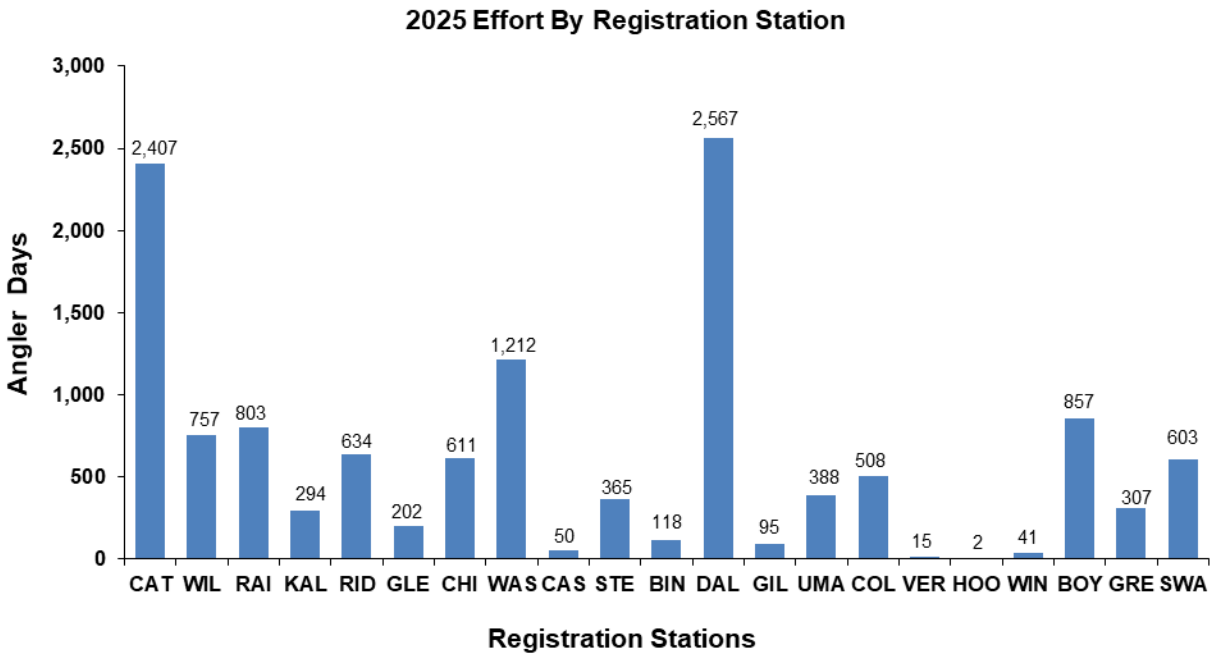


Figure 1.16. 2025 Northern Pikeminnow Sport-Reward Fishery angler effort by registration station CAT-Cathlamet, WIL-Willow Grove, RAI-Rainier, KAL-Kalama, RID-Ridgefield, GLE-Gleason, CHI-Chinook, WAS-Washougal, CAS-Cascade Locks, STE-Stevenson, BIN-Bingen, DAL-The Dalles, GIL-Giles, UMA-Umatilla, COL-Columbia Point, VER-Vernita, HOO-Hood Park, WIN-Windust, BOY-Boyer Park, GRE-Greenbelt, SWA-Swallows.

1.5.3 Catch Per Angler Day (CPUE)

The 2025 NPSRF recorded an overall (returning + non-returning anglers) catch per unit of effort (CPUE or "catch rate") of 11.72 Northern Pikeminnow harvested per angler day during the season. This catch rate was lower than the 2024 overall CPUE of 14.25 (Figure 1.17), indicating that angling conditions throughout the NPSRF area during the 2025 season were generally not as good as during the 2024 season. Angler CPUE in 2025 did continue to trend upward, as we have seen throughout the NPSRF's 35-year history. Returning angler CPUE during the 2025 NPSRF was 16.12 Northern Pikeminnow per angler day, down from 19.40 during 2024 and reinforcing the fact that fishing was not as good in 2025 (Shirley et al. 2025). The estimated CPUE for non-returning anglers was calculated as 0.04 reward size Northern Pikeminnow per angler day based on 2025 NPSRF phone survey results, which is consistent with past NPSRF season results.

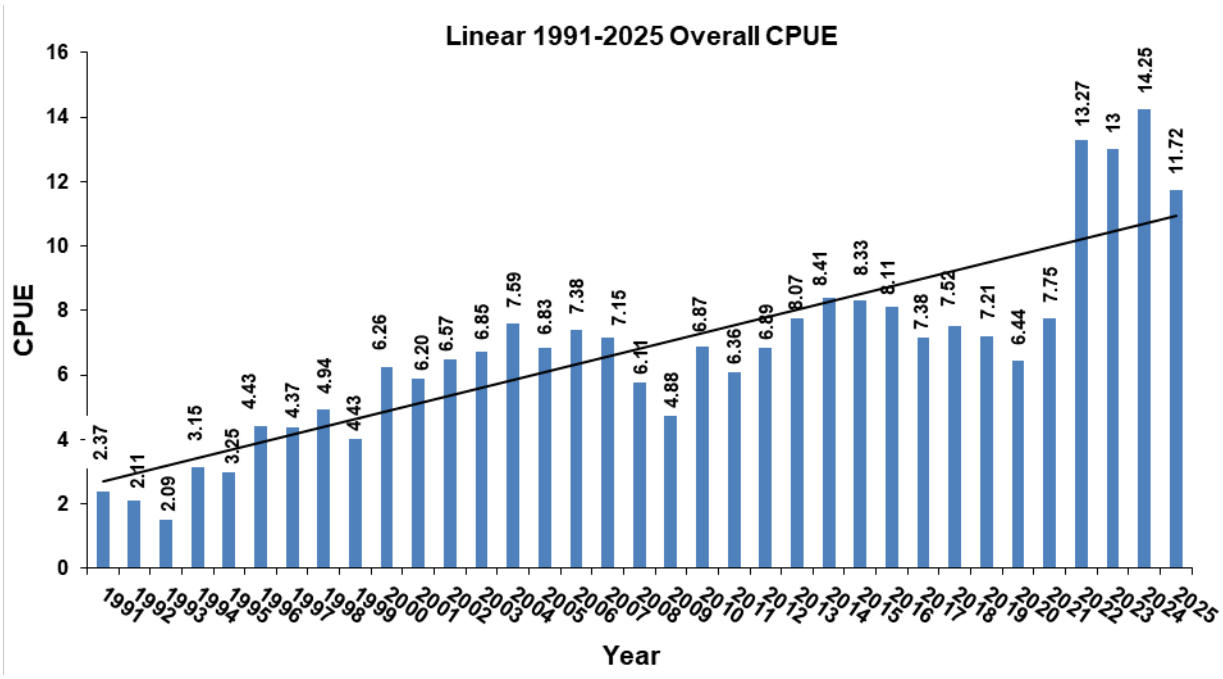


Figure 1.17. Annual NPSRF CPUE (returning + non-returning anglers) for the years 1991-2024

1.5.3.a. CPUE by Week

Mean angler CPUE by week for the 2025 NPSRF was 13.21 fish per angler day compared to 15.16 in 2024 (Shirley et al. 2025) and ranged from a low of 7.51 in week 29 (July 14-20) to a peak of 28.92 during extension week 41 (October 6-12) (Figure 1.18). Weekly CPUE for the 2025 NPSRF followed a two peak pattern as seen in recent years, with the first peak occurring in week 23 (near the peak of the spawn) and the second peak occurred in week 41 (the final week of the season extension), when more favorable water temp and angling conditions were present in the lower Columbia and Snake rivers (Winther et al. 2011).

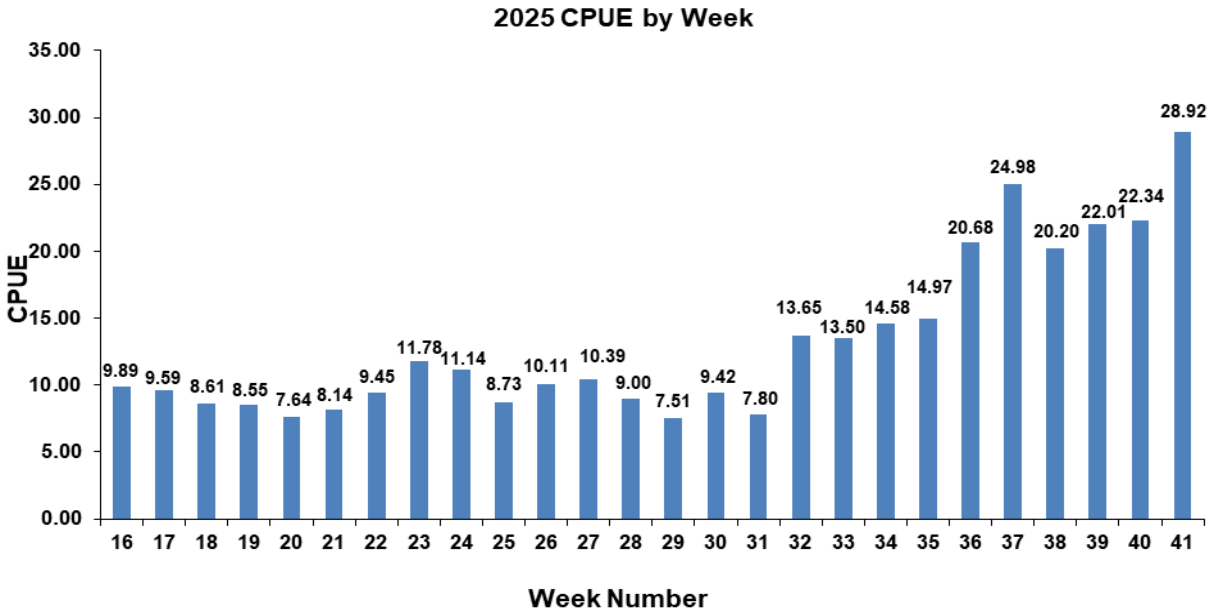


Figure 1.18. 2025 Northern Pikeminnow Sport-Reward Fishery angler CPUE by week

1.5.3.b. CPUE by Fishing Location

Angler success rates for the 2025 NPSRF (as indicated by CPUE), represent returning anglers only and varied by fishing location. Success rates ranged from a high of 19.73 Northern Pikeminnow per angler day in fishing location 02 (Bonneville Reservoir) to a low of 5.35 fish per angler per day in fishing location 06 (Mouth of the Snake River to Priest Rapids Dam) (Figure 1.19). CPUE increased at 5 of the 12 fishing locations and the average CPUE by fishing location was 11.80 Northern Pikeminnow per angler day in 2025 compared to 10.59 in 2024 (Shirley et al. 2025).

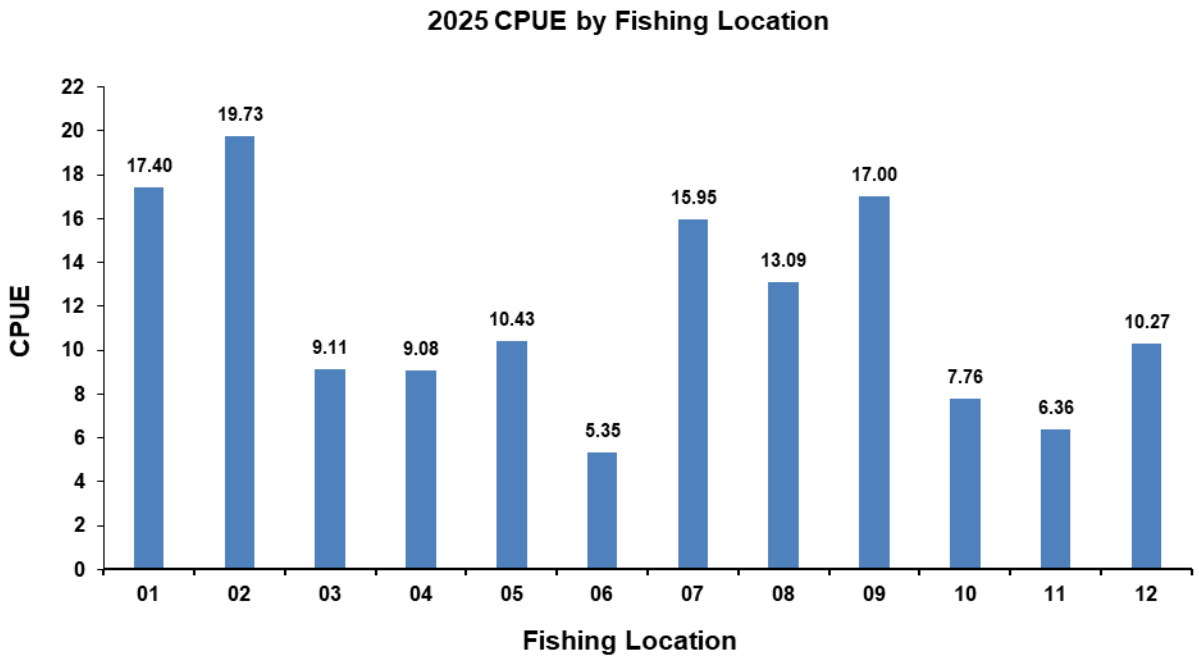


Figure 1.19. 2025 Northern Pikeminnow Sport-Reward Fishery angler CPUE by fishing location* *Fishing Location Codes for **Columbia River**; 01 = Below Bonneville Dam, 02 = Bonneville Reservoir, 03 = The Dalles Reservoir, 04 = John Day Reservoir, 05 = McNary Dam to the mouth of the Snake River, 06 = Mouth of the Snake River to Priest Rapids Dam. **Snake River**; 07 = Mouth of the Snake River to Ice Harbor Dam, 08 = Ice Harbor Reservoir, 09 = Lower Monumental Reservoir, 10 = Little Goose Reservoir, 11 = Lower Granite Dam to the mouth of the Clearwater River, 12 = Mouth of the Clearwater River to Hells Canyon Dam.

1.5.3.c. CPUE by Registration Station

The registration stations with the highest CPUE during the 2025 NPSRF were the Cascade Locks and Ridgefield stations where anglers averaged 29.24 and 21.86 Northern Pikeminnow per angler day respectively (Figure 1.20). The station with the lowest CPUE was Hood Park with a CPUE of 0.0 Northern Pikeminnow per angler day. The average angler CPUE by station was 10.55 Northern Pikeminnow per angler day in 2025, down from 12.79 in 2024 (Shirley et al. 2025). The largest CPUE increase occurred at the Cascade Locks station, where angler CPUE increased from 22.17 in 2024 to 29.24 in 2025.

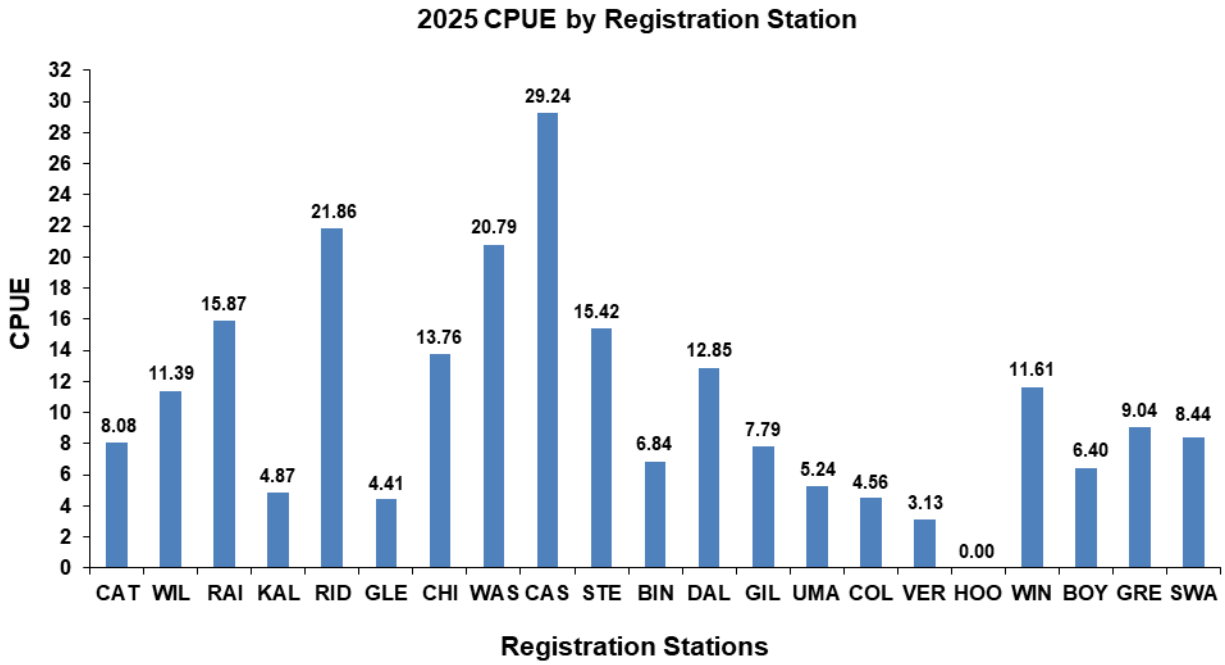


Figure 1.20. 2025 Northern Pikeminnow Sport-Reward Fishery angler CPUE by registration station CAT-Cathlamet, WIL-Willow Grove, RAI-Rainier, KAL-Kalama, RID-Ridgefield, GLE-Gleason, CHI-Chinook, WAS-Washougal, CAS-Cascade Locks, BIN-Bingen, DAL-The Dalles, GIL-Giles, UMA-Umatilla, COL-Columbia Point, VER-Vernita, HOO-Hood Park, WIN-Windust, BOY-Boyer Park, GRE-Greenbelt, SWA-Swallows.

1.5.4. Angler Totals

There were 1,501 separate anglers who participated in the 2025 NPSRF, representing a decrease of 127 participants from 2024 (Shirley et al. 2025). Six hundred sixteen of these anglers (41% of total compared to 40.8% in 2024) were classified as successful, harvesting at least one reward size Northern Pikeminnow for which a voucher was issued during the 2025 season. Of the successful anglers, 70.3% (433 anglers) sent in their vouchers to PSMFC for payment (PSMFC 11/21/25 Sport-Reward Payment Summary) while 183 anglers (29.7%) did not. The average successful angler harvested 244 Northern Pikeminnow during the 2025 NPSRF compared to 266 in 2024.

When we break down the 616 successful anglers by tier, 366 of these anglers (59.42%) harvested fewer than 25 Northern Pikeminnow and were classified as Tier 1 anglers (Figure 1.21). This is down from the 409 individual Tier 1 anglers in 2024 (Shirley et al. 2025). The number of 2025 Tier 2 anglers remained the same at 137 (22.24%) in 2025, while the number of Tier 3 anglers (known as “highliners”) decreased slightly from 118 anglers to 113 (18.34%) in 2025.

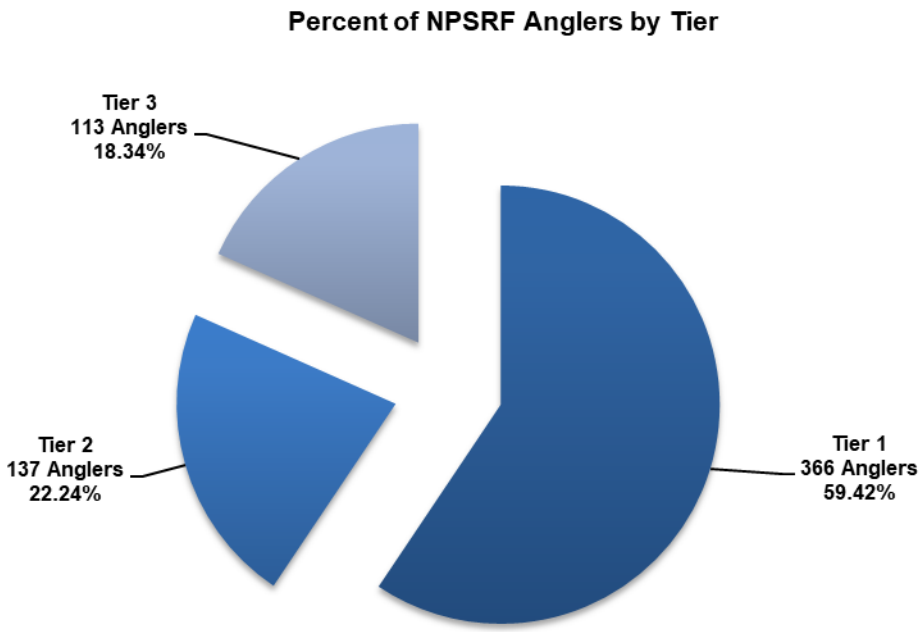


Figure 1.21. 2025 Percentage of NPSRF anglers by tier (returning anglers) based on total harvest

While Tier 1 anglers made up 59.42% of all successful NPSRF participants in 2025, they only accounted for 1.30% of total NPSRF harvest (1,952 Northern Pikeminnow) (Figure 1.22). Tier 2 anglers made up 22.24% of all successful anglers and harvested 7.38% of total NPSRF harvest (11,110 fish). Tier 3 anglers made up 18.34% of all successful anglers and accounted for 91.32% of total 2025 NPSRF harvest (137,394 fish), Tier 3 anglers represented 7.53% of all NPSRF participants (both returning and non-returning anglers combined).

The continued high percentage of overall NPSRF harvest achieved by Tier 3 anglers in 2025 remained especially important for successfully reaching 2025 harvest and exploitation objectives and their retention and incentivization should continue to be a priority since Tier 1 and 2 anglers have much lower harvest and CPUE levels than Tier 3 anglers (Hisata et al. 1996).

The average annual harvest per angler for Tier 1 anglers in 2025 decreased from 5.57 in 2024 to 5.34 NPM (Shirley et al. 2025). The average annual harvest for Tier 2 anglers decreased from 95 in 2024 to 81 during the 2025 and the average annual harvest for Tier 3 anglers decreased from 1,387 in 2024 to 1,216 in 2025.

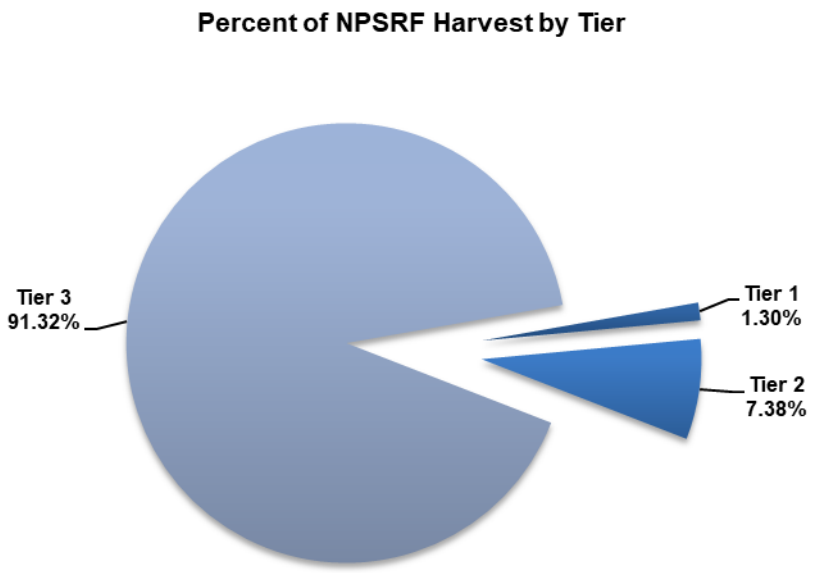


Figure 1.22. 2025 NPSRF harvest by angler tier (Tier 1 = ≤25, Tier 2 =26-200, Tier 3 = > 200)

The overall average NPSRF participant (returning anglers + non-returning anglers) expended more effort pursuing Northern Pikeminnow during the 2025 season (8.55 angler days) than in 2024 (7.60 angler days) (Shirley et al. 2025). When we look at successful anglers only, the average successful angler spent more annual effort during the 2025 NPSRF (13.81 angler days) than spent in 2024 (12.84 angler days). When we break down successful angler effort by tier, Tier 1 anglers expended the same amount of annual effort in 2025 as they did in 2024 (4 days). Tier 2 anglers averaged 20 days of effort in 2025 (vs 17 in 2024) and Tier 3 anglers spent an average of 62 days fishing in 2025 compared to 58 days in 2024) (Figure 1.23).

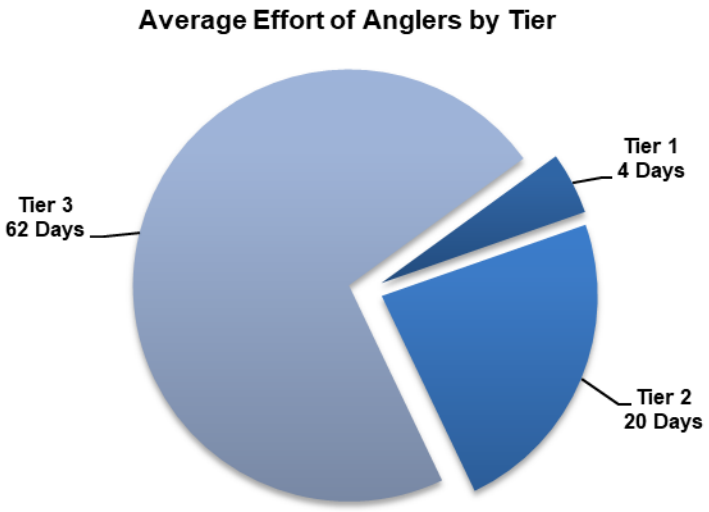


Figure 1.23. Average effort (angler days) of 2025 NPSRF anglers by tier (Tier 1 = ≤ 25, Tier 2 = 26-200, Tier 3 = > 200)

When 2025 angler CPUE by tier is compared to 2024, it is clear that fishing conditions were not as good in 2025 as they were in 2024. CPUE for anglers at Tier 1 decreased slightly from 1.36 to 1.21 (Figure 1.24). Angler CPUE for Tier 2 anglers decreased from 4.59 fish per angler day in 2024 to 4.02 in 2025 (Shirley et al. 2025), and CPUE for Tier 3 anglers decreased from 23.88 fish per angler day in 2024 to 19.69 in 2025.

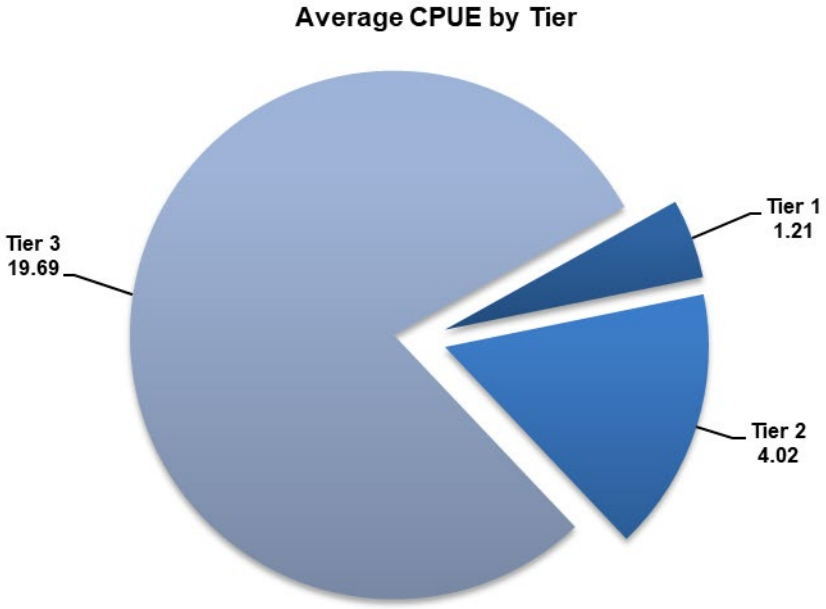


Figure 1.24. Average CPUE of 2025 NPSRF anglers by tier (Tier 1 = ≤25, Tier 2 =26-200, Tier 3 = > 200)

The top individual angler for the 2025 NPSRF harvested 15,715 Northern Pikeminnow (including 13 PIT tagged Northern Pikeminnow) worth total earnings of $159,310 (PSMFC 11/21/2025 Sport-Reward Payment Summary). The 2025 top angler caught 435 less reward sized Northern Pikeminnow than the top angler did in 2024 (Shirley et al. 2025). The CPUE for this year's top angler (103 fish per angler day) was down from the top angler CPUE in 2024 (144 fish per angler day) once again reflecting less productive fishing/river conditions seen for all anglers in 2025. In addition to having a lower total catch in 2025, the top angler also spent 41 more days of effort (153 days total) than the same top angler did in 2024. The top angler in participation during the 2025 NPSRF (who also had the top harvest) fished 153 days of the 182 available days (84.1% of available days).

1.5.5. Tag Recovery

1.5.5.a. Northern Pikeminnow Tags

WDFW deployed 94 external spaghetti or Floy tags during 2025 as an angler incentive intended to supplement ODFW's PIT tagging activities for the NPMP. Returning anglers harvested 13 Northern Pikeminnow tagged with external spaghetti or Floy tags during the 2025 NPSRF compared to 6 external spaghetti/Floy tags harvested in 2024 (Shirley et al. 2025). Of these, 9 were from WDFW externally tagged NPM. There were also 143 Northern Pikeminnow recovered with ODFW PIT tags in 2025 (ODFW no longer conducts NPM tagging using external tags). Tag recoveries (both external and PIT) peaked during week 21 (Figure 1.25), which was similar to peak tag recovery weeks in 2024 (weeks 19 and 23). In addition, 12.6% of ODFW PIT tags (18 tags) were recovered during the early preseason opener or during the extension, indicating the importance of adding those weeks to achieving the 10-20% NPMP exploitation goal in 2025. Of the 13 externally tagged Northern Pikeminnow recovered in the 2025 NPSRF, 4 also retained PIT tags implanted by ODFW. WDFW tag recovery data from the 2025 NPSRF (Spaghetti/Floy and/or PIT) was used by ODFW to estimate a 11.6% exploitation rate for the NPMP in 2025 (Snauer et al. 2025)

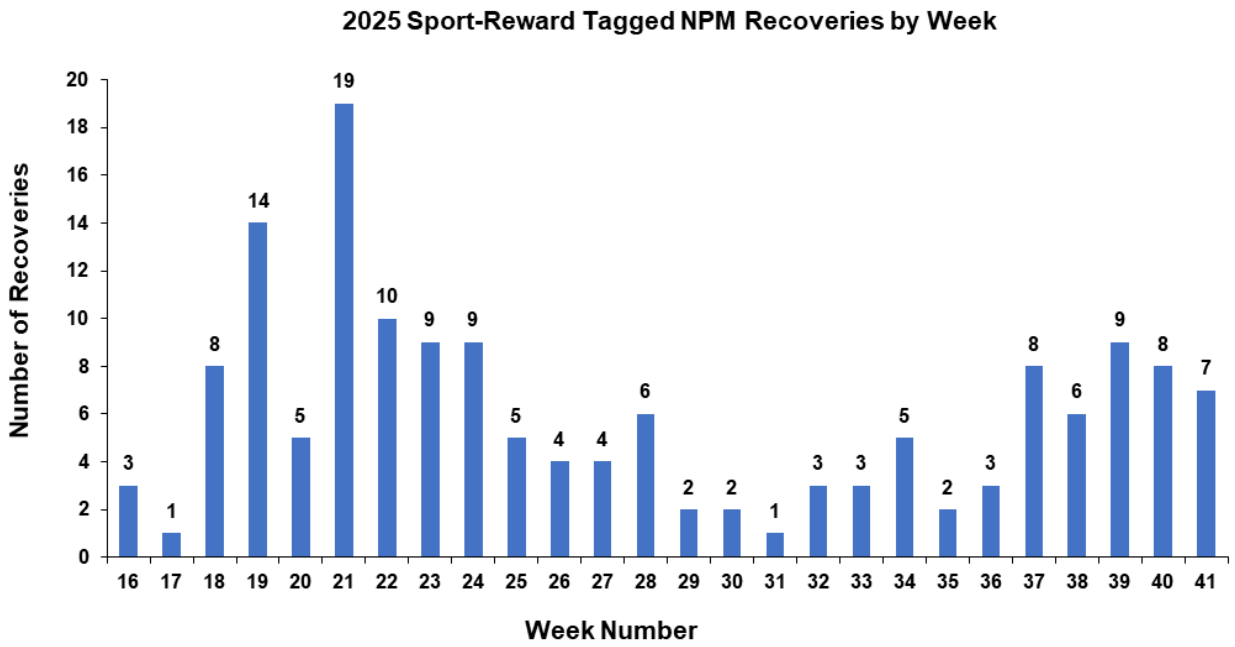


Figure 1.25. 2025 NPSRF tagged NPM recoveries by week

1.5.5.b. Ingested PIT Tags

A total of 150,456 Northern Pikeminnow were individually scanned for the presence of PIT tags in 2025. This represents 100% of the total harvest of qualifying reward-size fish for the 2025 NPSRF. Northern Pikeminnow, which did not qualify for rewards, were also scanned whenever possible. Technicians recovered a total of 40 PIT tags from consumed smolts that had been ingested by Northern Pikeminnow harvested during the 2025 NPSRF. There was a higher overall occurrence rate of PIT tagged to untagged NPM during the 2025 NPSRF (1:3,761 compared to 1:4,524 in 2024) (Shirley et al. 2025) and total ingested PIT tag recoveries of salmonid smolts ingested by Northern Pikeminnow in 2025 was 1 more than 2024. PIT tag recoveries peaked during week 19 of the 2025 NPSRF and the final ingested PIT tag recovery for the 2025 NPSRF occurred during week 25 (June 16th – June 22nd) (Figure 1.26), four weeks earlier than in 2024.

Ingested PIT tag recoveries by fishing location during the 2025 NPSRF showed that Northern Pikeminnow harvested from fishing location 02 (Bonneville Reservoir) consumed the largest number of PIT tagged juvenile salmonids totaling 25 (Figure 1.27).

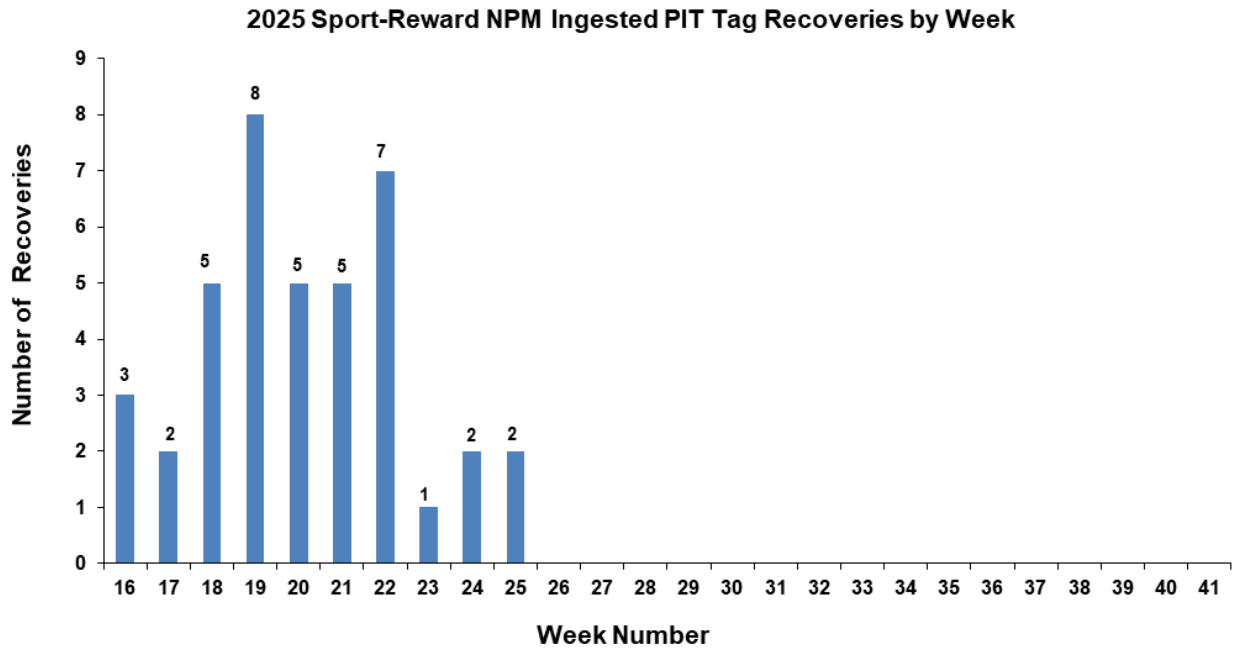


Figure 1.26. 2025 NPSRF ingested PIT Tag recoveries by week

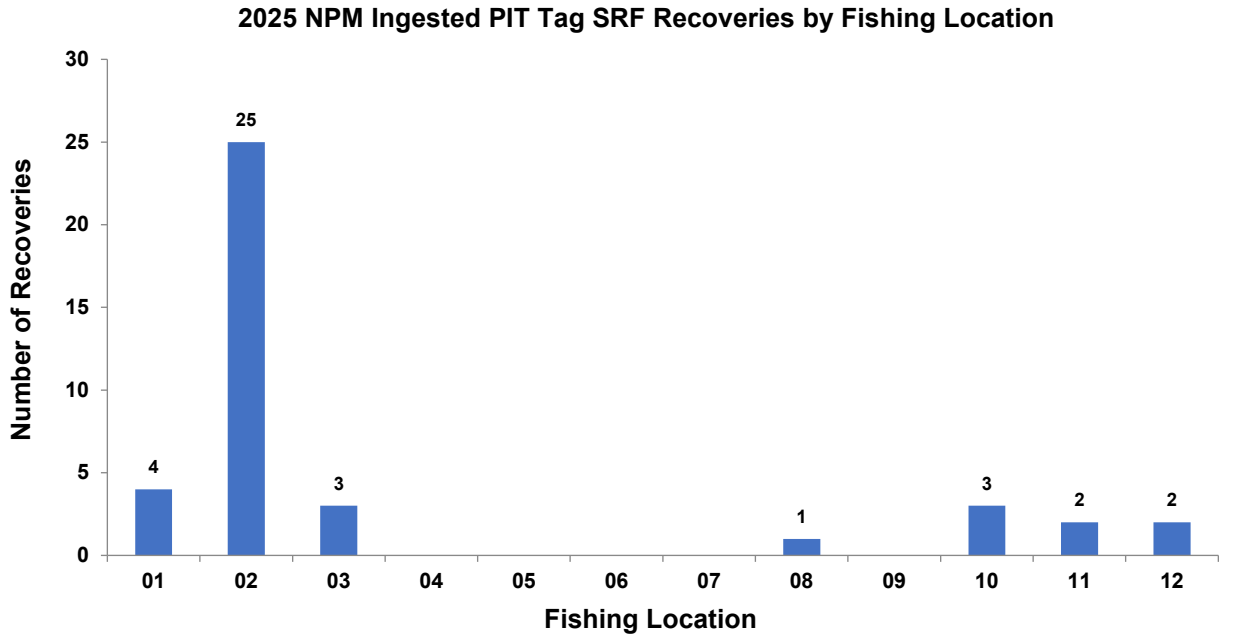


Figure 1.27. 2025 NPSRF ingested PIT Tag recoveries by fishing location*

*Fishing Location Codes – Columbia River; 01 = Below Bonneville Dam, 02 = Bonneville Reservoir, 03 = The Dalles Reservoir, 04 = John Day Reservoir, 05 = McNary Dam to the mouth of the Snake River, 06 = Mouth of the Snake River to Priest Rapids Dam. Snake River; 07 = Mouth of the Snake River to Ice Harbor Dam, 08 = Ice Harbor Reservoir, 09 = Lower

Monumental Reservoir, 10 = Little Goose Reservoir, 11 = Lower Granite Dam to the mouth of the Clearwater River, 12 = Mouth of the Clearwater River to Hells Canyon Dam.

Species composition of PIT tagged smolts ingested by Northern Pikeminnow harvested in the 2025 NPSRF was obtained from PTAGIS and showed that 27 of the 40 ingested PIT tag recoveries (67.5%) were from Chinook smolts (Figure 1.28). PTAGIS indicated that 24 of the 27 Chinook smolts were of hatchery origin, 2 were of wild origin, and 1 was of unknown origin. PTAGIS queries further revealed that the Chinook PIT tag recoveries consisted of 5 Fall Chinook, 14 Spring Chinook, and 8 Summer Chinook. Finally, PTAGIS queries revealed that the other 13 ingested PIT tag recoveries consisted of 6 hatchery summer Steelhead, 2 wild summer Steelhead, 1 wild unknown run Steelhead, 3 Coho, and 1 orphan (unrecorded origin) PIT tag recovery.

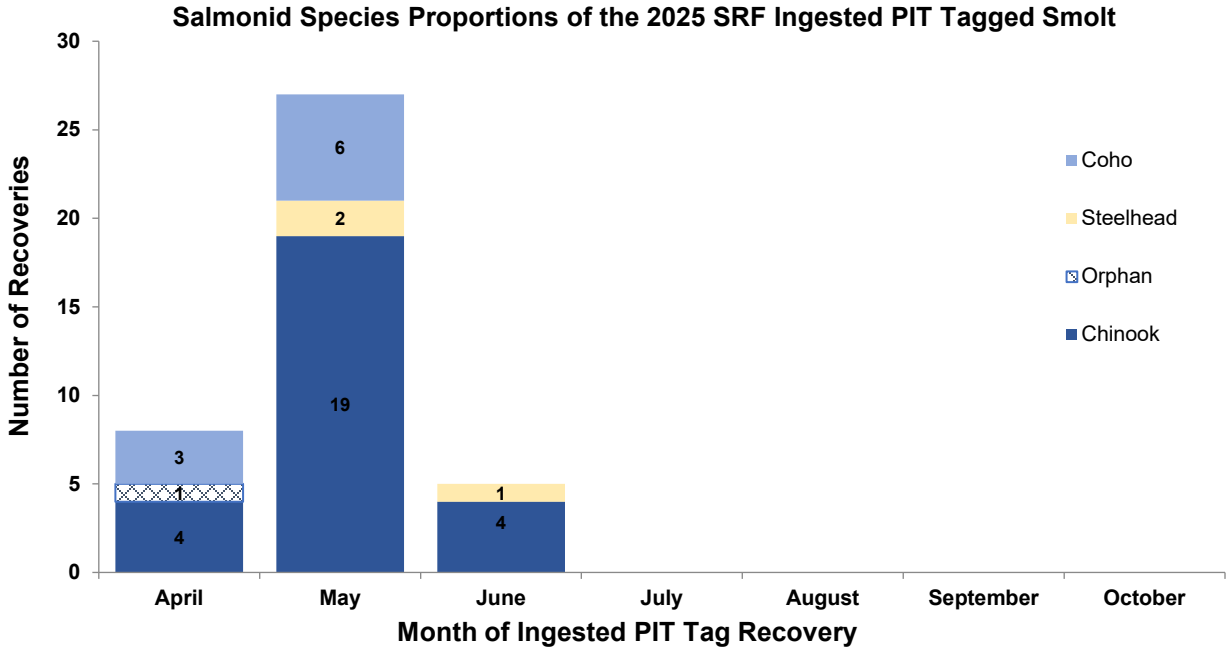


Figure 1.28. Recoveries of ingested Salmonid PIT Tags from the 2025 NPSRF

Analysis of PIT tag recovery data from the 2025 NPSRF continues to document actual Northern Pikeminnow predation on downstream migrating juvenile salmonids (and occasional lamprey) and may help to identify possible predation "hotspots". Further data collection and analysis of PIT tag recoveries from juvenile salmonids consumed by Northern Pikeminnow harvested in the NPSRF may lead to a better understanding of Northern Pikeminnow predation on salmonid smolts and the factors affecting the vulnerability of smolts and juvenile lamprey to predation while migrating through the Columbia River System.

1.6 SUMMARY

- The 2025 NPSRF season harvest was lower than the previous season by nearly 26,000 fish and was the first year of declining NPSRF harvest after three consecutive seasons of increasing harvest. Without the early pre-season opener and the season extension, 2025 harvest would have been an additional 17,000 fish lower. Less favorable river and angling conditions were clearly in effect during 2025 (compared to 2024) as is reflected by lower overall NSRF harvest, and lower harvest totals for anglers from all three tier levels.

- The 2025 NPSRF had an increase in overall angler effort for the second consecutive year, which was a direct result of the early season opener and the end of season extension. Angler effort may also have improved through additional awareness of the angler registration App.

- Total 2025 NPSRF harvest of 150,456 was below historical 1991-2024 average annual harvest (169,668) and was the first year to decline in harvest from the previous year (after three consecutive years of increased harvest). Despite the decrease in harvest, the NPSRF achieved an estimated exploitation rate of 11.6%. The Dalles was the top producing station with 32,974 Northern Pikeminnow harvested and Fishing location 01 was the top producing harvest area.

- With the 12,836 angler days recorded by Pikeminnow anglers during the 2025 SRF season, the NPSRF continued to build on the more than 1 million angler days of effort (1,027,252) generated by anglers participating in the NPSRF since the program's inception in 1991. Annual angler effort in 2025 increased by 458 angler days from 2024 while the number of individual anglers decreased by 127 anglers.

- CPUE decreased from 14.25 fish per angler day in 2024 to 11.72 in 2025. Despite the decline in CPUE from the previous year, the upward trend in angler CPUE seen since the NPSRF's inception continued in 2025 and once again the highest angler catch rates (CPUE) per week occurred in the final month of the season and during the extension.

- We recovered 13 Northern Pikeminnow with external spaghetti or Floy tags in 2025 and an additional 143 Northern Pikeminnow which had no external tags but retained ODFW PIT tags (formerly "tag-loss"). Eighteen of the 143 ODFW PIT tags were recovered during the early opener and season extension. Mean fork length for Northern Pikeminnow harvested during the 2025 NPSRF was 275 mm, which is up from 261 mm in 2024. Incidental catch consisted primarily of Peamouth, Smallmouth Bass, and Sculpin, reflecting a similar pattern seen in past NPSRF seasons, and only 2 adult salmonids were caught by surveyed non-returning anglers.

- Detection of PIT tags from juvenile salmonids ingested and retained in the gut of Northern Pikeminnow continues to yield valuable data about predation on juvenile salmonids. The occurrence rate of ingested salmonids increased to 1:3,761 in 2025, from 1:4,524 in 2024, and species composition of the 40 ingested PIT tags continued to indicate that most (27)

were from spring Chinook smolts of hatchery origin. There were also 8 summer steelhead (2 wild) and 3 hatchery coho recorded according to PTAGIS.

1.7 RECOMMENDATIONS

1.) Use early season opening dates along with season extensions (as warranted) for select stations during implementation of the 2026 NPSRF in order to generate additional angler harvest during periods of favorable river conditions in productive angling locations. Early season starts also likely generate additional angler effort and harvest later in the year (during the standard May-Sept season) by allowing anglers to attain higher tier levels (than they might normally achieve) by participating at early season opener locations when concentrations of Northern Pikeminnow are more readily available.

   a) Use early season openings at The Dalles, Columbia Point, and Umatilla registration stations in 2026 to enhance angler harvest opportunities for Northern Pikeminnow in areas where angler success has historically been highest near the start of the season and based on early season effort and harvest in 2025, add an additional early open station below Bonneville Dam (likely Washougal).
   b) Continue to use the "satellite" stations (< 5 month stations) for non-core registration stations to be used during limited dates and times as a means to increase NPSRF efficiency while addressing important "harvest windows" of angler opportunity in program areas where NPM availability and good angling conditions are short-lived.
   c) Continue to adjust station hours and/or close stations as needed if/when local harvest windows have closed and/or if continued low angler participation warrants.

2.) Improve and expand the abilities and use of the Pikeminnow smartphone application and related electronic data collection options. Pursue the option for upgrading PIT tag scanners to new models with increased compatibility with data collection from anglers using the phone application. Continue to improve the efficiency of collecting, recording and compiling NPSRF data including angler exit interviews, catch data and biological data using the phone application.

3.) Continue to utilize the standard angler Tier reward levels used in 2025 which were designed to incentivize proficient, knowledgeable anglers to expend additional effort participating in the 2026 NPSRF. Continue to evaluate if the tiered angler reward system and use of alternate registration station operation dates (such as early season openers) modifies angler effort and harvest and/or if it serves as an incentive to recruit new anglers to the NPSRF.

4.) Continue use of angler clinics, coupons, and sport shows as tools to recruit new anglers and promote NPSRF awareness. Develop additional methods to attract and engage new anglers to participate in the NPSRF.

5.) Continue to develop video content for use in improving angler education and NPMP awareness using Facebook, Instagram and other online/ social media as a means to maintain an acceptable online presence to potentially increase NPM effort and harvest.

6.) Continue to scan all Northern Pikeminnow for PIT tags from ingested juvenile salmonids, from Northern Pikeminnow tagged by ODFW as part of the biological evaluation of the NPMP, and as a way to deter fraud by identifying PIT tagged Northern Pikeminnow coming from outside NPSRF boundaries. Investigate and develop protocols for the new BPR-3001 PIT tag scanners and investigate and develop their ability to communicate with iPad devices used to handle and process angler registrations made with the phone application.

7.) Continue to evaluate and expand WDFW's use of Floy or Spaghetti type tags as external promotional tags deployed on Northern Pikeminnow as an angler incentive.

8.) Survey a minimum of 20% of non-returning NPSRF anglers to record non-returning angler catch of Northern Pikeminnow and all salmonids and estimate total catch and harvest of Northern Pikeminnow, all salmonids and all other fish species in 2026 per NPMP protocol. Analyze and monitor this data to identify and report any changes in non-returning angler catch trends.

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Section 2: Northern Pikeminnow Sport-Reward Payments

2025 Annual Report

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Division of Fish and Wildlife
Portland, Oregon 97208-3621

Project No. 1990-077-00
Contract No. 78040 REL 77

May 2026

2.1 ABSTRACT

During 2025, PSMFC staff provided technical, contractual, fiscal, and administrative oversight for the program. In addition, PSMFC processes and provides accounting for the reward payments to participants in the sport-reward fishery.

The 2025 season started early on April 14 at The Dalles station and on April 21 at the Umatilla and Columbia Point stations. The season was also extended through October 12. There were no late-season increases to the dollar amount paid for eligible Northern Pikeminnow or verified tagged fish. All vouchers issued from April 14 through October 12, 2025, were paid at $6, $8, and $10 per fish for the three payment tiers (1-25 fish, 26-200 fish, and 201-up). The rewards for tagged fish were $200 per fish with a PIT tag only and $500 per fish with an external tag.

A total of 149,036 fish were paid at the standard payment tiers (excluding coupon amounts, tagged fish, and tag-loss bonus payments). The season's total reward paid for these fish was $1,406,690.

A combined total of 13 tagged fish (having an external Spaghetti or Floy tag) were paid in 2025. The season's total paid for tag rewards was $6,500.

A total of 143 tag-loss fish (external tag missing but still possessing a verifiable PIT tag or PIT tag only as of 2022) were paid a *bonus* reward of $200 each. The season total paid for tag-loss *bonus* was $28,600.

A total of 366 anglers attached a one-time *$10 bonus coupon* to their reward voucher before submission for payment. The season total paid for *$10 bonus coupons* was $3,660.

A total of 1,501 separate anglers registered to fish, of which 433 (28.8%) caught one or more fish and received payments during the season. The total value for all 149,036 Northern Pikeminnow submitted for payment in 2025 (including all coupons, tagged fish, and tag-loss *bonus* payments) was $1,445,450.

2.2 INTRODUCTION

The Northern Pikeminnow Sport-Reward Program was administered by PSMFC in 2025. The program is a joint effort between the fishery agencies of the states of Washington (WDFW) and Oregon (ODFW), and the Pacific States Marine Fisheries Commission (PSMFC), and is funded by the Bonneville Power Administration (BPA). WDFW was responsible for the sport-reward registration/creel check stations throughout the river, handled all fish checked into the program, externally tagged fish for promotional purposes, and conducted dam angling at John Day Dam and The Dalles Dam. ODFW provided fish tagging services, population studies, and food habit studies, as well as exploitation rate estimates. PSMFC provided technical, contractual, fiscal, and administrative oversight for all segments of the Program and processed all reward vouchers for the sport-reward anglers.

2.3 THE 2025 SEASON

The 2025 Northern Pikeminnow Sport-Reward Fishery started early at select stations on April 14 and ran through October 12. The season was characterized by below average catch, below average effort, and above average catch per unit effort. Of the 150,456 pikeminnow vouchered, 149,036 (99.1%) were successfully submitted for payment (Table 2.1). There were 7,376 (5.0%) vouchered fish paid at the Tier 1 level, 27,018 (18.1%) vouchered fish were paid at the Tier 2 level, and 114,629 (76.9%) vouchered fish were paid at Tier 3. Anglers who obtained Tier 1 status by the end of the season harvested 1,329 (0.9%) of the total paid. Anglers who obtained Tier 2 status by the end of the season harvested 10,669 (7.2%) of the total paid. Anglers who obtained Tier 3 status by the end of the season harvested 137,038 (91.9%) of the total paid.

PSMFC distributed $1,445,450 (84.3%) of the $1,714,661 sport-reward fund to anglers participating in the program. Of the funds distributed, $44,256 (3.1%) was paid at the Tier 1 rate ($6/fish), $216,144 (14.9%) at Tier 2 ($8/fish), and $1,146,290 (79.3%) at Tier 3 ($10/fish) for the successful submission of a standard voucher. Another $38,760 (2.7%) in sport-reward funds was paid out for tag vouchers, tag-loss fish, and one-time bonus coupons

Table 2.1. Total number of Northern Pikeminnow vouchered and rewarded by tier group in 2025

	Angler Catch					
	Tier 1 ($6)	Tier 2 ($8)	Tier 4 ($10)	Incentives	Payout (% of Total)	Total
Northern Pikeminnow	7.376	27,018	114,629	13	149,036	150,456
Rewards	$44,256	$216,144	$1,146,290	$38,760	$1,445,450 (84.3%)	$1,714,661

Four hundred thirty-three anglers successfully submitted vouchers for payment by the November 15 deadline. Out of the 191 (44%) Tier 1 anglers paid, 146 caught ten or less pikeminnow (Figure 2.1). One hundred thirty (30%) anglers paid achieved Tier 2 status by the end of the season, and 112 (26%) achieved Tier 3 status by the end of the season. The top 20 anglers caught 82,652 (55%) of all pikeminnow paid and earned $834,710 (58%) of the total funds disbursed.

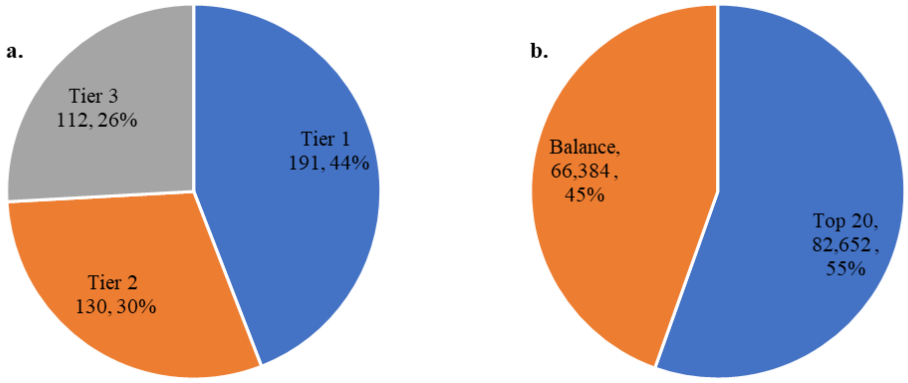

Figure 2.1. Number and percent of anglers with successful voucher submissions by tier level (a) and number and percent of vouchered fish successfully submitted by the Top 20 anglers versus the balance (b)

2.4 PARTICIPATION AND PAYMENT

A total of 616 anglers who registered were successful in catching one or more fish in 2025. Of those anglers; 433 caught one or more fish, submitted their voucher before the payment deadline (with no unresolved issues preventing payment), and received payment during the season.

In 2025, a total of 150,456 fish were harvested in the sport-reward fishery. Of this total, 149,036 (99.1%) fish were submitted for payment and paid preceding the 2025 payment deadline. To obtain payment, vouchers must have been received no later than November 15, 2025. In addition, any *received* vouchers with issues preventing payment (missing information, voiding of voucher for program violations, etc.) that had not been resolved by November 15, 2025, became null and void.

2.5 TAGGED FISH AND PAYMENTS

Registered anglers caught and submitted a total of 13 tagged fish (showing an external Spaghetti or Floy tag) to station technicians. For each tagged fish, the angler was issued a special tag voucher. The tag was placed in a special tag envelope, which was stapled to the tag voucher. It was then the angler's responsibility to mail both the tag and voucher to ODFW for verification. Once the tag was verified, the information was forwarded to PSMFC for payment of the special $500 tagged fish reward. The season's total paid for tag rewards was $6,500.

2.6 TAG LOSS BONUS PAYMENT

Prior to 2022, all tagged Northern Pikeminnow initially had both a Spaghetti/Floy tag and a PIT (Passive Integrated Transponder) tag. However, the special $500 tagged fish reward was valid only for fish that still retained the original Spaghetti/Floy tag. All qualifying Northern Pikeminnow

submitted by registered anglers were scanned to check for the presence of a PIT tag. When a PIT tag was detected on a fish with no Spaghetti/Floy tag, the fish was considered a *standard* fish (and paid at the standard tier rate of $6, $8, and $10 per fish) but was also flagged for verification (by WDFW) of a valid program PIT tag. Upon positive confirmation by WDFW; the angler was sent an additional $200 *bonus* check and a congratulatory letter that included the tagging date and the approximate area of release. As of 2022, ODFW began a PIT tag-only protocol. These PIT tag-only fish were paid at the same bonus rate as tag-loss fish. In 2025, a total of 143 tag-loss fish qualified for and were paid the *bonus* reward of $200. The season total paid for tag-loss *bonus* was $28,600.

2.7 ONE-TIME $10 BONUS COUPON

Leading up to the start of the season, brochures containing "coupons" were mailed to anglers in the pikeminnow database who participated in the program within the past 5 years (2020-2024) and to those who signed up for our mailing list at the various sportsmen's shows. The 2025 Coupon was worth a *one-time $10 bonus* when attached to a voucher for qualifying pikeminnow caught and turned in for the reward payment. A total of 366 anglers attached the *one-time $10 bonus coupon* to their reward voucher before submission for payment. The season total paid for *$10 bonus coupons* was $3,660.

Table 2.2. Incentives received and processed by category in 2025

	External Tags	**PIT Tags**	**Coupons**	**Total**
Value	$500	$200	$10	
Submitted Incentives	13	143	366	522
Total	$6,500	$28,600	$3,660	$38,760

2.8 TOTAL ACCOUNTING

Total payments for the season of regular vouchers, *$10 bonus coupons*, tag vouchers, and *tag-loss bonus* payments were $1,445,450.

All IRS Form 1099-NEC Statements were sent to the qualifying anglers for tax purposes on January 30, 2026. Appropriate reports and copies were provided to the IRS on January 30, 2026.

A summary of the catch and rewards paid, including information on the "top 20" anglers, is provided in Table 2.1.

Table 2.3. 2025 Sport-Reward Payment Summary

2025 SPORT REWARD PAYMENTS SUMMARY

The following is a summary of all vouchers received and paid as of November 21, 2025

	Fish	Incentives	Reward
Fish paid @ tier 1 ($6 each):	7,376		$44,256
Fish paid @ tier 2 ($8 each):	27,018		$216,144
Fish paid @ tier 3 ($10 each):	114,629		$1,146,290
Tags paid (@ $500 each):	13		$6,500
Coupons issued (@ $10 each):		366	$3,660
Tag-loss issued (@ $200 each):		143	$28,600
Total:	149,036		$1,445,450
Anglers @ tier 1		*191*	
Anglers @ tier 2		*130*	
Anglers @ tier 3		*112*	
Number of separate anglers		*433*	
Anglers with 10 fish or less:		*146*	
Anglers with 2 fish or less:		*66*	

	Total Fish	$500 Tags	Tag Loss	Coup.	Total Reward
1.	15,715	0	$ 2,600	$ 10	$ 159,310
2.	8,033	1	$ 1,000	$ 10	$ 81,380
3.	6,321	0	$ 1,200	$ 10	$ 63,970
4.	6,054	0	$ 1,800	$ 10	$ 61,900
5.	4,239	1	$ 400	$ -	$ 42,830
6.	4,112	0	$ 200	$ -	$ 40,870
7.	3,924	0	$ 2,000	$ 10	$ 40,800
8.	3,880	0	$ -	$ 10	$ 38,360
9.	3,759	1	$ 200	$ -	$ 37,830
10.	3,632	0	$ 1,200	$ 10	$ 37,080
11.	2,650	2	$ 800	$ 10	$ 27,840
12.	2,801	0	$ 200	$ -	$ 27,760
13.	2,719	0	$ -	$ 10	$ 26,750
14.	2,497	0	$ 1,200	$ -	$ 25,720
15.	2,507	0	$ 400	$ 10	$ 25,030
16.	2,171	0	$ 200	$ 10	$ 21,470
17.	2,149	0	$ 200	$ 10	$ 21,250
18.	2,033	0	$ -	$ 10	$ 19,890
19.	1,881	0	$ 200	$ -	$ 18,560
20.	1,575	0	$ 800	$ 10	$ 16,110
	82,652	5	$14,600	$ 140	$ 834,710

NORTHERN PIKEMINNOW SPORT-REWARD FISHERY VOUCHER **2025 STANDARD**

TO ENSURE PROMPT PAYMENT:
1) Verify voucher is complete.
2) Fill out, detach and keep receipt.

MAIL TO: NORTHERN PIKEMINNOW SPORT-REWARD FISHERY
PO Box 82128
Portland, OR 97282-0128

LAST NAME | FIRST NAME | MI

ADDRESS

CITY | STATE | ZIP CODE

ANGLER TELEPHONE NUMBER – –

VOUCHER #

EMAIL (OPTIONAL - By providing your email, you are agreeing to receive email communications from the Sport-Reward Program)
@

MONTH | DAY | 2025 | DOCUMENT # | STATION

TOTAL # OF QUALIFYING NORTHERN PIKEMINNOW CLAIMED (EXCLUDING TAGGED FISH)

(NUMBER) X (WRITTEN TOTAL)

LAST 4 DIGITS SS# –

I hereby swear under the penalty of perjury that the above information is true and correct and that I caught all fish claimed on this voucher in accordance with all Sport-Reward Fishery Rules and Regulations printed on the back of this voucher

X **TECHNICIAN SIGNATURE**

X **SIGN HERE**
ANGLER SIGNATURE (Must be signed in the presence of Technician)

DATE **STATION**

Fishing Date:
Station:
Voucher #:
Document Number:
Number of fish:

*** * * DETACH & KEEP THIS STUB FOR YOUR RECORDS * * ***

REWARD VOUCHER INFORMATION
1-800-769-9362 (Toll Free)
E-MAIL: vouchers@pikeminnow.org

*****TO OBTAIN PAYMENT, THIS VOUCHER MUST BE RECEIVED BY PSMFC NO LATER THAN 11/15/25.*****
[ANY ISSUES PREVENTING PAYMENT (missing information, voiding of vouchers for sport-reward fishery rule violations ect.) MUST BE RESOLVED PRIOR TO THIS DATE OR THE VOUCHER BECOMES NULL AND VOID]

Figure 2.2. 2025 Northern Pikeminnow Sport-Reward Fishery Standard Voucher

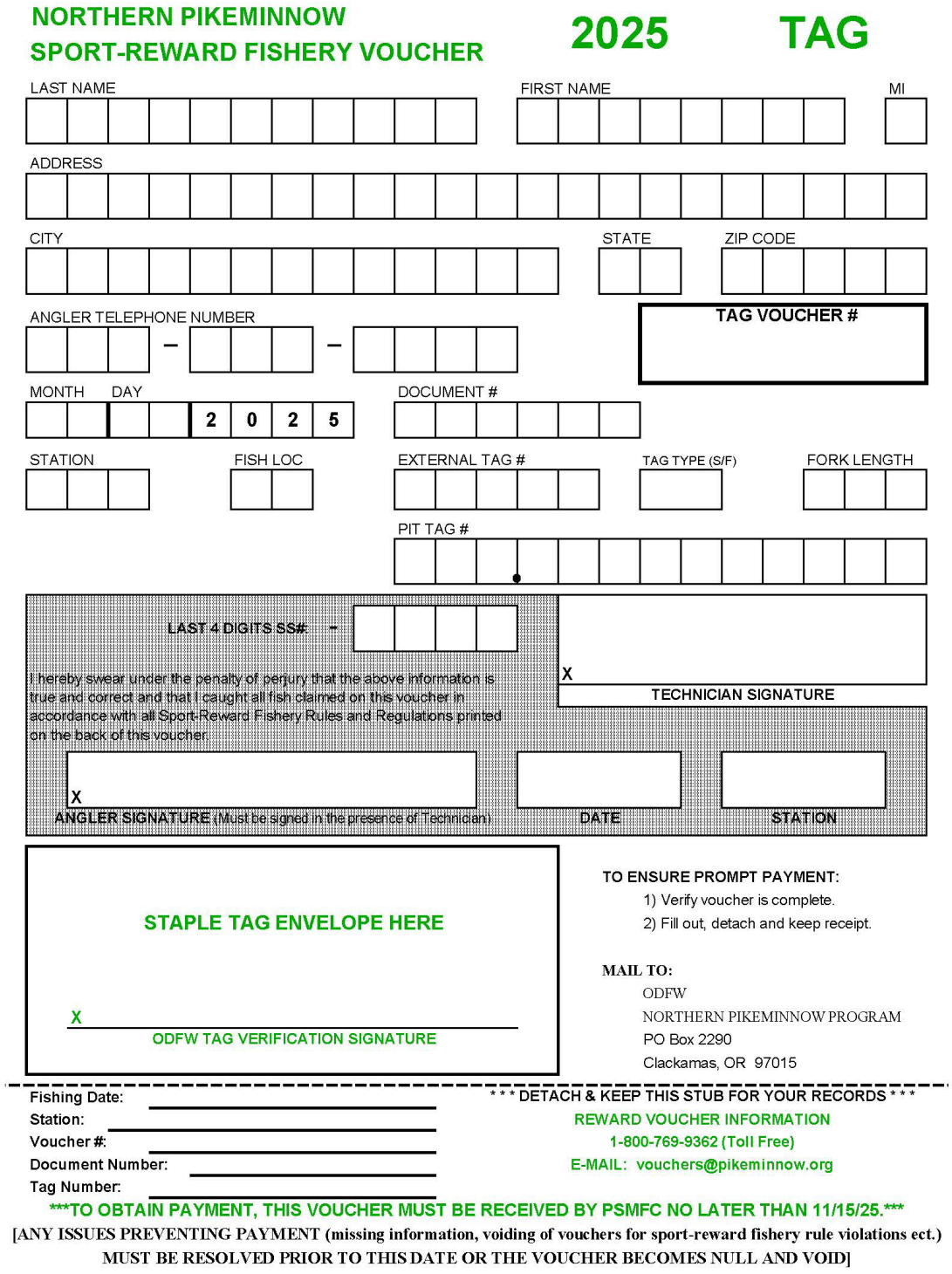

Figure 2.3. 2025 Northern Pikeminnow Sport-Reward Fishery Tag Voucher

NORTHERN PIKEMINNOW SPORT-REWARD FISHERY RULES AND REGULATIONS

Anglers participating in the Northern Pikeminnow Sport-Reward Fishery must adhere to each of the following rules:

1) Present a valid fishing license and picture identification upon request by any authorized program representative.

2) Adhere to all applicable state fishing regulations for the area in which you fish. Contact your local state fishery agency for license requirements and current fishing regulations.

3) Register for one of the designated registration stations each day prior to fishing. Anglers may register in person during times when stations are unstaffed by using the station's self-registration box. Anglers may also register online using the Pikeminnow Registration App. Anglers may not be registered at multiple stations simultaneously.

4) Provide true and accurate information to authorized program representatives regarding the taking, possession, delivery, transportation, sale, transfer or any other use of fish caught while participating in the Northern Pikeminnow Sport-Reward Fishery.

5) Comply with the directions of authorized program personnel related to the collection of sampling data and angler participation in the Northern Pikeminnow Sport-Reward Fishery.

6) Mail in all reward vouchers within 30 days of the end of each year's fishery. To obtain payment, vouchers must be received no later than Nov. 15th of each year's fishery and any issues preventing voucher payment (missing angler information, etc.) must also be resolved by that date or the voucher becomes null and void.

7) Fish must have been caught in the mainstem Columbia River from the mouth up to the restricted zone below Priest Rapids Dam, or in the Snake River from the mouth up to the restricted zone below Hells Canyon Dam. The "mainstem" includes backwaters, sloughs, and up tributaries 400 feet from the tributary mouths. "Tributary mouth" is as defined by state fishing regulations.

8) Fish must be returned to the same registration station where the angler registered. Fish must be returned before that station closes for that day on the date stamped on the angler's registration form or as indicated by the angler's online registration. All eligible fish must have been caught subsequent to that day's registration time.

9) Fish must have a total length greater than or equal to 9 inches. Fish less than 9 inches total length are not eligible for reward payment.

10) All fish to be redeemed for reward payment must have been personally caught solely by the angler submitting them for reward payment.

11) Fish must be alive or in fresh condition. Fish that are or were frozen, or that are in otherwise poor condition, will not be accepted for payment. Technicians have the authority to determine whether Northern Pikeminnow submitted for payment meet these standards.

12) Violation of any of the above rules may result in disqualification from the Northern Pikeminnow Sport-Reward Fishery.

Figure 2.4. Northern Pikeminnow Sport-Reward Fishery Rules and Regulations

Section 3: System-wide Predator Control Program: Fisheries and Biological Evaluation

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3.1 ABSTRACT

Since 1990, the Northern Pikeminnow Management Program (NPMP) has applied targeted fisheries in the Columbia and Snake rivers to restructure populations of Northern Pikeminnow (*Ptychocheilus oregonensis*) in an effort to suppress predation on out-migrating juvenile Pacific salmon and steelhead (*Oncorhynchus spp.)* by Northern Pikeminnow. During 2025, the Oregon Department of Fish and Wildlife (ODFW) evaluated the continued efficacy of the Northern Pikeminnow removal program and assessed potential outcomes of the fisheries through a combination of field activities, laboratory work, and data analyses. This report augments historical information with current data and seeks to: 1) estimate rates of targeted fisheries exploitation of Northern Pikeminnow and the concomitant reduction in juvenile salmonid predation by Northern Pikeminnow; 2) characterize population parameters of Northern Pikeminnow, Smallmouth Bass (*Micropterus dolomieu*), and Walleye (*Sander vitreus*) in The Dalles, and John Day reservoirs and 3) assess evidence of possible intra- and inter-specific compensatory responses by Northern Pikeminnow, Smallmouth Bass, and Walleye related to the sustained removal of Northern Pikeminnow from the lower Columbia and Snake rivers. To quantify exploitation during 2025, a Brownie bird band mark-recovery model was used in tandem with ODFW marking and Washington Department of Fish and Wildlife (WDFW) Sport-Reward Fishery (SRF) recovery data, to calculate exploitation rates for Northern Pikeminnow in the area covered by program implementation. Analyses of recoveries indicated that system-wide exploitation of Northern Pikeminnow greater than or equal to 250 mm FL during 2025 was 11.6% (9.1 – 14.6%; 95% confidence interval). Based on this level of exploitation, modeled results predict that predation by Northern Pikeminnow in 2026 will be reduced by 25% (range: 11–38%), relative to pre-program levels. These metrics suggest that NPMP continues to be successful in reducing predation on juvenile salmonids by Northern Pikeminnow. Fisheries independent biological monitoring was conducted during spring in The Dalles and John Day reservoirs to generate additional information about trends in the indices of abundance, consumption, and predation for Northern Pikeminnow and Smallmouth Bass. An index of abundance was also estimated for Walleye. These indices showed variable patterns during the 35-year time series of the data with decreasing trends for Northern Pikeminnow and increasing trends for Smallmouth Bass and Walleye in several areas. NPMP continued to effectively restructure the Northern Pikeminnow population to reduce predation on out-migrating salmonids by more than 25%. Fisheries independent data provided a means to assess long-term trends in population structure and potential compensatory responses among Northern Pikeminnow, Smallmouth Bass, and Walleye. There is evidence of potential compensatory responses to Northern Pikeminnow removals in some areas of The Dalles and John Day reservoirs. NPMP provides the region with an important piscine predation reduction tool as well as fisheries management relevant information about the impact of three piscine predators on out-migrating juvenile salmonids.

3.2 INTRODUCTION

The Columbia and Snake rivers historically supported large numbers of naturally produced anadromous Pacific salmon (*Oncorhynchus spp.).* Declines in adult returns have been attributed to multiple factors, including, but not limited to habitat degradation and overexploitation (Nehlsen et al. 1991; Wismar et al. 1994), and hydroelectric and flood control activities (Raymond 1988). Predation on out-migrating juveniles was also identified as a significant factor in adult salmon returns (Rieman et al. 1991; Collis et al. 2002). Escalating concern in the 1980s surrounding the impacts of predation on juvenile salmon and steelhead (salmonids) prompted researchers to further examine the degree to which predation, especially by resident fishes, may constrain juvenile salmonid survival in the Columbia River Basin. The John Day Reservoir in the Columbia River was selected as a "model" system to investigate predator impacts on juvenile salmonids given that: (1) the upper reaches of the reservoir were known to be an important area for rearing of subyearling Chinook Salmon (*Oncorhynchus tshawytscha*); (2) passage and residualism of juvenile salmonids was considered an issue in the reservoir; and (3) the John Day Reservoir supported substantial populations of resident predatory fishes (Poe and Rieman 1988). Based on existing information (e.g., Hjort et al. 1981), four species; Smallmouth Bass (*Micropterus dolomieu*), Walleye (*Sander vitreus*), Channel Catfish (*Ictalurus punctatus*), and Northern Pikeminnow (*Ptychocheilus oregonensis*) were identified as potentially important sources of juvenile salmonid mortality. Ultimately, research in the John Day Reservoir provided evidence that the native Northern Pikeminnow was the most abundant and dominant predator on juvenile salmonids, accounting for the majority of predation-related mortality observed during the study period (Beamesderfer and Rieman 1991; Poe et al. 1991; Rieman et al. 1991; Vigg et al. 1991).

While data indicated predation by Northern Pikeminnow contributed appreciably to juvenile salmonid mortality in the John Day Reservoir, questions remained surrounding impacts of Northern Pikeminnow predation in other areas of the lower Columbia and Snake rivers. To answer these questions, indices were developed to allow rapid assessment of predation by Northern Pikeminnow throughout the system. From 1991 through 1993, researchers applied these indices to data collected in the lower Columbia River reservoirs (1990 and 1993), the Columbia River downstream of Bonneville Dam (1991), and lower Snake River reservoirs (1992) to characterize abundance, consumption, and predation (Ward et al. 1995). Results from these evaluations showed that temporally variable predation by Northern Pikeminnow on juvenile salmonids was problematic in areas throughout the lower Columbia and Snake River reservoirs. Management strategies aimed at decreasing predation on juvenile salmonids were examined, according to the premise that persistent exploitation of Northern Pikeminnow (i.e., 10–20% per year) could lead to a disproportionate reduction in predation (i.e., up to 50%; Rieman and Beamesderfer 1990). Ultimately, assessments of various management strategies identified targeted removal fisheries as a favorable option to address the issue of predation on juvenile salmonids and provided the foundation for the contemporary NPMP.

From its inception, NPMP has operated based on two underlying objectives: (1) implementation of the predator control program (see reports 1, 2, and 4) and (2) evaluation and monitoring of the predator control strategy. The Oregon Department of Fish and Wildlife (ODFW) is responsible for Objective 2 through standardized monitoring techniques in the Columbia and Snake rivers. This sampling has been ongoing at monitoring locations since the early 1990s. The data collected

through these evaluation and monitoring efforts have been used to evaluate the efficacy of targeted removals to reduce predation and monitor for possible compensatory consequences (e.g., intra- and inter-specific responses to management actions) that may be related to sustained removals of Northern Pikeminnow. Additionally, ODFW in collaboration with WDFW and the Pacific States Marine Fisheries Commission (PSMFC) has monitored the population of the native predator, Northern Pikeminnow, for signs of significant population declines related to the predation control program. There are two current Northern Pikeminnow predator removal strategies being incorporated by NPMP, both managed by WDFW. The first involves a reward-based recreational angler fishery, known as the Sport-Reward Fishery (SRF). The second involves WDFW staff directly removing Northern Pikeminnow from areas with high concentrations of these predators below the powerhouse turbine outflows in the tailrace of The Dalles Dam and the John Day Dam, known as the Dam Angling Fishery (DAF). More details on SRF and DAF removal fisheries can be found in reports 1 and 4, respectively.

ODFW evaluates the efficacy of predator removal efforts and fish population parameters through a combination of field and laboratory studies incorporating data obtained throughout the Columbia and Snake rivers in the states of Oregon, Washington, and Idaho (Fig. 3.1). Broadly, ODFW estimates Northern Pikeminnow exploitation from SRF and DAF, salmonid predation reduction, and curation of long-term data to assess piscine predator population trends. ODFW relies on data collected through independent activities within the agency as well as biological samples acquired through SRF and DAF. ODFW field activities span two field studies. The first field study was designed to mark Northern Pikeminnow to incentivize the SRF and inform a mark-recovery-based estimate of exploitation from SRF and DAF (fisheries evaluation). The second field study was designed to obtain fisheries independent assessments of abundance and provide predator digestive material used to estimate prey consumption for Northern Pikeminnow, Smallmouth Bass, and Walleye (biological monitoring). Laboratory techniques were applied to quantify gut contents used to inform indices of consumption and predation as well as to address the question of predator compensation due to continued exploitation of Northern Pikeminnow.

Historically, the monitoring area has been divided into sub-units (below Bonneville Dam/Bonneville Reservoir, The Dalles Reservoir/John Day Reservoir, and the lower four Snake River reservoirs from Ice Harbor to above Lower Granite Dam). Since 2005, ODFW has generally collected biological monitoring data from one river sub-unit on a three-year rotating cycle with occasional variations from the rotation. In 2025, ODFW implemented biological monitoring in The Dalles and John Day reservoir subunits. This report augments historical information with data collected in 2025 from areas of the Columbia and Snake rivers and evaluates spatiotemporal changes of fish population parameters and their relation to reductions in juvenile salmonid predation from SRF and DAF activities where possible. Specific goals for this reporting period were to:

1.) Estimate rates of exploitation of Northern Pikeminnow and quantify potential predation reduction resulting from the targeted removal fisheries.

2.) Characterize population parameters of Northern Pikeminnow, Smallmouth Bass, and Walleye in The Dalles and John Day reservoirs.

3.) Monitor for evidence of possible intra- and inter-specific compensatory responses by Northern Pikeminnow, Smallmouth Bass, and Walleye related to the sustained removal of Northern Pikeminnow from the Columbia and lower Snake rivers.

4.) Assess Independent Scientific Review Panel (ISRP) recommendations to improve biological monitoring and evaluation related to NPMP.

3.3 METHODS

3.3.1 Sport Reward Fishery Evaluation and Predation Reduction Estimates

3.3.1.a. Field Procedures

Boat electrofishing was historically used to annually tag (mark) Northern Pikeminnow in the Columbia River from river kilometer (rkm) 76 (near Clatskanie, Oregon) upstream to rkm 637 (Priest Rapids Dam), and in the Snake River from Little Goose Dam to rkm 251 (near Asotin, WA) upstream of Lower Granite Dam (Fig. 3.1). Beginning in 2024 and due to changes in resource availability and requests to reduce electrofishing effort, marking efforts have been restricted to the area below Bonneville Dam and the Bonneville Reservoir and the sub-unit coinciding with the concurrent year's biological monitoring. Annual marking efforts persist in the area below Bonneville Dam and in Bonneville Reservoir to facilitate comparisons between Brownie bird band and Lincoln–Peterson mark–recovery models per recommendations from ISRP. Additionally, a strategic marking approach was implemented in 2024 shifting from the historic strategy of equal marking effort across every river mile. The revised approach emphasized focused effort within select areas to maximize nightly mark totals while maintaining broad coverage across the reservoir. Spatial data, previous years' mark totals and real-time evaluations of habitat conditions were utilized to target specific areas where there has been greater catch of Northern Pikeminnow and fewer interactions with salmonids to balance maximum deployment of marks with a focused electrofishing effort.

ODFW researchers conducted marking efforts using Smith-Root™ 18-EH model electrofishing boats equipped with an Apex™ electrofisher powered by an air-cooled Honda generator. When engaged, the electrofishing unit applies pulsed direct current at a rate of 60 pulses/s to maximize capture efficiency with minimal injury to fishes. Two boom arms extend forward from the bow of each boat, each supporting an array of six electrodes that function as an anode. Electrodes hanging from the boat and the hull itself, function as the cathodes. Electrofishing controls were set according to federal guidelines for waters containing ESA listed salmonids where peak output does not exceed 800 V at water conductivity 100 to 300 µS/cm (NMFS 2000). The targeted average electrical current during all electrofishing events was 3–4 A. All controls were standardized across boats with minor adjustments to the duty cycle and/or voltage to achieve the targeted output. Electrofishing protocols were followed to minimize fish exposure to electric current yet induce uncontrolled swimming toward the anode (electrotaxis) and avoid intense muscle contraction to the point of becoming stiff (tetany). Additionally, protocols were developed and implemented to reduce interactions with species listed under the U.S. Endangered Species Act to guide sampling efforts.

These protocols included, but were not limited to, discontinuing electric current when encountering listed species, or terminating sampling transects when encountering 500 or more out-migrating juvenile salmonids or 50 adult salmonids. Sampling occurred along shallow shoreline areas as the effective range of boat electrofishing was limited to an approximate maximum depth of 3 m. The timing of sampling generally ranged from early April to mid-June between 1800 and 0500 hours. When weather or other reasons required, sampling was strategically adjusted to eliminate sampling areas with historically low rates of mark deployment. Ideally, all tagging activities would have concluded before SRF and DAF began. However, that was unachievable due to time constraints and the extent of the sampling area. All fish marked in The Dalles and John Day reservoirs were tagged prior to the start of the fisheries (14 April 2025). Fish marked in the area below Bonneville Dam and some of the fish tagged in the Bonneville Reservoir were marked after the opening of the 2025 SRF. Northern Pikeminnow ≥ 200 mm fork length (FL) were marked with an internal 134.2 MHz passive integrated transponder (PIT) tag injected into the dorsal sinus cavity (Fig. 3.2). In 2022, ODFW initiated a PIT tag only marking strategy in which Northern Pikeminnow were not marked externally. This strategy was deployed in an effort to increase survival of marked fish and increase our recapture rate through increased tag retention and fish survival. During Northern Pikeminnow marking operations, Walleye were also captured, measured, and weighed.

Working with WDFW, mark-recovery information was obtained from the SRF and DAF (Report 4). SRF occurred daily from 14 April to 12 October 2025 (Report 1). Participating anglers received payment for all harvested Northern Pikeminnow ≥230 mm (9 in) total length (TL). This size criterion for TL corresponds to the minimum FL (200 mm) of Northern Pikeminnow marked during tagging operations. The 2025 reward payment schedule consisted of three tiers (see Report 2 for details). Further, anglers were eligible for a $500 reward for each externally tagged fish returned to a check station and a $200 reward for each "tag-loss" fish (i.e., 2025 PIT tag only fish or fish tagged prior to 2025 for which an external tag had been lost in the environment but retained a functioning PIT tag). It was assumed 100% of the Northern Pikeminnow marked with an external and/or an internal PIT tag harvested by participating anglers were submitted to a check station for reward payment during the season.

DAF operated from 30 April to 9 October 2025 (Report 4) in the powerhouse tailraces of The Dalles and John Day dams and used a team of anglers with hook-and-line fishing gear to remove Northern Pikeminnow. WDFW personnel examined all fish for the presence of external tags (loop and T-bar) and PIT tags. Tagged Northern Pikeminnow removed in the DAF were accounted for when estimating exploitation rates for the SRF.

3.3.1.b. Data Analysis

Sport Reward Fishery Exploitation

A multi-year mark-recovery model was assessed that incorporated a Brownie bird band framework (Brownie, 1978). This allowed exploitation to be estimated for 2025 using tags deployed in previous years. This mark-recovery model was new to the program starting in 2023. Recovery data were reported through fish returned by anglers to NPMP SRF creel stations operated by WDFW. Marking efforts were changed to a strategic sampling plan in 2025 due to limited resources. Exploitation was estimated using a Brownie bird band model structure in the program Mark (White

and Burnham, 1999) within the package RMark (Laake, 2013) via the R statistical analysis framework (R Core Team, 2021). The Brownie bird band model produces the probability of survival between marking periods (years) and the probability of recovery (exploitation) using mark-recovery data where marks were deployed through electrofishing activities (ODFW) and recoveries were obtained through creel stations with SRF (WDFW). Because NPMP had numerous years of mark-recovery data, a model was fit using variable survival and recovery, year-to-year. The proportion of the Northern Pikeminnow population removed during program fisheries was quantified using mark-recovery data for the entire area covered by SRF (system-wide). To account for a reduction in the minimum length of Northern Pikeminnow eligible for sport-reward payment from 11 inches TL (≥ 278 mm TL; ≥ 250 mm FL) to 9 inches TL (≥ 230 mm TL; ≥ 200 mm FL) beginning in the year 2000, rates of exploitation were calculated for two size-classes: 1) ≥200 mm FL (all marked fish); and 2) ≥ 250 mm FL. The subset of fish ≥ 250 mm FL was used for long-term temporal comparisons.

Predation Reduction

Indirect measures of predation reduction were used to evaluate the efficacy of Northern Pikeminnow removals (Beamesderfer et al. 1996), due to numerous confounding factors that limit the ability to measure success in terms of increased number of juvenile salmonids reaching the estuary or returning as adults. A model based on Friesen and Ward (1999) was implemented to estimate changes in predation on juvenile salmon that have occurred since before the onset of the program. The model was designed to estimate the effects of the NPMP on predation of juvenile salmonids if all other factors were held constant (e.g., river and ocean conditions, number of migrating juvenile salmonids, passage conditions/mortality at dams). The model also assumed no compensation by non-native predators and remaining Northern Pikeminnow. That assumption was assessed through the biological evaluation. The model estimated potential predation reduction from pre-program levels by incorporating: (1) Northern Pikeminnow population size structure before removals by fisheries, (2) area- and size-specific annual exploitation rates, (3) an estimate of natural mortality and recruitment, (4) area- and size-specific abundance estimates, and (5) area- and size-specific estimates of seasonal consumption of juvenile salmon by Northern Pikeminnow (Friesen and Ward 1999). The details for these components were:

1.) Northern Pikeminnow population size (length) structure before SRF and DAF removals were simulated using length-frequency distributions in each reservoir (Parker et al. 1995; Knutsen and Ward 1999).
2.) Historically, area-specific exploitation rates were calculated using within year estimates based on Lincoln-Peterson derived mark-recovery models for the area below Bonneville Reservoir, the pooled Columbia River reservoirs and the pooled Snake River reservoirs. In 2025, as previously mentioned, one system-wide exploitation rate was calculated using a Brownie bird band model structure. The 2025 Predation Reduction model assumes this system-wide exploitation rate is representative of these three individual areas. Relationships between exploitation and length of Northern Pikeminnow were used to estimate age-specific exploitation rates (Friesen and Ward 1999). Age increments were changed to 15 mm FL increments based on measured annual growth from mark recapture information (Weaver et. al 2008).
3.) A linear regression on a growth curve, constructed from adjusted age frequencies (Ricker 1975), was used to estimate natural mortality (0.611 for area below Bonneville Reservoir,

0.62 for impounded Columbia and Snake River reservoirs) and mean index of recruitment to age five or 240 mm FL (Friesen and Ward 1999).

4.) Area specific size structure was adjusted over time for exploitation and natural mortality using equation 1:

$$A_{h+j} = A_{h-1,j-1}\left(1 - E_{(h-1,j-1)}(1 - M)\right), \quad (1)$$

where

A_{h+j} = abundance index for size-h fish in year j,

$A_{h-1,j-1}$ = abundance index of fish size h -1 in year j –1,

$E_{h-1,j-1}$ = exploitation rate of fish size h –1 in year j –1, and

M = annual natural mortality rate.

5.) Consumption information from 1990 to 1996 was collected and the consumption index as calculated below in equation (2) was converted to consumption rates:

$$C = -0.077 + 0.618(CI), \quad (2)$$

where

C = number of juvenile salmonids per Northern Pikeminnow per day

CI = consumption index

Separate size and area specific consumption rates were calculated for the area.

Using these five model components, consumption rates for each size class were multiplied by the abundance index and the number of days in each season (Spring 91, Summer 62) to get a loss index by season and area. Summing loss by season and area estimated the total loss for the year for all areas contained within the NPMP. Relative predation was calculated by subtracting the overall loss index in the current year and divide it by the 1990 overall loss index and multiply by 100.

PSD, DAF

Rates of exploitation of Northern Pikeminnow increase with increasing fish size (Zimmerman et al. 1995). A model describing proportional size distribution (PSD; Anderson 1980; Guy et al. 2007) was fit to characterize variation in size structure for Northern Pikeminnow to three groups; those sampled during fishery evaluation (not calculated in this report), biological monitoring, and

from DAF. Models describing PSD for Walleye and Smallmouth Bass populations sampled during DAF; were applied using the equation 3:

$$PSD_i = 100 \times \frac{FQ_i}{FS_i}, \quad (3)$$

where

FQ_i = number of fish ≥ quality-length for species *i*, and

FS_i = number of fish ≥ stock-length for species *i*.

PSD of Northern Pikeminnow caught during DAF were evaluated by applying a non-parametric Mann-Whitney U test (Mann and Whitney 1947) to evaluate PSD from the 'early' period of the dataset (1990-1996) and the 'late' period (2006-2025) since there was a ten year lapse in DAF monitoring. All analyses were conducted in the R programming environment using the function 'wilcox.test' (R Core Team ver. 4.4.1) and, where necessary, the 'boot' or 'tsboot' (Fox and Weisberg 2011) packages. Significant differences were assessed at $\alpha \leq 0.05$.

Proportional Size Distribution, preferred length (PSD-P), Fishery Evaluation

Proportional size distribution of preferred-length fish (PSD-P) was calculated for Smallmouth Bass and Walleye (Gabelhouse 1984; Guy et al. 2007) sampled during DAF and biological evaluation using equation 4:

$$PSD - P_i = 100 \times \frac{FP_i}{FS_i}, \quad (4)$$

where

FP_i = number of fish ≥ preferred-length for species *I*, and

FS_i = number of fish ≥ stock-length for species *i*.

Stock and quality minimum length categories used for Northern Pikeminnow were 250 and 380 mm FL, respectively (Beamesderfer and Rieman 1988; Parker et al. 1995). Stock, quality, and preferred minimum length categories were collected from the literature (Anderson 1980; Gabelhouse 1984) and converted them to FL measurements using a species-specific model for Smallmouth Bass (FLSMB = TLSMB /1.040). The published stock-length measurement is smaller than our target size (200 mm FL) for Smallmouth Bass. To remove any bias in our data from variation in sampling procedures among years, our target size was used as the minimum stock-

length for PSD and PSD-P analyses. Thus, stock, quality, and preferred minimum FL categories for Smallmouth Bass were 200, 269, and 337 mm, respectively. Similarly, using published categories (Anderson 1980; Gabelhouse 1984) and the species-specific model for Walleye (FLWAL= TLWAL/1.060), these categories were calculated as 236, 358, 481 mm FL, respectively. Annual PSD and PSD-P values were calculated only when sample sizes exceeded 19 stock-length fish in an area. To characterize uncertainty surrounding PSD and PSD-P values, a non-parametric bootstrap approach using the 'boot' package (Fox and Weisberg 2011) in the R programming environment (R Core Team 2021) was used to calculate 95% confidence intervals. Temporal monotonic trends were calculated for PSD of Northern Pikeminnow and PSD and PSD-P of Walleye by applying a non-parametric Mann-Kendall test (Mann 1945). All analyses were conducted in the R programming environment using the 'Kendall' (McLeod 2011) and, where necessary, the 'boot' or 'tsboot' (Fox and Weisberg 2011) packages. Significant differences were assessed at $\alpha \leq 0.05$.

Relative Weight (W_r), DAF

Relative weight (W_r) (Wege and Anderson 1978) was calculated to compare the condition of Northern Pikeminnow over time. Length-specific standard weights predicted by a length-mass regression model ($\log_{10}[W_s]=a'+b\cdot\log_{10}[L]$) were used for Northern Pikeminnow (Parker et al. 1995) to calculate W_r according to equation 5:

$$W_r = 100 \times \frac{W}{W_s}, \tag{5}$$

where

W = the mass of an individual fish, and
W_s = predicted standard weight.

To account for sexual dimorphism, male and female *Wr* values were calculated separately for Northern Pikeminnow. Additionally, these analyses only included fish that met minimum target sizes, 250 mm FL for Northern Pikeminnow. Annual median *Wr* values were calculated only when sample sizes exceeded four target-sized fish in a given reservoir and by sex for Northern Pikeminnow. 95% confidence intervals were estimated for median *Wr* values using a non-parametric bootstrap approach (Fox and Weisberg 2011; R Core Team 2021).

Temporal monotonic trends in median *Wr* were assessed for Northern Pikeminnow by applying a non-parametric Mann-Kendall test (Mann 1945). Spline interpolation was used to account for data gaps, when present. Last, to help visualize trends, locally weighted scatterplot smoothing (LOWESS) curves were fit to the data. All analyses were conducted in the R programming environment using the 'Kendall' (McLeod 2011) and, where necessary, the 'boot' or 'tsboot' (Fox and Weisberg 2011) packages. Significant differences were assessed at $\alpha \leq 0.05$.

DAF Consumption Index (DAF-CI)

Consumption indices provide a proxy of the number of juvenile salmon eaten per day by an average predator. Previous work has demonstrated that the output values are correlated with consumption rates for Northern Pikeminnow (Ward et al. 1995). An index of consumption for DAF fish (DAF-CI) was calculated for each week using the model of Ward et al. (1995) for Northern Pikeminnow (CI_{NPM}) using the equation 6:

$$CI_{NPM} = 0.0209 \times T^{1.60} \times W^{0.27} \times (S \times GW^{-0.61}), \quad (6)$$

where

T = mean water temperature per week stratum (°C),

W = mean predator mass (g),

S = mean number of juvenile salmon per predator, and

GW = mean diet mass (g) per predator.

Water temperature data were downloaded from the Columbia River Operational Hydrometeorological Management System. CI-DAF was calculated when sample sizes exceeded five fish, per week, per dam.

3.3.2 Biological Monitoring

3.3.2.a Field Procedures

Standardized boat electrofishing techniques were used to monitor Northern Pikeminnow, Smallmouth Bass, and Walleye population parameters in The Dalles and John Day reservoirs during 2025 (Ward et al. 1995; Zimmerman and Ward 1999). Sampling was conducted in the early morning (0200-1000 hours) during Spring (12 May to 30 May 30, 2025) in the forebay, mid-reservoir, and tailrace of the area in The Dalles Reservoir and John Day Reservoir. Sampling areas in The Dalles Reservoir included the shoreline areas around the forebay of The Dalles Dam in The Dalles, OR (rkm 307-313), the areas around Miller Island and Biggs Junction (rkm 329-334), and the tailrace in Rufus, Oregon (rkm 329-334) and the corresponding Washington shoreline. Sampling areas around the forebay of John Day Dam and LePage Park in Oregon (rkm 347-354), near Arlington, OR (rkm 387-394), and Umatilla, OR (rkm 461-469) and the corresponding Washington shoreline. The objective was to analyze predatory fish diets, focusing on salmonid consumption. The timing of this work was selected to correspond with peak smolt outmigration. Sampling locations were randomly selected fixed-site transects, approximately 500-m long, in each area along all shorelines of the river. Effort at each transect consisted of a 900-second boat electrofishing period with continuous output of approximately 3-4 A. Temperature (nearest 0.1°C) and minimum/maximum observed depth were recorded for each transect (nearest foot).

Species FL (nearest mm) and mass (nearest 10 g) were recorded for all Northern Pikeminnow, Smallmouth Bass, and Walleye ≥200 mm. Target-sized Northern Pikeminnow that were not previously marked were euthanized and the digestive tract was extracted for content analysis in the laboratory. To remove the digestive tracts, an incision was made along the ventral midline from the pectoral fins to the vent. The digestive tract was removed by securing both ends with hemostats, removing extra tissue, and placing the complete digestive tract into individual Whirl-Pak bags. Digestive tracts were squeezed with forceps from one end to the other to extract the contents and water was added to reduce post-collection digestion. Sex and stage of maturity were assessed by examining the gonads and scoring maturity from 0-4 with '0' an a n unknown maturity, '1 an immature fish, '2' a developing fish where sex is first determinable, '3' a fish ready to spawn and '4' representing a mature fish that had recently spawned (spawned-out). Diet samples were collected from target-sized Smallmouth Bass and Walleye by a non-lethal gastric lavage method using a modified Seaburg sampler (Seaburg 1957). Gut contents were flushed from the foregut of each fish into a 425 µm sieve and then transferred into individual sample bags. For all species, diet samples were stored on ice while in the field and transferred to a freezer until processing.

Using the protocol described above, diet samples were also collected from Northern Pikeminnow, Smallmouth Bass, and Walleye captured during the 2025 DAF in Bonneville and The Dalles reservoirs. Smallmouth Bass and Walleye were sampled to assess the feasibility of obtaining digestive content samples for these species through DAF in order to compare the temporal variability from diets among all three species during the DAF season. Diets were collected from a representative subsample of catches at each dam weekly from 13 May to 1 October 2025, generally two days per week, with a target of 20 fish per day at each dam. In addition, FL, mass, sex, and stage of maturity were recorded for each fish sampled, where possible.

3.3.2.b Laboratory Procedures

Contents of diets from Northern Pikeminnow, Smallmouth Bass, and Walleye collected during biological evaluation field activities, and Northern Pikeminnow collected from the DAF were examined to quantify relative consumption of juvenile salmonids. All diet samples in 2025 were scanned for the presence of Coded Wire Tags (CWT). Positive CWT detections were analyzed as per methodology described in Appendix A (Section 5) of this report and excluded from consumption calculations. When Smallmouth Bass subsampling occurred with samples collected during the biological evaluation process, CWT positive diet samples were replaced with diets from a Smallmouth Bass from the same area and size class. All Northern Pikeminnow and Walleye digestive contents collected in the field, excluding positive CWT detections, during 2025 were processed in the laboratory as described below.

Frozen field samples were thawed in the laboratory and the diet contents were sorted into general prey categories (i.e., fish, crayfish, other crustaceans, insects, other invertebrates, vegetation, miscellaneous). Parasitic invertebrates (e.g., tapeworms, nematodes, parasitic copepods) found in the diet samples were noted in our dataset comments, but they were not weighed, categorized as prey items, or included in the prey consumption calculations. Diet items were blotted with a paper towel to remove excess moisture and weighed to the nearest 0.01 g according to prey category. For Smallmouth Bass and Walleye, portions of diet samples containing fish were returned to the original sample bags for chemical digestion. To ensure complete recovery of diagnostic structures from Northern Pikeminnow diet samples, the entire digestive tract was chemically digested along with possible fish tissue. To chemically digest soft tissues, a 20 ml of solution of pancreatin (20

g/L) and sodium sulfide nonahydrate (Na2O9S; 10 g/L) in tap water was added to each sample. Next, sample bags were placed in a desiccating oven at approximately 48°C for 24 h. After removal from the oven, a 20 ml solution of sodium hydroxide (lye, NaOH) mixed at 30g/L with tap water was added to dissolve remaining fatty materials and the sample was agitated. Contents of each sample bag were then poured into a 425 µm sieve and rinsed with tap water. In rare cases, the presence of fish was recorded during the initial sorting and weighing but no bones were found after chemical digestion. When this occurred, those bones were assumed lost, and therefore one unidentified fish was counted present in the sample (unless the taxon was identified during the preprocessing stage). Diet samples of fishes that did not contain any diet items (empty) were included in all statistical analyses.

Bones from prey items, post chemical digestion, were identified to the lowest possible taxon (typically family) using stereoscopic dissecting microscopes at 6.1x-55x magnification with 10x eyepieces and standard keys (Hansel et al. 1988, Frost 2000, and Parrish et al. 2006). Paired structures were enumerated to arrive at minimum counts of a given prey taxon in a diet sample, but only presence/absence could be determined for certain prey items. For example, if ventral scutes of American Shad (*Alosa sapidissima*) were the only diet item present in a sample, it was assumed that one American Shad had been consumed because the total number of scutes associated with an individual fish is ambiguous. A similar assumption was made for instances where lamina of lampreys (family *Petromyzontidae*) were present in diet samples. Diet samples containing large numbers of juvenile shad bones were sampled to estimate the total number of shad using a subset of the diagnostic bones. The dentaries and parasphenoid bones were used as rapid identification diagnostic bones, allowing staff to process these samples in a fraction of the time needed for full diagnostic bone enumeration. Shad quantified in this way were identified in our database and the complete sample of bones was stored for future enumeration, should the need arise.

For samples where fish vertebrae were observed, it was possible to distinguish between salmonid and other fish prey; however, it was impossible to determine the exact number of juvenile salmon consumed. In these cases, it was assumed that one juvenile salmon was consumed to avoid artificially inflating the count. Given these constraints, diet data represent a conservative enumeration of prey fish within diet samples. Lastly, to calibrate identification accuracy among analysts, 10% of all samples were re-analyzed at random by a second reviewer. arise.

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3.3.2.c Data Analysis

Biological Monitoring Abundance Index (AI)

Catch per unit effort (CPUE) was found to be the strongest index of abundance to correlate with mark-recapture population estimates (Ward et al, 1995). Following the methods of Ward et al. (1995), seasonal abundance index values were calculated for each predator species using the

mean CPUE of boat electrofishing by season and area, the surface area (ha) of the specific sampling locations in each river area, divided by 1,000 for scale using the equation 7:

$$AI_i = \frac{(D_i \times S_i)}{1{,}000}, \quad (7)$$

where:

AI_i = abundance index for area *i*

D_i = density in area *i* as determined by mean CPUE and

S_i = surface size (hectares of area *i*)

Biological Monitoring Consumption Index (CI)

Consumption indices provide a proxy of the number of juvenile salmon eaten per day by an average predator and previous work has demonstrated that the output values are correlated with consumption rates for Northern Pikeminnow (Ward et al. 1995) and Smallmouth Bass (Ward and Zimmerman 1999). An index of consumption (CI) was calculated using the models of Ward et al. (1995) and Ward and Zimmerman (1999) for Northern Pikeminnow (CI_{NPM}) and Smallmouth Bass (CI_{SMB}) using the equations 6 and 8:

$$CI_{\mathrm{SMB}} = 0.0407 \times e^{(0.15)(T)} \times W^{0.23} \times (S \times GW^{-0.29}), \quad (8)$$

where

T = mean water temperature per season-area stratum (^{o}C),
W = mean predator mass (g),
S = mean number of juvenile salmon per predator, and
GW = mean diet mass (g) per predator.

Water temperature data were either collected in the field (boat electrofishing) or downloaded from the Columbia River Operational Hydrometeorological Management System (DAF collected fish). CI was calculated when sample sizes exceeded five fish for a given species, season, and sampling area.

Biological Monitoring Predation Index (PI)

To quantify compensatory responses to removals, a predation index (PI) was developed to describe changes in the relative magnitude of predation on juvenile salmonids by Northern Pikeminnow (Ward et al, 1995) and Smallmouth Bass (Ward and Zimmerman, 1999). Currently, no comparable model exists to evaluate Walleye consumption and predation. Seasonal-and location-specific PI

estimates were generated for Northern Pikeminnow and Smallmouth Bass using the product of seasonal AI and CI values (Ward et al. 1995) using equation 9:

$$PI_i = AI_i \times CI_i, \quad (9)$$

where

PI_i = predation index for area *i.*

AI_i = abundance index in area *i,*

CI_i = consumption index in area *i.*

Proportional Size Distribution (PSD)

PSD was calculated for Northern Pikeminnow, Smallmouth Bass, and Walleye caught during biological monitoring using equation 3.

Proportional Size Distribution, preferred length (PSD-P)

PSD-P was calculated for Smallmouth Bass and Walleye (Gabelhouse 1984; Guy et al. 2007) sampled during biological monitoring using equation 4.

Stock and quality minimum length categories used for Northern Pikeminnow were 250- and 380-mm FL, respectively (Beamesderfer and Rieman 1988; Parker et al. 1995). Stock, quality, and preferred minimum length categories were collected from the literature (Anderson 1980; Gabelhouse 1984) and converted them to FL measurements using a species-specific model for Smallmouth Bass (FLSMB = TLSMB /1.040). The published stock-length measurement was smaller than the target size (200 mm FL) for Smallmouth Bass from this study, and to remove any bias in these data from variation in sampling procedures among years, the target size was used as the minimum stock-length for PSD and PSD-P analyses. Thus, stock, quality, and preferred minimum FL categories for Smallmouth Bass were 200, 269, and 337 mm, respectively. Similarly, using published categories (Anderson 1980; Gabelhouse 1984) and the species-specific model for Walleye (FLWAL= TLWAL/1.060), these categories were calculated as 236, 358, 481 mm FL, respectively. Annual PSD and PSD-P values were calculated only when sample sizes exceeded 19 stock-length fish in an area. To characterize uncertainty surrounding PSD and PSD-P values, a non-parametric bootstrap approach using the 'boot' package (Fox and Weisberg 2011) in the R programming environment (R Core Team 2021, Canty et al. 2021) was used to calculate 95% confidence intervals.

Relative Weight (*Wr*)

Relative weight (*Wr*; Wege and Anderson 1978) was calculated to compare the condition (within species) of Northern Pikeminnow, Smallmouth Bass, and Walleye over time. Length-specific standard weights predicted by a length-mass regression model ($\log10[Ws]=a'+b\cdot\log10[L]$) were

used for Northern Pikeminnow (Parker et al. 1995), Smallmouth Bass (Kolander et al. 1993), and Walleye (Murphy et al. 1990) to calculate *Wr* according to equation (5).

To account for sexual dimorphism, male and female *Wr* values were calculated separately for Northern Pikeminnow. However, field sampling methodologies precluded diagnosis of sex for Smallmouth Bass and Walleye as they were not sacrificed. Therefore, calculations of *Wr* for Smallmouth Bass and Walleye were, for both sexes, combined. Additionally, these analyses only included fishes that met minimum target sizes (250 mm FL for Northern Pikeminnow and 200 mm FL for Smallmouth Bass and Walleye). Annual median *Wr* values were calculated only when sample sizes exceeded four target-sized fish in a given reservoir and by sex for Northern Pikeminnow. 95% confidence intervals were estimated for median *Wr* values using a non-parametric bootstrap approach (Fox and Weisberg 2011; R Core Team 2021).

Temporal monotonic trends in PSD were assessed for Northern Pikeminnow and Walleye and median *Wr* for Northern Pikeminnow, Smallmouth Bass, and Walleye by applying a non-parametric Mann-Kendall test (Mann 1945). Similarly, PSD-P was also analyzed with this method for Walleye. Spline interpolation was used to account for data gaps, when present. Due to a large gap in length data for Northern Pikeminnow in the DAF (1997-2005 in Bonneville Reservoir and 1996-2006 in The Dalles Reservoir), data for this large data gap were not interpolated. Instead, the two periods were treated as separate time series; data collected before 1997 as "early" and data collected after 2005 as "late". Data that were normally distributed were tested for differences in mean PSD between early and late periods for each DAF location using ANOVA. A non-parametric Mann-Whitney U test was used to compare PSD values between early and late years for each reservoir when PSD data were not normally distributed. Last, to help visualize trends, locally weighted scatterplot smoothing (LOWESS) curves were fit to the data. All analyses were conducted in the R programming environment using the 'Kendall' (McLeod 2011) and, where necessary, the 'boot' or 'tsboot' (Fox and Weisberg 2011) packages. Significant differences were assessed at $\alpha \leq 0.05$.

3.4 RESULTS

3.4.1. Sport Reward Fishery Evaluation and Predation Reduction Estimates

A total of 324 Northern Pikeminnow ≥ 200 mm FL were marked across all Columbia River project areas below McNary Dam during 2025, of which 153 were ≥ 250 mm FL (Table 3.1). Overall, 69 of the fish marked in 2025 were recovered from SRF and none from DAF. 147 NPM were recaptured in 2025 from fish marked between 2012-2025. One fish tagged in Bonneville Reservoir was recaptured below Bonneville Dam. All fish recaptured in 2025 in the SRF were at large from 2 to 4795 days. The oldest recapture was a Northern Pikeminnow that was initially tagged in April of 2012. Sport-Reward Fishery recaptures greater than or equal to 250 mm FL accounted for 83% of all recoveries during 2025, from fish marked 2012-2025 (Table 3.1).

3.4.1.a Sport Reward Fishery Exploitation

The system-wide exploitation rate using the Brownie bird band model and mark-recovery data from 2012-2025 for Northern Pikeminnow ≥ 250 mm FL during SRF was estimated at 11.6% (9.1-

14.6%; 95% confidence interval; Figure 3.3). This estimate was within the targeted exploitation range of 10-20% (Fig. 3.3). The system-wide exploitation rate using the Brownie bird band model and recovery data from 2012-2025 for Northern Pikeminnow ≥ 200 mm FL during SRF was estimated to be 14.4% (12.3-17%; 95% confidence interval).

3.4.1.b. Sport Reward Fishery Predation Reduction

Using the system-wide Brownie bird band mark-recovery derived estimate of exploitation, the model-estimated median reduction of predation on juvenile salmonids by Northern Pikeminnow relative to pre-program levels for 2026 was 25% (range: 11-38%) and predictions for 2027 was 27% (range: 12-40%; Fig. 3.4). Model projections based on continuation of the current fishery, population structure, and mean rates of exploitation suggest predation on juvenile salmon by Northern Pikeminnow will remain at suppressed levels through 2029 with an estimated median reduction near 29% (Fig. 3.4).

3.4.1.c. Dam Angling Fishery

During the 2025 DAF season, 416 diet samples were processed from fish harvested at the angler accessible areas in the powerhouse turbine outflow areas (powerhouse tailraces) of Bonneville Reservoir (fishing from The Dalles Dam) and The Dalles Reservoir (fishing from the John Day Dam). Of those, 201 were Northern Pikeminnow diet samples, 124 were Smallmouth Bass diet samples and 91 were Walleye. There was variation in fish length; Northern Pikeminnow ranged in size from 265-643 mm FL, Smallmouth Bass ranged in size from 220-443 mm FL, and Walleye ranged in size from 245-631 mm FL. In Bonneville Reservoir, the most prevalent diet item was fish, while in The Dalles it was non-crayfish invertebrates and fish. The proportion of Northern Pikeminnow caught in the powerhouse tailrace areas of Bonneville Dam and The Dalles Dam with salmonids in their digestive tracts in 2025 was 9-11%, while the proportion with American Shad was higher at 18-30% (Table 3.2).

There were consistent weekly trends in diet prey item presence for Northern Pikeminnow caught during DAF in Bonneville Reservoir and The Dalles Reservoir with lamprey, salmonids, and other fish being present in the first few weeks of DAF which transitioned to primarily American Shad around statistical week 32 (Fig. 3.5). Northern Pikeminnow in The Dalles Reservoir and Bonneville Reservoir had a number of weeks with insufficient sample size or gaps in fishing effort throughout the season. Smallmouth Bass and Walleye had inconsistent weekly trends due to insufficient sample size, but did show consumption of salmonids, lamprey and non-salmonid fishes earlier in the season with a shift to American Shad later in the season (Fig. 3.6 and 3.7), parallel to the pattern observed for Northern Pikeminnow.

The 2025 weekly juvenile salmonid consumption index for Northern Pikeminnow removed during DAF in Bonneville and The Dalles reservoirs was the greatest during week 26. This time period corresponded with pulses of outmigration of sub-yearling Chinook salmon (Fig. 3.8).

PSD of Northern Pikeminnow in Bonneville Reservoir during DAF was significantly greater during the early years (1990-1996) of sampling than during the later years (2006-2025) ($W = 112$, $p < 0.01$, Fig. 3.9). There was no significant difference in PSD at The Dalles Reservoir during the early years (1990-1996), relative to the later years (2007-2025) ($W = 82$, $p = 0.12$) (Fig. 3.9). PSD for DAF caught fish in both reservoirs has followed a decreasing trend since 2023. W_r of female

Northern Pikeminnow from DAF in Bonneville Reservoir in 2025 was 105.1%, and there was not a significant monotonic trend (Mann-Kendall τ = -0.29, p = 0.13) (Fig. 3.10). W_r of male Northern Pikeminnow from DAF in Bonneville Reservoir in 2025 was 95.6%, and there was not a significant monotonic trend (Mann-Kendall τ = -0.26, p = 0.19) (Fig. 3.10). W_r of female Northern Pikeminnow from DAF in The Dalles Reservoir in 2025 was 111.9%, and there was not a significant monotonic trend (Mann-Kendall τ = 0.02, p = 0.93) (Fig. 3.11). W_r of male Northern Pikeminnow from DAF in The Dalles Reservoir in 2025 was 102%, and there was not a significant monotonic trend (Mann-Kendall τ = -0.02, p = 0.92) (Fig. 3.11).

3.4.2. Biological Monitoring

Field staff conducted a total of 142 electrofishing runs during spring 2025 to collect fishes for biological monitoring in The Dalles Reservoir and John Day Reservoir. Due to time, budget, and ESA-listed species constraints, total effort was reduced to only include a spring biological monitoring season. In 2025, ODFW sampled 1,308 piscine predators; 1,144 Smallmouth Bass (87.5% of the total catch), 13 Northern Pikeminnow (1% of the total catch), and 150 Walleye (11.5% of the total catch). The timing of our annual biological evaluation fieldwork was planned to coincide with predicted peak juvenile salmon outmigration. Sampling in The Dalles Reservoir and John Day Reservoir occurred slightly later than peak yearling salmonid outmigration but still fell during a period of outmigration (Fig. 3.12). The forebay area of John Day Dam was not sampled in 2025 due to poor weather conditions that did not provide an opportunity to safely conduct biological monitoring in that area.

3.4.2.a. Diet Composition

Detailed results of the diet assessments are found in Table 3.3A and 3.3B but relevant trends are listed here. Diets were examined from one Northern Pikeminnow, 295 Smallmouth Bass, and 38 Walleye in The Dalles Reservoir, and 11 Northern Pikeminnow, 129 Smallmouth Bass, and 105 Walleye in John Day Reservoir. Food items were present in the majority of digestive tracts assessed during biological monitoring (91%-100%, Table 3.3A and 3.3B). There were no fish prey items found in the digestive tracts of the 12 Northern Pikeminnow sampled between the two reservoirs. Fish were found in digestive tracts of Smallmouth Bass and Walleye (20%-72%). Salmonids were detected in the digestive tracts of Smallmouth Bass and Walleye (1%-30%). Walleye in John Day Reservoir had the highest proportion (30%) of diets containing salmonids. Proportions of diets containing lampreys were low (0%-4%) across all predator species in The Dalles Reservoir and John Day Reservoir.

3.4.2.b. AI, Northern Pikeminnow

Northern Pikeminnow AI showed a declining trend over the course of the 35-year time series in all biological monitoring sites in The Dalles Reservoir (Fig. 3.13). Northern Pikeminnow abundance was relatively high in the first few years of NPMP and declined and remained at reduced levels for the next couple of decades. Prior to 2025, The Dalles has not been biologically monitored by NPMP since 2018, leaving a substantial gap in the more recent time series. Northern Pikeminnow AI showed a declining trend over the course of the 35-year time series in all the mid-reservoir and tailrace of the John Day Reservoir (Fig. 3.14). Northern Pikeminnow abundance was relatively high in the first few years of NPMP and declined and remained at reduced levels for the

next couple of decades. Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.c. AI, Smallmouth Bass

Smallmouth Bass AI showed a consistent increasing trend over the course of the 35-year time series in all biological monitoring sites of The Dalles Reservoir (Fig. 3.13). Prior to 2025, The Dalles has not been biologically monitored by NPMP since 2018, leaving a substantial gap in the more recent time series. Smallmouth Bass AI in the John Day reservoir showed an increasing trend over the 35-year time series in the mid-reservoir and a variable trend in the tailrace until 2018 when AI substantially increased relative to historic levels (Fig. 3.14). Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.d. AI, Walleye

Walleye AI was variable in all biological monitoring sites in The Dalles Reservoir with substantially elevated AI levels in the tailrace in 2018 and 2025 (Fig. 3.13). Prior to 2025, The Dalles has not been biologically monitored by NPMP since 2018 leaving a substantial gap in the more recent time series. Walleye AI has consistently increased in the mid-reservoir and tailrace areas of the John Day Reservoir (Fig. 3.14). Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.e. CI, Northern Pikeminnow

Northern Pikeminnow CI could not be calculated for 2025 due to insufficient sample size ($n < 6$) in The Dalles Reservoir (Fig. 3.15). Northern Pikeminnow CI could not be calculated for 2025 in the mid-reservoir and tailrace of John Day Reservoir due to insufficient sample size ($n < 6$) (Fig. 3.16). Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.f. CI, Smallmouth Bass

Smallmouth Bass CI in biological monitoring sites in The Dalles Reservoir showed low but decreasing trends in the forebay, and stable trends in the mid-reservoir, and stable to slightly increasing trends in the tailrace. (Fig. 3.15). Smallmouth Bass CI in John Day Reservoir showed an increasing trend in the mid-reservoir and a stable trend in the tailrace (Fig. 3.16). Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.g. PI, Northern Pikeminnow

Northern Pikeminnow PI in biological monitoring sites in The Dalles Reservoir was unable to be calculated for 2025 due to insufficient sample size ($n < 6$) (Fig. 3.17). Northern Pikeminnow PI could not be calculated for 2025 in the mid-reservoir and tailrace of John Day Reservoir due to insufficient sample size ($n < 6$) or were not sampled due to weather (Fig. 3.18). Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.h. PI, Smallmouth Bass

Smallmouth Bass PI was low in all biological monitoring sites in The Dalles Reservoir during the 35-year time series, with a stable trend in the tailrace, and increasing trends in the forebay and

mid-reservoir. However, PI was greater in 2025 than any previous year in the mid-reservoir. PI was stable in the tailrace (Fig. 3.17). Smallmouth Bass PI showed an increasing trend in John Day Reservoir in the mid-reservoir and a stable trend in the tailrace (Fig. 3.18). Due to unsafe conditions, NPMP was unable to biologically monitor the forebay in the John Day Reservoir in 2025.

3.4.2.i. PSD, Northern Pikeminnow

Northern Pikeminnow PSD could not be calculated in The Dalles Reservoir in 2025 due to insufficient sample size (n = 2, minimum for PSD n = 20). Northern Pikeminnow PSD could not be calculated in John Day Reservoir in 2025 due to insufficient sample size (n = 1, minimum for PSD n = 20).

3.4.2.j. PSD, Smallmouth Bass (see Fig. 3.19)

Smallmouth Bass PSD in The Dalles Reservoir in 2025 was 74.4%. No statistical analysis was conducted on the calculated point estimate and trend in The Dalles Reservoir. Smallmouth Bass in John Day Reservoir in 2025 was 54.1% and there was not a significant monotonic trend (Mann-Kendall $\tau = 0.19$, $p = 0.19$).

3.4.2.k. PSD-P, Smallmouth Bass (see Fig. 3.20)

Smallmouth Bass PSD-P in The Dalles Reservoir in 2025 was 29.8%. No statistical analysis was conducted on the calculated point estimate and trend in The Dalles Reservoir. Smallmouth Bass PSD-P in John Day Reservoir in 2025 was 17.0%, and there was not a significant monotonic trend (Mann-Kendall $\tau = -0.19$, $p = 0.22$).

3.4.2.l. PSD, Walleye (see Fig 3.21)

Walleye PSD in The Dalles Reservoir in 2025 was 46.4%. No statistical analysis was conducted on the calculated point estimate and trend in The Dalles Reservoir. Walleye PSD in John Day Reservoir was 15.7%, and there was a significant decreasing monotonic trend (Mann-Kendall $\tau = -0.40$, $p = 0.01$).

3.4.2.m. PSD/PSD-P, Walleye (see Fig 3.22)

Walleye PSD-P in The Dalles Reservoir in 2025 was 21.41%. No statistical analysis was conducted on the calculated point estimate and trend in The Dalles Reservoir. Walleye PSD-P in John Day Reservoir in 2025 was 5.7%, and there was a significant decreasing monotonic trend (Mann-Kendall $\tau = -0.53$, $p < 0.001$).

3.4.2.n. Wr, Northern Pikeminnow

Female Northern Pikeminnow relative weight in The Dalles Reservoir in 2025 could not be calculated due to insufficient sample size (n = 2, minimum for *Wr* = 5). Male Northern Pikeminnow relative weight in The Dalles Reservoir in 2025 could not be calculated due to insufficient sample size (n = 0, minimum for *Wr* = 5). Female Northern Pikeminnow relative weight in The Dalles Reservoir in 2025 could not be calculated due to insufficient sample size (n = 0, minimum for *Wr* = 5). Male Northern Pikeminnow relative weight in John Day Reservoir in 2025 could not be calculated due to insufficient sample size (n = 0, minimum for *Wr* = 5).

3.4.2.o. Wr, Smallmouth Bass (see Fig. 3.23)
Smallmouth Bass *Wr* in The Dalles Reservoir in 2025 was 92.8%. No statistical analysis was conducted on the calculated point estimate and trend in The Dalles Reservoir. Smallmouth Bass *Wr* in John Day Reservoir in 2025 was 91.1%, and there was not a significant monotonic trend (Mann-Kendall τ = -0.21, p = 0.16).

3.4.2.p. W_r, Walleye (see Fig. 3.24)
Walleye *Wr* in The Dalles Reservoir in 2025 was 88.7%. No statistical analysis was conducted on the calculated point estimate and trend in The Dalles Reservoir. Walleye *Wr* in John Day Reservoir 2025 was 85.8%, and there was not a significant decreasing monotonic trend (Mann-Kendall τ = -0.17, p = 0.28).

3.5 DISCUSSION

3.5.1. Overview

NPMP was tasked with reducing the predation on juvenile salmonids by Northern Pikeminnow as they migrate through the hydropower systems of the Columbia and Snake rivers. NPMP was a multi-agency collaboration incorporating sport-reward and dam fisheries managed by WDFW, which promoted focused removals of Northern Pikeminnow. These removal efforts were paired with requisite biological monitoring of the Northern Pikeminnow targeted by these removal activities as well as evaluation into the efficacy of the Northern Pikeminnow removal efforts on the reduction in predation to juvenile salmonids conducted by ODFW. NPMP program administration and contract management was led by PSMFC.

3.5.2. Sport Reward Fishery Exploitation

The 2025 Sport-Reward Fishery system-wide exploitation rate of Northern Pikeminnow ≥ 250 mm FL was 11.6% (9.1-14.6%; 95% CI). The point estimate was within the range of the exploitation management goal, though the lower confidence limit was just outside the range of the exploitation target. 2023 was the first year that NPMP incorporated a new mark-recovery analytical framework, a Brownie bird band model, which utilizes tag recoveries from multiple years of marking. NPMP is still in the process of assessing how an exploitation estimate based on a Brownie bird band model and multiple years of recovery data compares to the historically used Lincoln-Peterson model, which incorporates only within-year recoveries. NPMP will continue to implement and evaluate the replacement of the Lincoln-Peterson model with the Brownie bird band model. Going forward, NPMP will adapt and make project management decisions to optimize resource use to meet project objectives within a constrained budget.

3.5.1.a. Predation Reduction
The target predation reduction by Northern Pikeminnow will be met in 2026 at a median, system-wide reduction of 25%. The variability associated with this predation reduction estimate was indicative of uncertainty associated with the numerous indices that were integrated into the predation reduction model. Despite this uncertainty, the predation reduction estimates were comparable to previous years and as expected with the measured level of exploitation. The

exploitation estimate, coupled with the estimated predation reduction value, suggests that the removal program continued to be successful. These findings were designed to be presented in conjunction with biological monitoring of additional fisheries independent metrics, allowing NPMP to further assess whether long-term exploitation of Northern Pikeminnow contributed to predatory compensation by non-native piscivores and native Northern Pikeminnow. The biological monitoring metrics also provide a means to monitor for a chronic decline in the Northern Pikeminnow population.

3.5.1.b. Fishery Evaluation Trends

Beginning with the 2024 field season, ODFW modified its approach to marking Northern Pikeminnow for the SRF from an extensive system-wide sampling plan to a strategic plan focused on locations that historically have a higher density of Northern Pikeminnow. This change has resulted in relatively large numbers of marks with respect to electrofishing effort. This approach also allowed the crews to opportunistically explore habitats that are more productive within a sampling area. The marking results since 2024 suggest the strategic marking approach may represent a balance between electrofishing effort and marks deployed. NPMP will continue to explore this approach and assess it as a means to mark suitable numbers of Northern Pikeminnow while efficiently distributing our electrofishing effort in areas open to SRF. Historically, length and weight measurements from fish captured during fishery evaluation have been used to assess system-wide trends in proportional size distribution and *Wr*. However, because the modified sampling approach does not include system-wide marking efforts for the fishery evaluation and incorporated a change in approach since 2024, it is unknown whether these metrics will be comparable in space and time with historic fishery metrics. Part of the ongoing assessment of the strategic approach will be to further analyze the relationship between previous methods and the trends in fisheries metrics to future fishery evaluation efforts.

3.5.1.c. DAF

Northern Pikeminnow removed in DAF appeared to be feeding regularly in the powerhouse tailrace areas of Bonneville and The Dalles reservoirs and 9-11% of the DAF caught Northern Pikeminnow had salmonids in their digestive tracts. These proportions were calculated from predatory fish collected from 13 May to 1 October 2025. During this time, there were documented pulses of out-migrating juvenile salmonids associated with increases in the proportions of juvenile salmonids in the diet of Northern Pikeminnow. There was intra-annual variation in the diet composition. Salmonids and lamprey were primarily predated during the early weeks of DAF (weeks 20-28), with diet composition largely consisting of American Shad in later weeks (weeks 30-40). These data suggest that Northern Pikeminnow feeding in the powerhouse tailrace areas may be influenced by prey availability. Though previous years of data indicate Northern Pikeminnow feeding on pulses of out-migrating salmonids (Carpenter et al. 2019), diet data from DAF 2025 showed salmon and lamprey consumption early in the season, followed by diets consisting largely of American Shad later in the season. One possible explanation could be a particularly large outmigration of shad around week 31, concurrent with a reduction in the number of outmigrating salmonids. Because of this, salmonids and other prey items were found in a smaller proportion of Northern Pikeminnow digestive tracts in the powerhouse tailrace areas. 2025 was the second year Smallmouth Bass and Walleye diet samples were taken during DAF. These samples were taken to test the viability of collection and analysis of diet samples and to ultimately compare diet composition from native Northern Pikeminnow to non-native Smallmouth Bass and

Walleye. 20-22% of Smallmouth Bass and 0-8% of Walleye had salmonids in their digestive tracts. This data set is limited by sample size as DAF gear is primarily designed to target Northern Pikeminnow. Despite the gaps in digestive content data for Smallmouth Bass and Walleye during some of the DAF season, the broad trends appear to parallel those of Northern Pikeminnow. These results are encouraging and provide the project a framework to continue to collect and compare digestive contents from these native and non-native predators. Digestive content data from all three species will allow the program to assess the importance of powerhouse tailrace areas, which were previously identified key feeding areas for Northern Pikeminnow.

Due to sampling location and timing differences, a comparison between the diets of DAF-caught Northern Pikeminnow and diets sampled during biological evaluation was not possible. The continuation of diet composition analyses from DAF-caught Northern Pikeminnow, Smallmouth Bass, and Walleye may be valuable to track trends in the predation of numerous taxa traveling through the powerhouse tailraces, several of which may be threatened or endangered. The significance of this work is elevated in the context of high proportions of Northern Pikeminnow with salmonids in their digestive tracts from fish caught in the boat-restricted zones in previous years. Unfortunately, due to budget cuts, safety and logistical concerns, and access restrictions, sampling in these areas has been eliminated from the study design. Therefore, DAF diet composition data provide one mechanism to fill data gaps surrounding potentially important native and non-native piscine predator feeding areas adjacent to the powerhouse tailrace areas. These data were useful in augmenting the understanding of the predator/prey dynamics between Northern Pikeminnow, juvenile salmonids, lamprey, American shad, and numerous other prey taxa. In addition, the removal of Northern Pikeminnow from the powerhouse tailrace areas via DAF mitigates the direct impact of the Federal Columbia River Power System (FCRPS) through a means that is inaccessible to anglers participating in the SRF.

PSD for Northern Pikeminnow in Bonneville Reservoir powerhouse tailrace (The Dalles Dam), caught through DAF, was significantly lower during the more recent sampling time period (2006-2025) relative to the older time period (1990-1995). This may indicate a fishing signal from DAF, which began actively removing Northern Pikeminnow in 1990. The Dalles Reservoir powerhouse tailrace (John Day Dam) did not have a significant difference in PSD for late relative to early time periods. DAF may have initially depressed PSD in the powerhouse tailrace area in Bonneville Reservoir, but these data don't suggest this happened in The Dalles Reservoir powerhouse tailrace. The mechanism for this difference remains unknown. Potential explanations include a shift in SRF effort and/or catch between the two reservoirs (Winther et al. 2021), or differential population responses to abiotic and/or biotic factors (e.g., Jackson 2001). There appear to be cyclical patterns in both PSD and *Wr* from tailrace areas fished by DAF, possibly indicating broad population-level changes from recruitment or other biotic or abiotic factors. Future biological evaluation of Bonneville and The Dalles reservoirs will be conducted through 2026 and may help to further elucidate trends in PSD across the sub-areas of each reservoir.

Northern Pikeminnow *Wr* was not significantly different in either powerhouse tailrace for males or females. This result may not be surprising, given that several hundred to thousands of Northern Pikeminnow were removed from the powerhouse tailrace areas each year through DAF, thereby possibly reducing the intraspecific competition from presumably food-rich areas of these hydropower reservoirs. However, if these powerhouse tailrace areas were prime feeding areas,

increasing competition from other predators may change the present predator/prey dynamics, potentially impacting when or how much food Northern Pikeminnow were able to access from the powerhouse tailrace areas. Ongoing biological monitoring of these areas, as well as the inclusion of two additional piscine predator species (i.e., Smallmouth Bass and Walleye), should continue as they provide important insight into shifts in predator dynamics that other sampling within NPMP cannot address.

3.5.2 Biological Monitoring

In addition to modeling the predation reduction due to the NPMP SRF and DAF, fishery metrics were measured for three predatory species: Northern Pikeminnow, Smallmouth Bass, and Walleye. These data were collected independently of the SRF and DAF and were designed to test for indications of a compensatory predatory response among these three species due to focused Northern Pikeminnow removals and monitor for signs of Northern Pikeminnow population declines. The primary indicator of a compensatory response was whether the level of predation changed within Northern Pikeminnow populations and how it compared with other piscine predators of salmon and steelhead, particularly non-native Smallmouth Bass and Walleye. Changes in the abundance of these predators or trends in the consumption of juvenile salmonids among these predators can provide additional evidence of a compensatory response to Northern Pikeminnow removals.

The Dalles Reservoir has not been biologically monitored since 2018 due to insufficient catch rates of Northern Pikeminnow and to accommodate NPMP priorities. This left a relatively large gap in the biological monitoring time series impacting the ability to assess trends in biological monitoring indices and conduct statistical tests based on consistent time series data. During the 2025 field season, ODFW resumed the normal three-year rotating cycle sampling reservoir sub-units with a return to The Dalles and John Day reservoirs for biological monitoring. Prior to 2025, ODFW doubled sampling efforts in the John Day Reservoir in 2022 in an attempt to expand the sample size of Northern Pikeminnow used to calculate indices of abundance, consumption, and predation.

Northern Pikeminnow abundance has remained suppressed and continues to show declining trends throughout all areas between The Dalles and McNary dams. Abundance was initially high at the start of the SRF, followed by a decline during the first decade of removals. Since then, abundance indices have varied around a low level relative to the first decade of SRF. In 2025, no consumption or predation indices were calculated for Northern Pikeminnow in any of the six areas sampled due to insufficient diet samples ($n < 6$). Since 2000, spring biological monitoring in The Dalles Reservoir has been implemented in six individual years for a total of 18 sampling events; however, insufficient diet samples, due to low abundance, have limited the calculation of the consumption index to only four individual index calculations. Similarly, since 2000, spring biological monitoring has been implemented in the John Day Reservoir in eight individual years, but due to low abundance and insufficient diet samples, a consumption index could only be calculated in the tailrace area in 2004, 2006, and 2022. The 2022 data point is noteworthy because ODFW prioritized biological evaluation in this reservoir by doubling sampling efforts across all study areas of John Day Reservoir, and was only able to obtain the minimum sample size necessary to calculate a consumption index in the tailrace of John Day Reservoir. There were insufficient

sample sizes to calculate a consumption or predation index in the mid-reservoir and forebay sub-areas.

In contrast, the overall trend in the index of abundance was increasing for Smallmouth Bass and Walleye in most areas of The Dalles and John Day reservoirs. The index of abundance for both non-native predators is at or near the highest recorded value for both reservoirs and each sub-area for Smallmouth Bass since 2018. Increases in Walleye index of abundance is less pronounced in the forebay and mid-reservoir areas of The Dalles and John Day reservoirs, but are more distinct in the tailrace areas where recent (since 2018) monitoring efforts have demonstrated the highest totals on record.

Due to low abundance of Northern Pikeminnow and the lack of developed consumption and predation indices for Walleye, we are only able to track these indices of consumption and predation for Smallmouth Bass in these reservoirs. The Smallmouth Bass predation index shows an overall increase in predation across the time series with a notable increase in the John Day mid-reservoir. The consumption index for Smallmouth Bass has varied around the long-term mean in all areas of The Dalles and John Day reservoirs, without exhibiting a sustained increasing or decreasing trend. When considered together, predation on salmonids by Smallmouth Bass has increased primarily as a result of rising abundance. Walleye have also demonstrated increases of abundance that would presumably lead to increased predation on juvenile salmonids. This study does not explicitly track indices of consumption and predation for Walleye, but they are demonstrated piscivores in the size classes that are frequently encountered during this work (Waltz et al. 2024) and from other studies (e.g., Poe et al. 1991). Therefore, it's reasonable to conclude that the substantial increases in the Walleye index of abundance observed in this study translates to substantial increases in predation of salmonids. This shift in Walleye abundance has been observed for a number of years in numerous locations throughout the Columbia River Basin (e.g., Waltz et al. 2024, Dobos pers. comm.).

Long-term reductions in the Northern Pikeminnow abundance index have limited the number of individuals available for diet analysis, and the resulting data suggest that measurable predation by this species is currently low within these reservoirs. The inverse trends between native and non-native piscine predators suggest that compensatory responses to removals may be occurring in The Dalles and John Day reservoirs. Tailrace areas have been identified as predation hotspots throughout the Columbia River Basin and specifically in John Day Reservoir (Poe et al. 1991). These tailrace areas represent a direct effect of the FCRPS, where piscine predators aggregate and prey on migrating juvenile salmonids that are vulnerable due to injury or disorientation after passing through powerhouses or spillways, or due to bottlenecking at juvenile bypass outflows. Additionally, the upper reaches of John Day Reservoir are known to be important rearing areas for sub-yearling Chinook (Tiffan et al. 2006), increasing their vulnerability to predation in this reservoir. Together, these patterns underscore the importance of adaptive management strategies when there are indications of shifting piscine predation dynamics in the mainstem Columbia River.

The interpretations from these indices were complicated by the fact that the Columbia and Snake River reservoirs were assessed on a multi-year rotating schedule that has varied spatially and temporally throughout the history of the project. This schedule rotation left gaps in the data, leading to a coarser temporal scale used to assess trends in AI, CI, and PI. The coarser temporal

scale of data could miss important high or low index years, leading to misinterpretations of the long-term trends present in the data. The low Northern Pikeminnow and high Smallmouth Bass AI, CI, and PI, as well as the high Walleye AI, observed in 2025 were broadly consistent over this timeframe and not from a single anomalously low or high year in a series of relatively constant years. The rotating index scheduling was driven by the incorporation of rapid assessment methods necessary to generate management actionable data through chronic flat funding for this program. The results presented here demonstrate the difficulty in assessing fish predator populations with limited data and means for assessment.

Two additional fisheries metrics were calculated for these three species, independent of SRF and DAF, for the John Day Reservoir. These metrics were PSD and *Wr,* which provided additional information about the size frequency distribution and body condition of these species. These metrics can be used to assess for further signs of compensation among predator species, potentially related to Northern Pikeminnow removal, as well as to monitor for signs of overfishing of Northern Pikeminnow. Neither of these metrics could be calculated for Northern Pikeminnow due to insufficient sample sizes. There were no significant monotonic trends in PSD, PSD-P, or *Wr* for Smallmouth Bass, suggesting stable proportions of small fish to large fish for Smallmouth Bass and supported by the cyclical trends apparent in the data during the 35-year time series (Figs. 3.19-3.24). There were significant declines in PSD and PSD-P for Walleye in John Day Reservoir, suggesting a change in the proportions of small fish to large fish. John Day Reservoir supports an active recreational Walleye fishery that doesn't have size or bag limits. Significant declines in PSD and PSD-P could be indicative of reductions in the proportion of larger Walleye in the population due to anglers preferentially targeting larger fish. These results could also indicate a strong recruitment of Walleye recently in the John Day Reservoir.

Taken in aggregate, the fisheries independent indices of abundance, consumption, and predation suggest a long-term depression in Northern Pikeminnow populations since the initiation of the Sport-Reward Fishery and a reduction in their predatory impact on juvenile salmonids in The Dalles and John Day reservoirs. This pattern was the expected outcome from the implementation of a reward fishery for this species. Furthermore, it was not possible to say for certain that the patterns between declining metrics for Northern Pikeminnow and some increasing metrics for Smallmouth Bass and Walleye were indicative of a compensatory response; both species were substantially more abundant in 2025 in The Dalles and John Day reservoirs than they were at the start of NPMP in 1990. This also suggests that predation of juvenile out-migrating salmonids by Northern Pikeminnow has reduced, while it has increased by Smallmouth Bass. Additionally, while NPMP doesn't have consumption or predation index values for Walleye, the proportion of Walleye with salmonids in their diets suggests that the increase in the index of abundance leads to an increase in predation of out-migrating juvenile salmonids by Walleye (Tables 3.3A and 3.3B), particularly in the tailrace areas below the dams.

Studies used to justify the Sport-Reward Fishery for Northern Pikeminnow demonstrated that they were the single largest contributor of piscine predation due to the combined consumption rate and estimated population at the time, relative to Smallmouth Bass, Walleye and Channel Catfish (Beamesderfer and Rieman 1991; Poe et al. 1991; Rieman et al. 1991; Vigg et al. 1991). However, those studies also acknowledged and predicted that this dynamic could change in the future due to focused exploitation of Northern Pikeminnow to reduce the population by 10-20% and truncate

the length frequency of the population to reduce the number of longer, more piscivorous Northern Pikeminnow. Current data indicate that non-native Walleye and Smallmouth Bass now likely exert the greatest predatory pressure, from piscine predators, on out-migrating juvenile salmonids, with the diminished Northern Pikeminnow population contributing only minimally to overall piscine predation in The Dalles and John Day reservoirs. This signal highlights the need for the region to re-evaluate the total contributions of mortality from this suite of piscine predators in a greatly modified river/reservoir system and in the context of dynamic physical conditions in and around these aquatic ecosystems.

There are a suite of physical parameters that have been modified through natural and anthropogenic processes that are also linked to increases in Smallmouth Bass and Walleye abundance or predation in the region (e.g., water transit time, water temperature, prey availability). Separating the influence of those physical parameters on Smallmouth Bass and Walleye abundance relative to Sport-Reward Fishery removals is beyond the current scope of this project. However, patterns in fishery independent metrics like those presented in this report point to an ongoing shift in piscine predator dynamics in a greatly modified river system that likely have an impact on juvenile salmonid survival through the Columbia and Snake rivers. Continued evidence of compensatory responses to removals should justify resources to implement adaptative management actions including plans to investigate the predator/prey dynamics occurring in areas where compensation is suspected. In the absence of long-term, scientifically rigorous data, state and federal resource managers will not be able to accurately assess the effects of long-term fishing pressure, subsequent reduction in predation on juvenile salmonids, and changes to the multi-species predator/prey dynamics in this greatly modified river system. It is important that NPMP adapts and continues to monitor these areas to assure a viable population of the native predator.

The rapid assessment methods incorporated into this report provided cost effective methods to biologically monitor and evaluate the effect of recreational sport-reward fishing for Northern Pikeminnow. While these methods were not spatially or temporally exhaustive, they did provide an additional year of scientifically robust data that was used to augment the existing 34 years of historical data. In doing so, NPMP was able to address the efficacy of the Sport-Reward Fishery to exploit 10-20% of the Northern Pikeminnow population, estimate the concomitant juvenile salmonid predation reduction, monitor for predator compensation, and provide a safeguard against overexploiting a native fish predator. These methods provided evidence that there may be a compensatory response in Smallmouth Bass and Walleye, potentially due to the removal of Northern Pikeminnow in The Dalles and John Day reservoirs. This potential compensatory response needs to be monitored carefully as continuing to remove one predator, only to have the reductions to juvenile salmonid predation negated by predation from another predator, counteracts the essence of the efforts of NPMP. There were many factors that influenced the predatory impact of piscivorous fishes on ESA listed salmonids. In the effort to elucidate the relationships among these factors, NPMP will continue adapting the research methods to provide management actionable information about the predation of juvenile salmonids in the Columbia and Snake rivers.

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TABLES

Table 3.1. Number of Northern Pikeminnow marked and recaptureda in the Sport-Reward and Dam Angling Fisheries during 2025 by location and size class. Represented marks are from 2025 Tagging season while recaptures are from fish marked between 2012 and 2025.

	200-249 mm FL		≥ 250 mm FL		≥ 200 mm FL		
Reach/Reservoir	Marked	Recaptured	Marked	Recaptured	Marked	Recaptured	Recaptures of 2025 Marks
Below Bonneville	57	3	110	53	167	56	18
Bonneville	61	14	33	63	94	77	40
The Dalles	1		4		5		
John Day	53	8	6	3	59	11	11
McNary							
Ice Harbor							
Little Goose				2		2	
Lower Granite				1		1	
All areas	172	25	153	122	325	147	69

[a] Fish that were recaptured the same week in which they were tagged are not included in this table or in calculations of exploitation to avoid violating mark-recapture assumptions (i.e., incomplete mixing). '≥ 200 mm' includes all fish tagged or recaptured.

Table 3.2. Number (n) of Northern Pikeminnow diets examined from Dam Angling Fishery catch from Bonneville (tailrace of The Dalles Dam) and The Dalles (tailrace of John Day Dam) reservoirs and proportions containing specific prey items (cray =crayfish, other invert = all invertebrates not identified as crayfish, sal = salmon or steelhead, lam = lamprey, ash = American Shad). Note: start and end dates for the Dam Angling Fishery and the affiliated fishery monitoring have varied year to year.

Reservoir, Year	n	$\hat{p}_{food}$	$\hat{p}_{fish}$	$\hat{p}_{cray}$	$\hat{p}_{other\ invert}$	$\hat{p}_{sal}$	$\hat{p}_{lam}$	$\hat{p}_{ash}$	$\hat{p}_{other\ fishes}$
Bonneville,									
2006	129	0.36	0.21	0.08	0.04	0.04	0.17	0.00	0.05
2007	340	0.61	0.40	0.04	0.22	0.13	0.31	0.00	0.06
2008	209	0.63	0.44	0.04	0.33	0.11	0.31	0.00	0.12
2009	223	0.70	0.64	0.06	0.19	0.09	0.50	0.01	0.14
2010	395	0.62	0.49	0.06	0.14	0.16	0.18	0.15	0.18
2011	329	0.66	0.44	0.07	0.19	0.36	0.09	0.00	0.08
2012	275	0.77	0.57	0.09	0.19	0.15	0.18	0.00	0.00
2013	216	0.77	0.43	0.12	0.34	0.17	0.22	0.04	0.06
2014	489	0.58	0.46	0.07	0.13	0.19	0.47	0.19	0.42
2015	474	0.75	0.53	0.13	0.29	0.07	0.53	0.21	0.15
2016	463	0.73	0.37	0.03	0.44	0.07	0.14	0.13	0.08
2017	415	0.76	0.53	0.03	0.35	0.14	0.18	0.17	0.14
2018	346	0.72	0.46	0.04	0.36	0.06	0.05	0.29	0.15
2019	383	0.82	0.49	0.03	0.50	0.07	0.24	0.13	0.12
2020	336	0.69	0.49	0.03	0.26	0.16	0.26	0.07	0.13
2021	327	0.78	0.55	0.04	0.34	0.18	0.23	0.03	0.19
2022	221	0.71	0.54	0.04	0.20	0.09	0.14	0.31	0.11
2023	506	0.73	0.57	0.02	0.24	0.05	0.20	0.30	0.10
2024	263	0.84	0.57	0.02	0.41	0.08	0.23	0.27	0.10
2025	82	0.83	0.63	0.04	0.44	0.09	0.17	0.30	0.24

The Dalles,

2007	453	0.58	0.37	0.02	0.27	0.13	0.08	0.11	0.21
2008	64	0.81	0.36	0.03	0.69	0.09	0.23	0.00	0.08
2009	224	0.61	0.56	0.08	0.31	0.11	0.40	0.00	0.14
2010	382	0.55	0.29	0.07	0.34	0.16	0.10	0.02	0.07
2011	283	0.70	0.22	0.06	0.56	0.15	0.07	0.00	0.02
2012	479	0.77	0.39	0.13	0.48	0.15	0.12	0.04	0.00
2013	447	0.78	0.47	0.22	0.34	0.23	0.16	0.09	0.05
2014	363	0.72	0.44	0.31	0.27	0.18	0.46	0.14	0.36
2015	337	0.79	0.45	0.24	0.37	0.14	0.45	0.12	0.16
2016	426	0.73	0.31	0.04	0.57	0.14	0.04	0.06	0.07
2017	329	0.61	0.30	0.05	0.48	0.11	0.07	0.09	0.08
2018	473	0.75	0.30	0.04	0.57	0.13	0.09	0.06	0.04
2019	410	0.77	0.38	0.06	0.54	0.14	0.16	0.06	0.06
2020	549	0.70	0.48	0.04	0.39	0.13	0.19	0.19	0.03
2021	317	0.67	0.45	0.06	0.40	0.20	0.20	0.08	0.07
2022	161	0.70	0.48	0.06	0.37	0.27	0.21	0.06	0.06
2023	173	0.65	0.39	0.02	0.43	0.06	0.08	0.19	0.08
2024	242	0.86	0.54	0.07	0.62	0.21	0.24	0.09	0.11
2025	119	0.66	0.40	0.04	0.40	0.11	0.08	0.18	0.07

Table 3.3A and 3.3B. Number (n) of Northern Pikeminnow, Smallmouth Bass, and Walleye (≥ 200 mm FL) diets examined during biological monitoring in The Dalles and John Day reservoirs during spring 2025 and proportion of samples containing specific prey items (cray = crayfish, crust = all crustacea not identified as crayfish, sal = salmon or steelhead, lam = lamprey).

3A

Spring 2025	The Dalles Reservoir							
Species	n	$\hat{p}_{food}$	$\hat{p}_{fish}$	$\hat{p}_{cray}$	$\hat{p}_{crust}$	$\hat{p}_{insect}$	$\hat{p}_{sal}$	$\hat{p}_{lam}$
Northern Pikeminnow	1	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Smallmouth Bass	295	0.98	0.20	0.49	0.30	0.27	0.01	0.02
Walleye	38	0.95	0.61	0.08	0.34	0.08	0.03	0.03

3B

Spring 2025	John Day Reservoir							
Species	n	$\hat{p}_{food}$	$\hat{p}_{fish}$	$\hat{p}_{cray}$	$\hat{p}_{crust}$	$\hat{p}_{insect}$	$\hat{p}_{sal}$	$\hat{p}_{lam}$
Northern Pikeminnow	11	0.91	0.00	0.09	0.09	0.64	0.00	0.00
Smallmouth Bass	129	0.99	0.36	0.43	0.44	0.42	0.09	0.00
Walleye	105	0.99	0.72	0.02	0.41	0.14	0.30	0.04

FIGURES

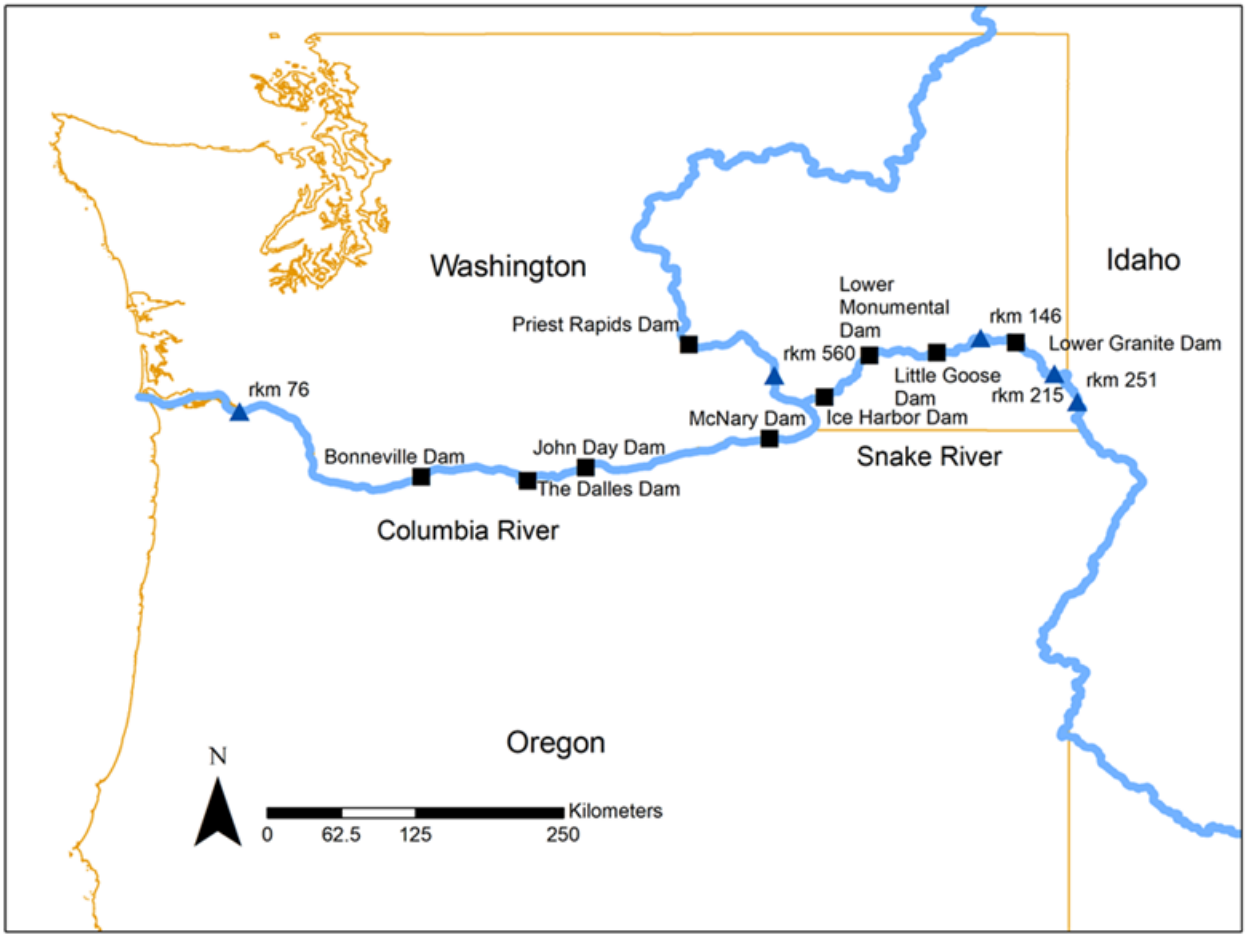

Figure 3.1. Study area in the Columbia and Snake rivers

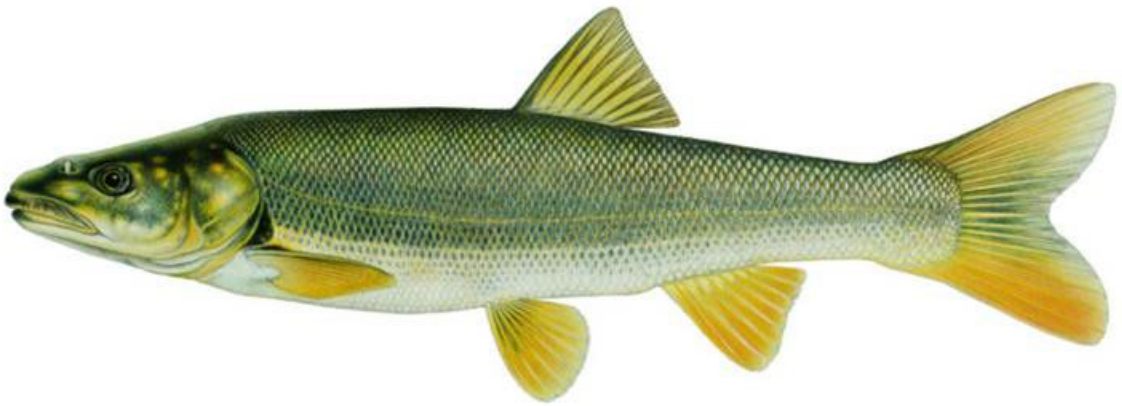

Figure 3.2. Tag placement areas for 134.2 MHz passive integrated transponder (PIT) tags for marked Northern Pikeminnow

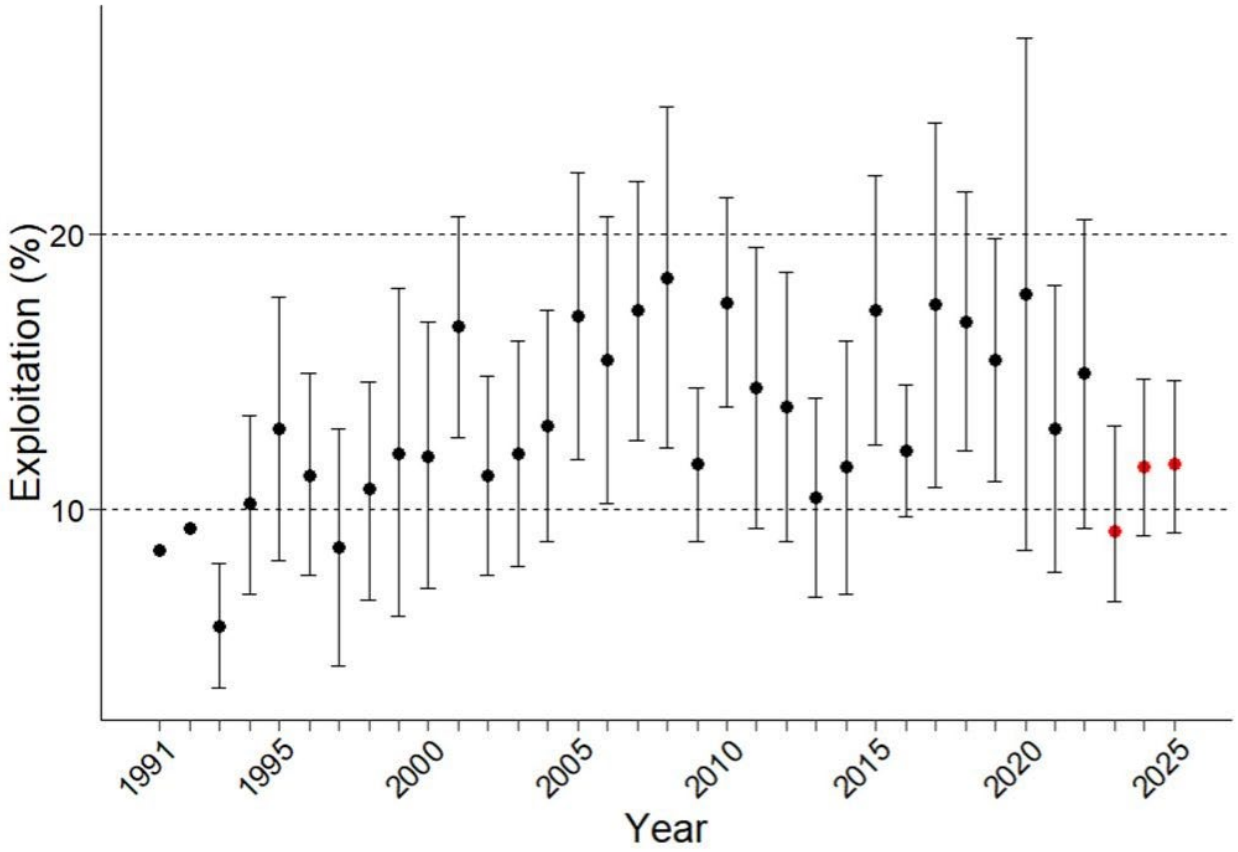

Figure 3.3. System-wide exploitation rates of Northern Pikeminnow (≥ 250 mm FL) in the Sport-Reward Fishery, 1991–2025. Error bars represent 95% confidence intervals, though variation was not estimated for the years 1991–1992. Target exploitation is 10–20% (dashed lines).

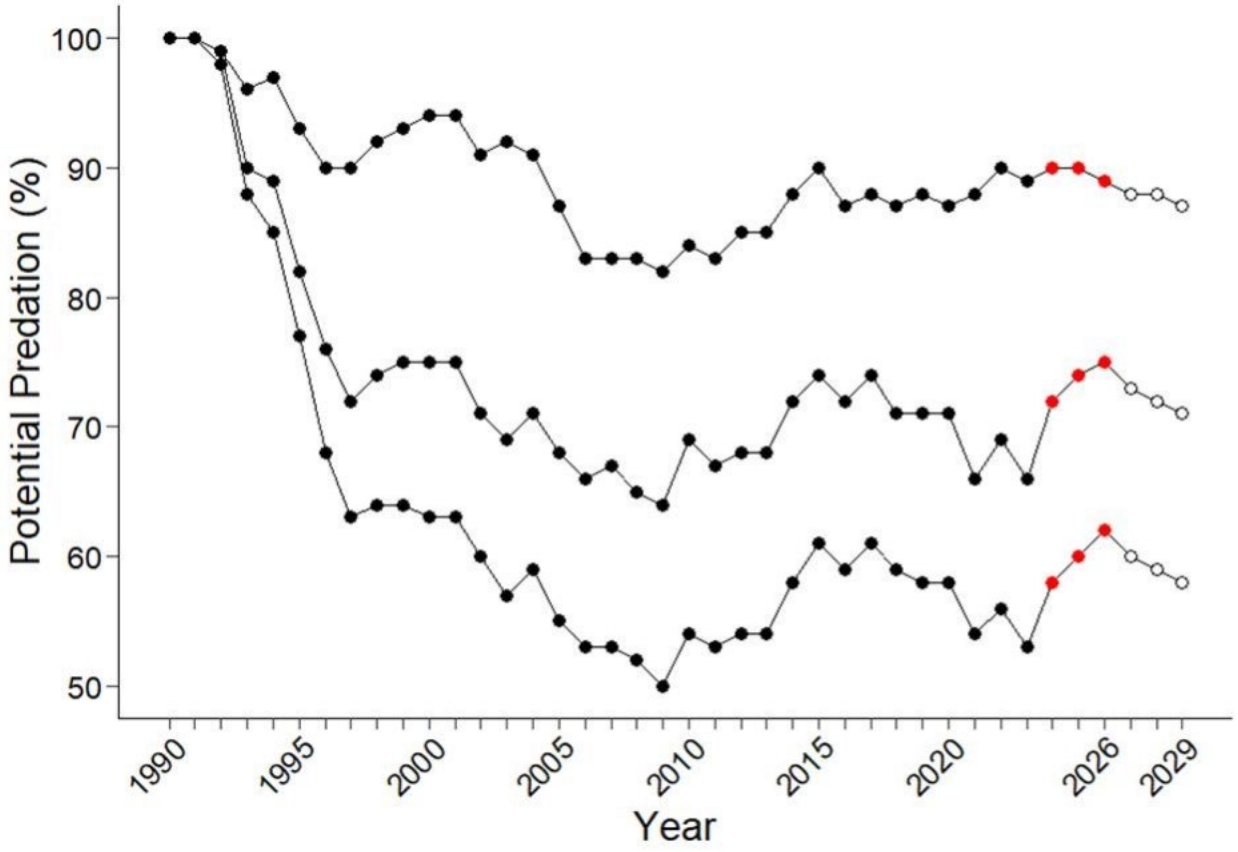

Figure 3.4. Estimates of maximum, median, and minimum annual levels of potential predation by Northern Pikeminnow on juvenile salmon relative to predation levels before implementation of the Northern Pikeminnow Management Program. For the years 1991–2026, model estimates (filled circles) are based on exploitation rates from the previous year. Model forecast predictions after 2026 (open circles) are based on average exploitation estimates from years with similar fishery structure (2001, 2004–2025). Change in exploitation model methods (filled red circles) in 2024-2026.

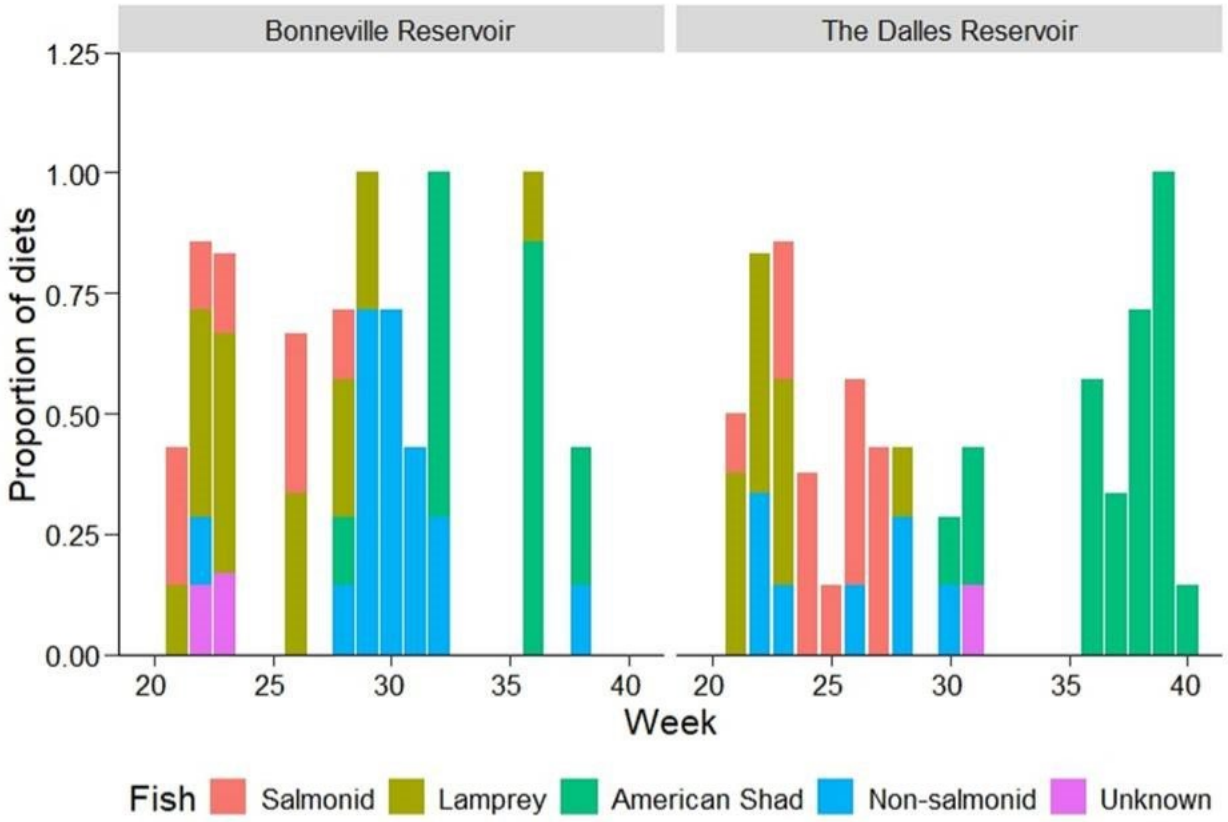

Figure 3.5. Proportion of all Northern Pikeminnow diet samples containing prey fish collected during the Dam Angling Fishery from the powerhouse tailraces of Bonneville (fishing from The Dalles Dam) and The Dalles (fishing from John Day Dam) reservoirs, May-October 2025. All Northern Pikeminnow diet samples collected were included in this analysis, including samples that were empty or did not contain fish. Multiple fish taxa may be represented in individual Northern Pikeminnow diets. Note: weeks without data indicate that sampling was not conducted, or sample sizes were insufficient for analyses ($n < 6$).

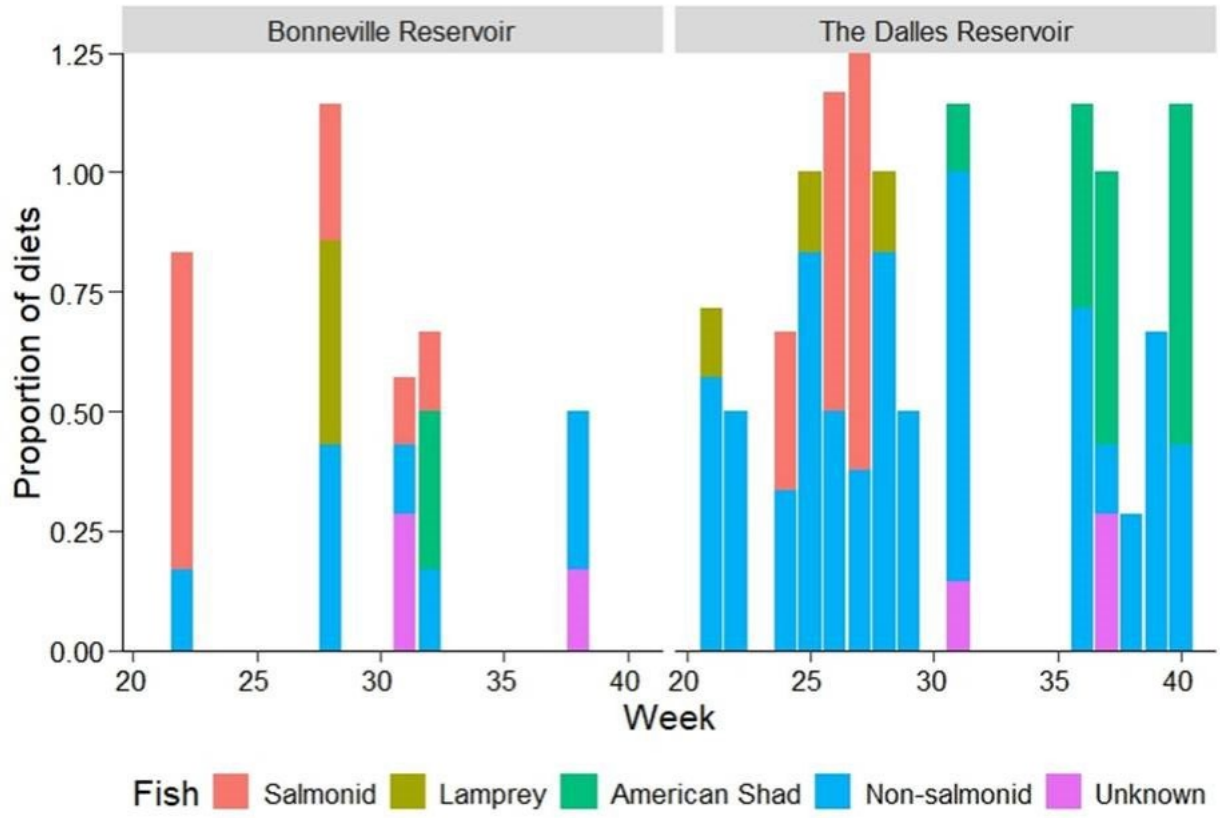

Figure 3.6. Proportion of all Smallmouth Bass diet samples containing prey fish collected during the Dam Angling Fishery from the powerhouse tailraces of Bonneville (fishing from The Dalles Dam) and The Dalles (fishing from John Day Dam) reservoirs May-October 2025. All Smallmouth Bass diet samples collected were included in this analysis, including samples that were empty or did not contain fish. Multiple fish taxa may be represented in individual Smallmouth Bass diets. Note: weeks without data indicate that sampling was not conducted, or sample sizes were insufficient for analyses ($n < 6$).

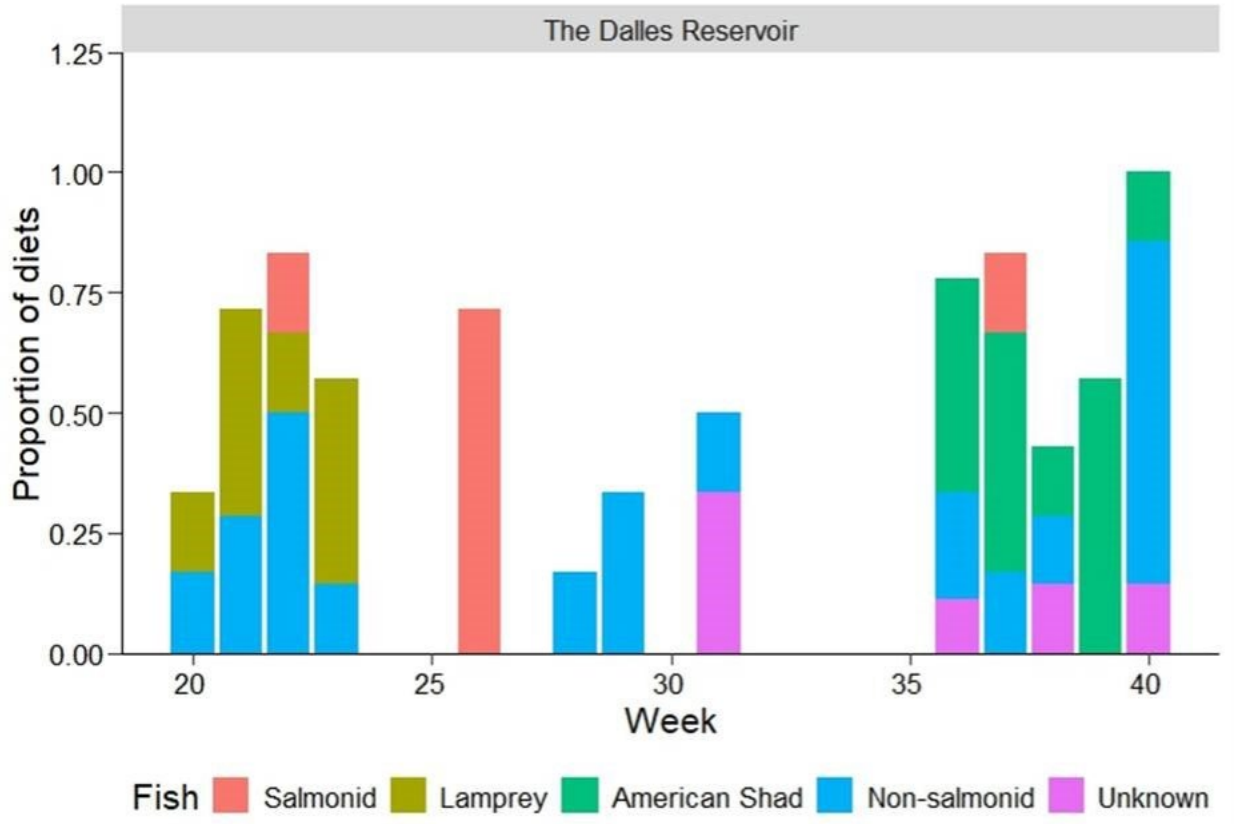

Figure 3.7. Proportion of all Walleye diet samples containing prey fish collected during the Dam Angling Fishery from the powerhouse tailraces of Bonneville (fishing from The Dalles Dam) and The Dalles (fishing from John Day Dam) reservoirs, May-October 2025. All Walleye diet samples collected were included in this analysis, including samples that were empty or did not contain fish. Multiple fish taxa may be represented in individual Walleye diets. Note: weeks without data indicate that sampling was not conducted, or sample sizes were insufficient for analyses ($n < 6$).

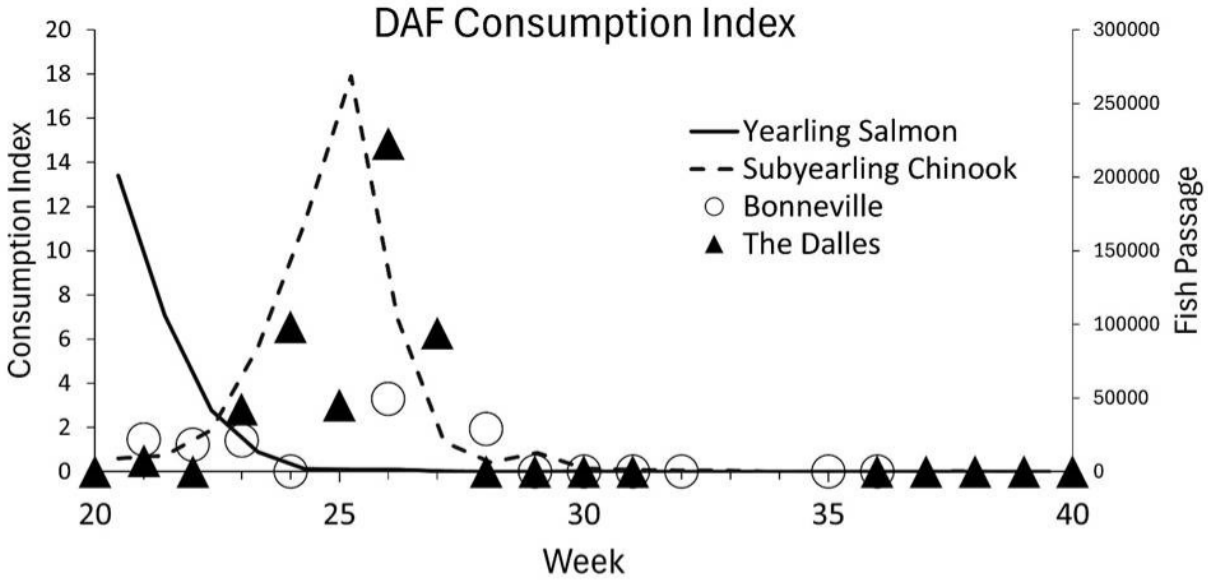

Figure 3.8. Mean weekly juvenile salmon consumption index for Northern Pikeminnow captured from the Dam Angling Fishery (DAF) in Bonneville (open circles) and The Dalles (filled triangles) reservoirs compared to the weekly smolt passage index at McNary Dam, 2025. Smolt passage data are summarized from Fish Passage Center (unpublished data). DAF sampling was conducted from Weeks 20-40. Weeks without data indicate that sampling was not conducted, or sample sizes were insufficient for analyses ($n < 6$).

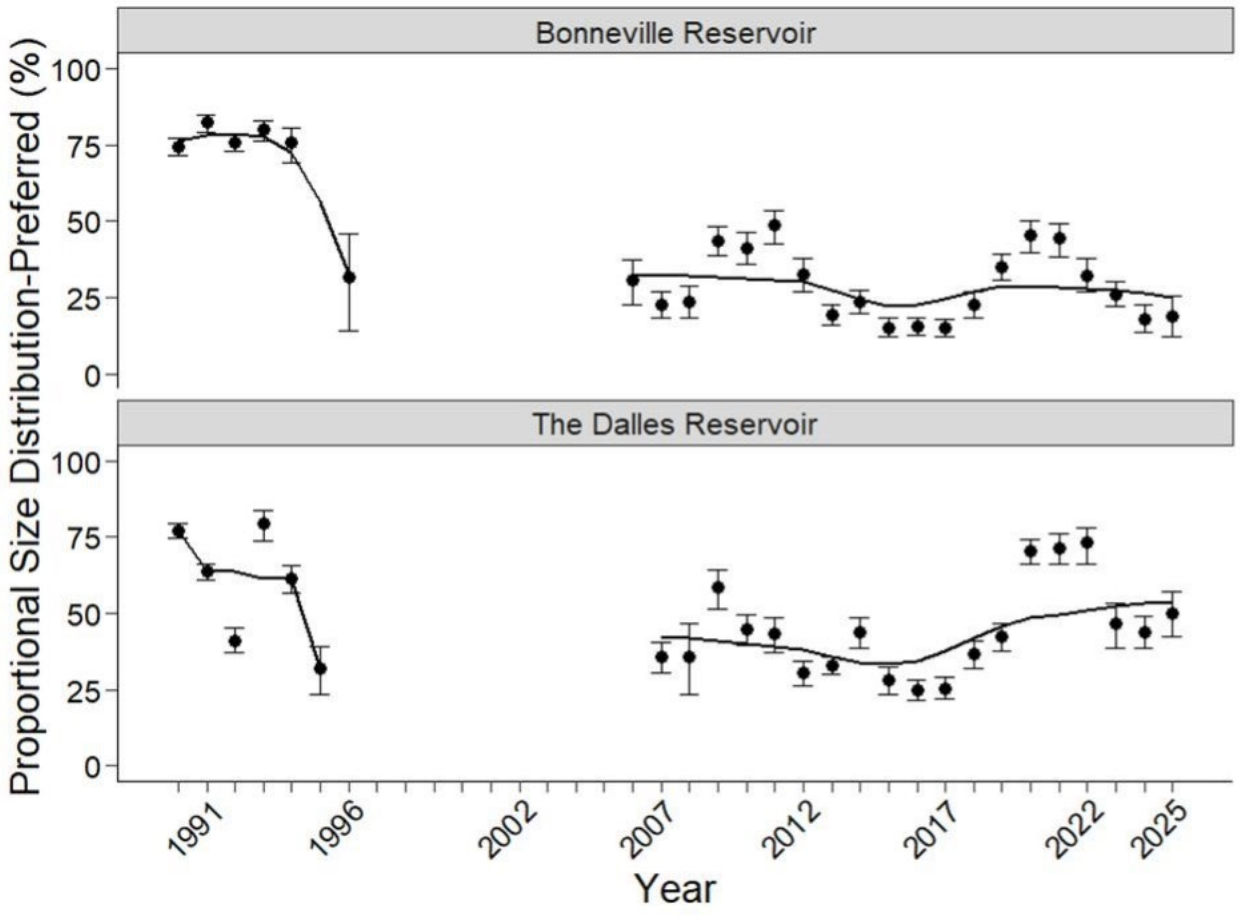

Figure 3.9. Estimates of proportional size distribution (PSD, %) of Northern Pikeminnow sampled in Bonneville and The Dalles reservoirs during the Dam Angling Fishery, 1990-2025. Error bars represent 95% bootstrap confidence intervals. Data are fit with LOWESS curves for two different time series: early (1990-1996) and late (2006-2025), due to the large data gap between them. Years without data indicate sampling was not conducted or sample sizes were insufficient for analyses (ns < 20).

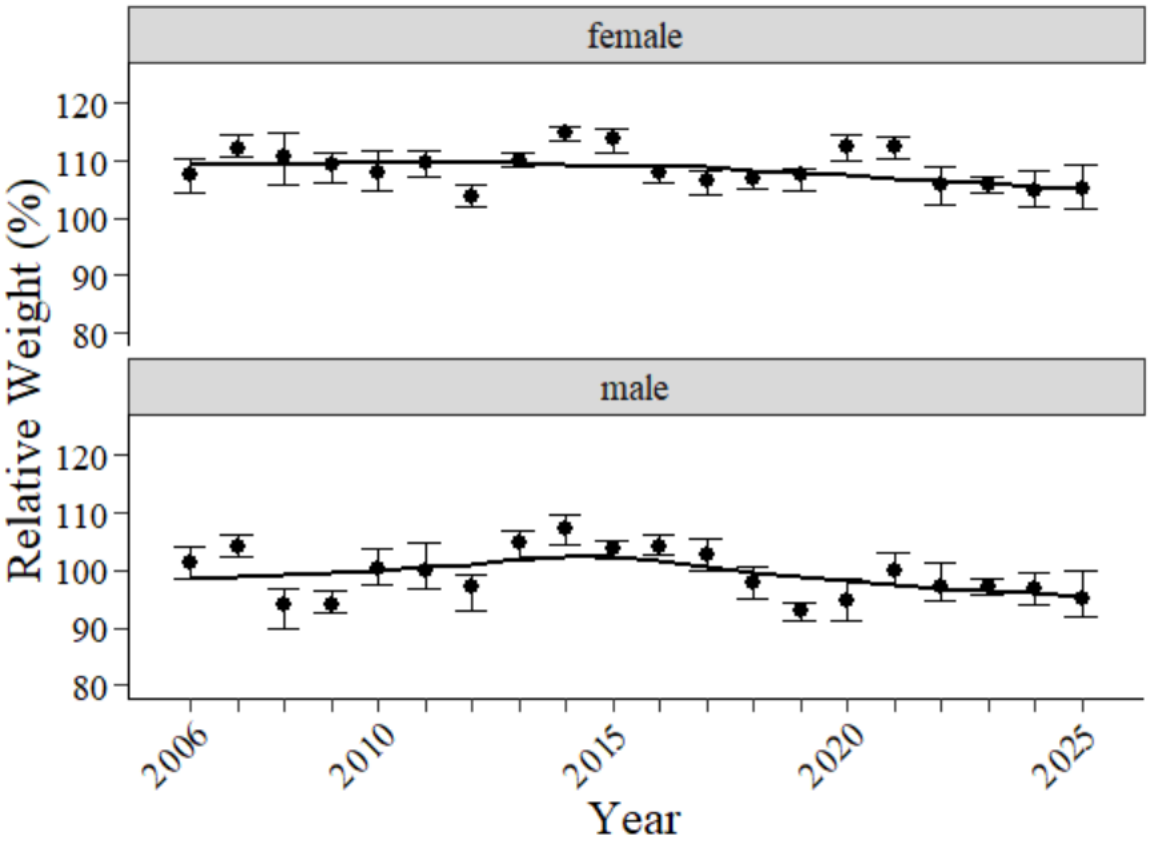

Figure 3.10. Median relative weight (Wr, %) for female and male Northern Pikeminnow collected in Bonneville Reservoir during the Dam Angling Fishery, 2006-2025. Error bars represent 95% bootstrap (percentile) confidence intervals. Data are fit with LOWESS curves.

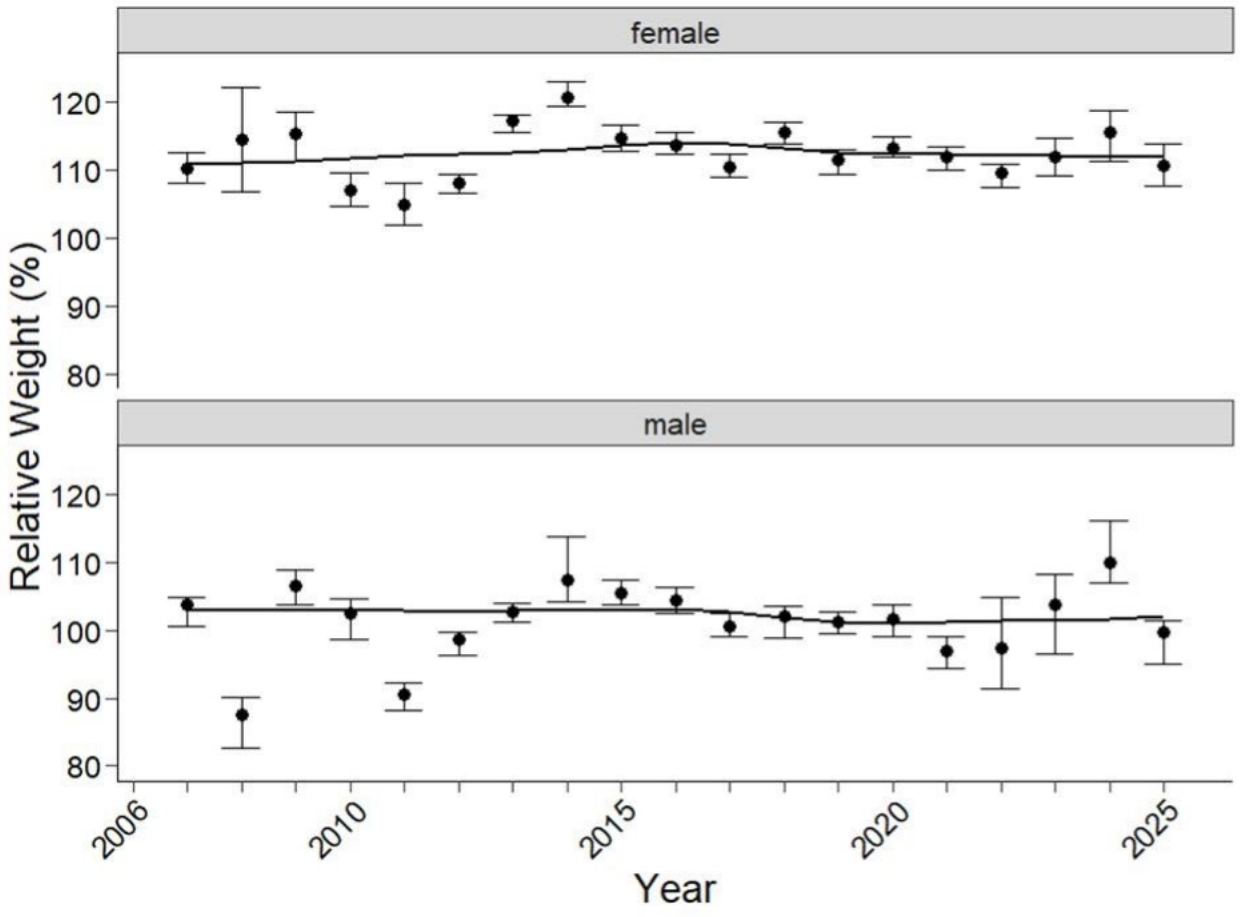

Figure 3.11. Median relative weight (Wr, %) for female and male Northern Pikeminnow collected in The Dalles Reservoir during the Dam Angling Fishery, 2007-2025. Error bars represent 95% bootstrap (percentile) confidence intervals. Data are fit with LOWESS curves.

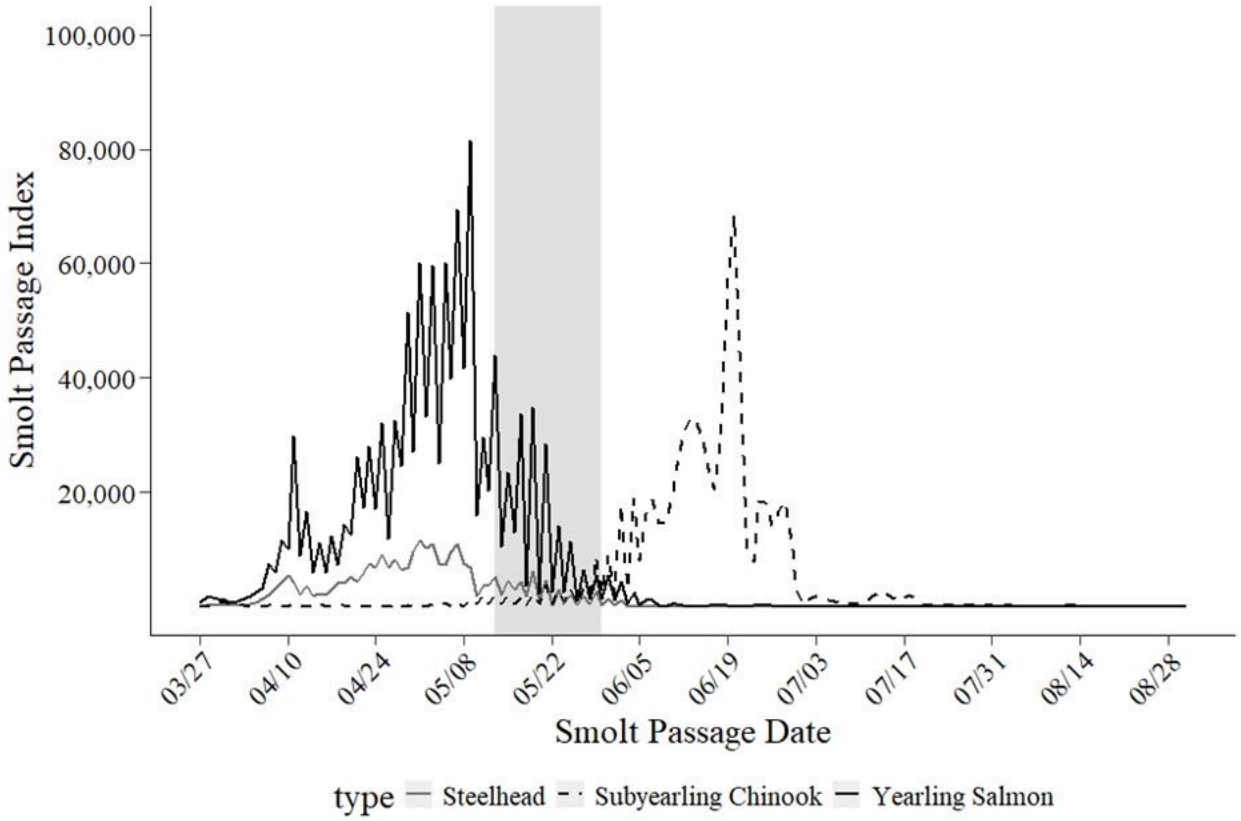

Figure 3.12. Period of biological evaluation (vertical bar) in The Dalles and John Day reservoirs, and juvenile salmon and steelhead daily passage index through McNary Dam, March–August 2025 (Source: Fish Passage Center, unpublished data)

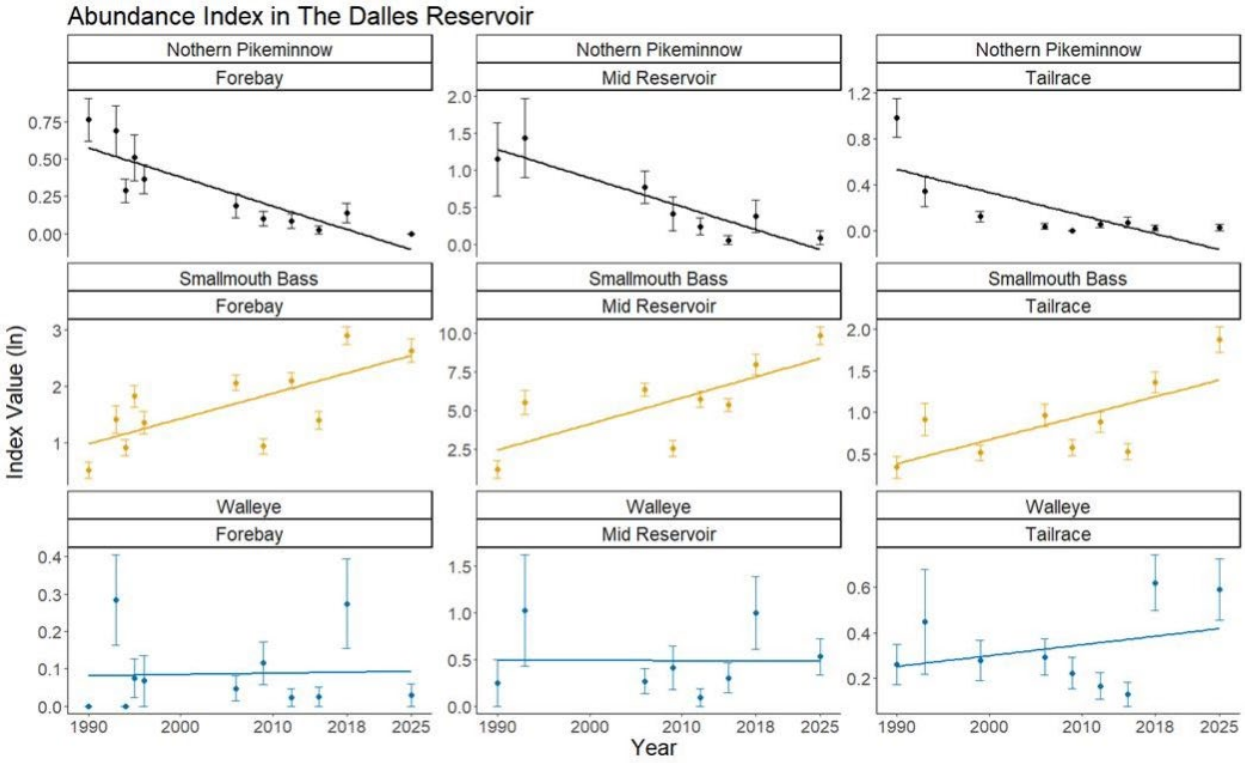

Figure 3.13. Spring abundance index values (mean catch per 900-s boat electrofishing scaled to surface area [ha] divided by 1,000; and SE) with natural log transformation for Northern Pikeminnow (≥ 250 mm FL), Smallmouth Bass (≥ 200 mm FL), and Walleye (≥ 200 mm FL) in The Dalles Reservoir, 1990-2025. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis. Individual y-axes were added to each pane to allow for clearer visualization of trends in each reservoir sub-area.

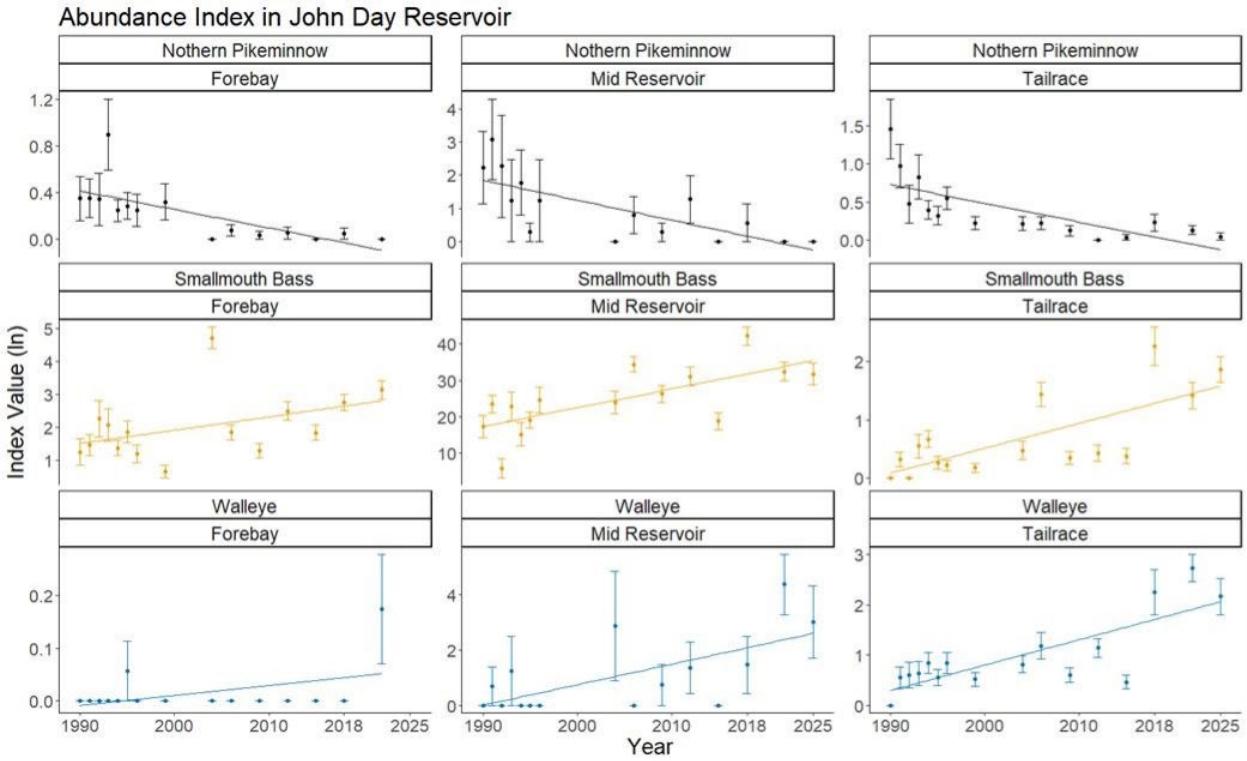

Figure 3.14. Spring abundance index values (mean catch per 900-s boat electrofishing scaled to surface area [ha] divided by 1,000; and SE) with natural log transformation for Northern Pikeminnow (≥ 250 mm FL), Smallmouth Bass (≥ 200 mm FL), and Walleye (≥ 200 mm FL) in John Day Reservoir, 1990-2025. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis. Individual y-axes were added to each pane to allow for clearer visualization of trends in each reservoir sub-area.

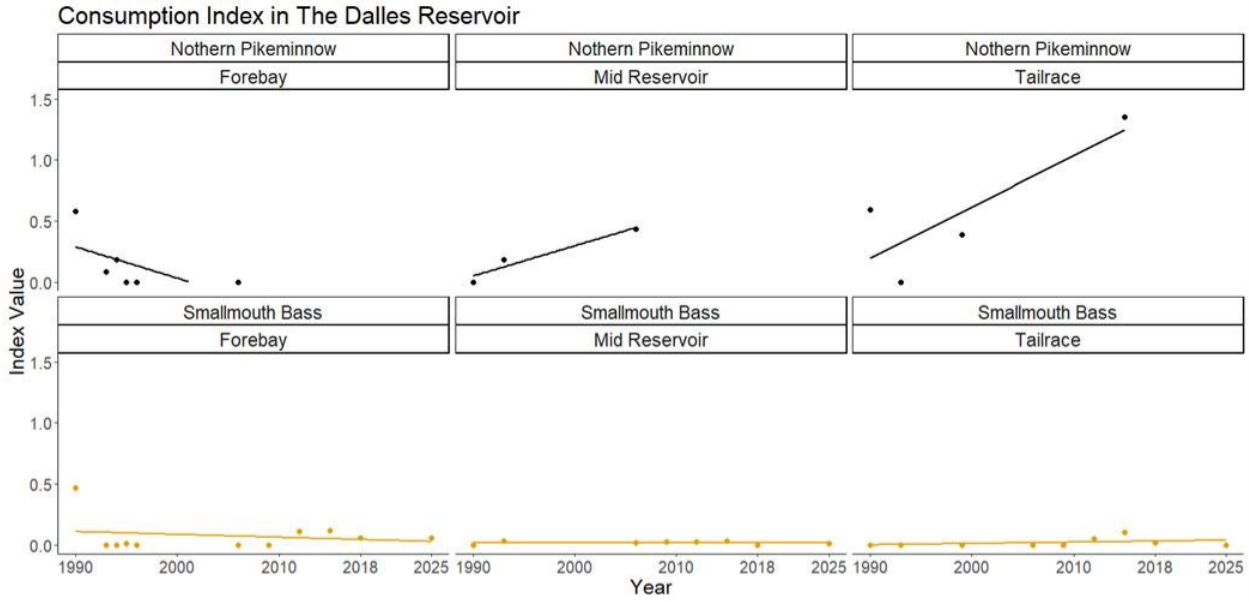

Figure 3.15. Annual spring consumption index values for Northern Pikeminnow (≥ 250 mm FL), and Smallmouth Bass (≥ 200 mm FL) captured during biological evaluation in The Dalles Reservoir, 1990-2025. Walleye were not included due to a lack of consumption index model. Mean and SE were calculated for each location across the time series. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis.

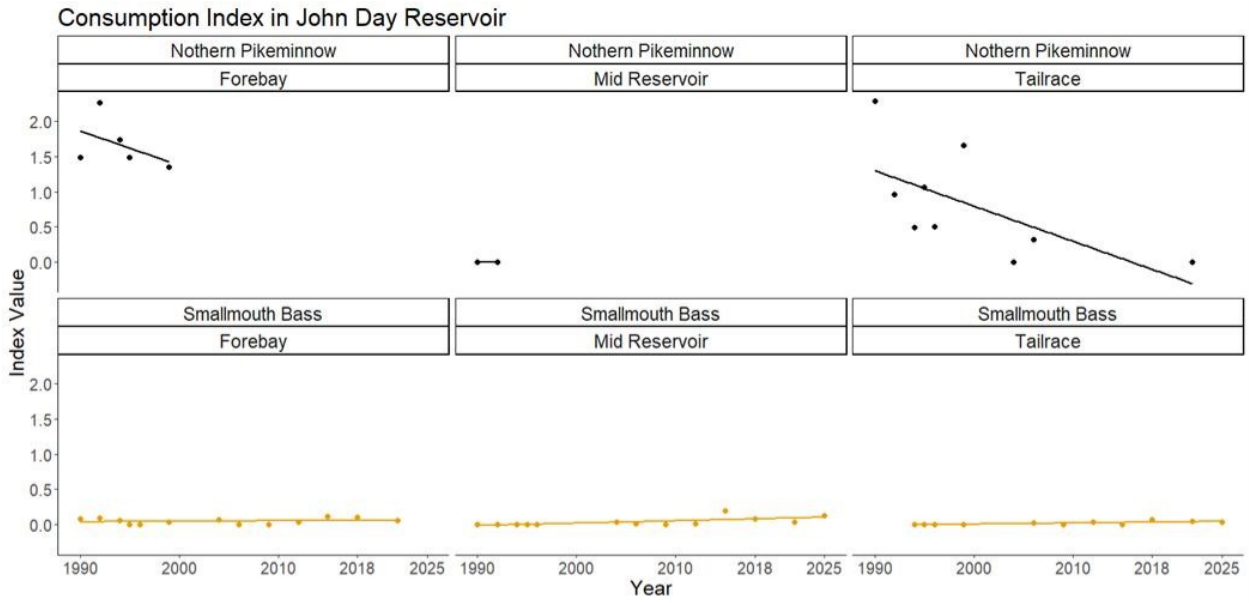

Figure 3.16. Annual spring consumption index values for Northern Pikeminnow (≥ 250 mm FL), and Smallmouth Bass (≥ 200 mm FL) captured during biological evaluation in John Day Reservoir, 1990-2025. Walleye were not included due to a lack of consumption index model. Mean and SE were calculated for each location across the time series. Years without data indicate sampling was not conducted or sample sizes were insufficient for analyses.

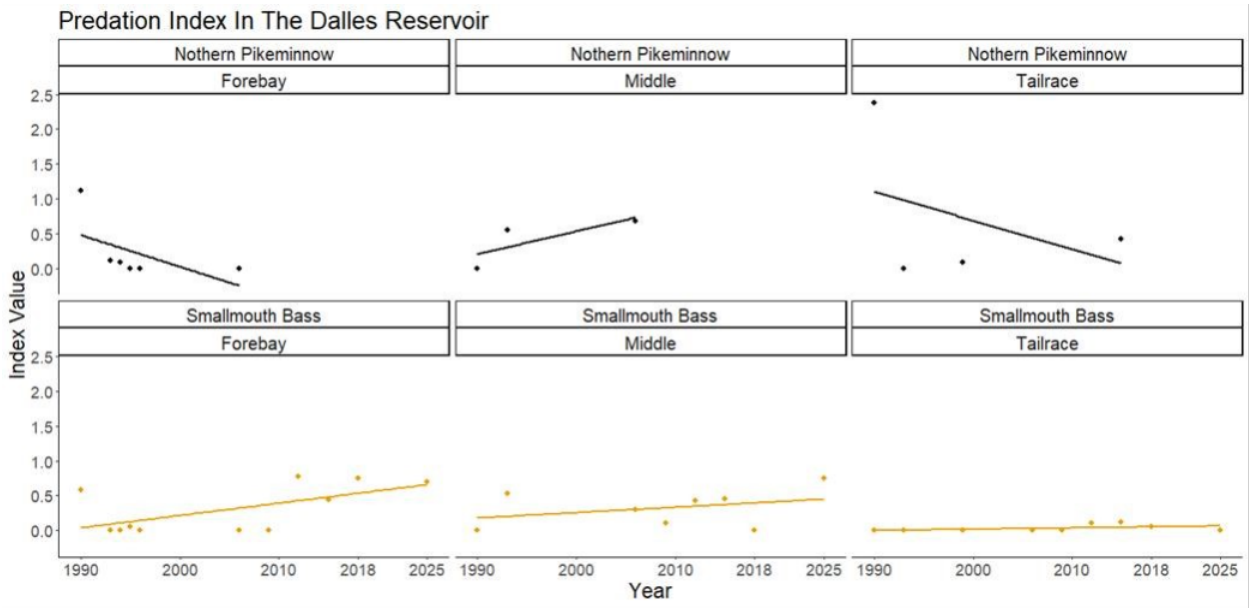

Figure 3.17. Annual spring predation index values for Northern Pikeminnow (≥ 250 mm FL) and Smallmouth Bass (≥ 200 mm FL) captured during biological evaluation in The Dalles Reservoir, 1990-2025. Walleye were not included due to a lack of consumption index model needed to calculate the predation index. Mean and SE were calculated for each location across the time series. Years without data indicate sampling was not conducted or sample sizes were insufficient for analyses.

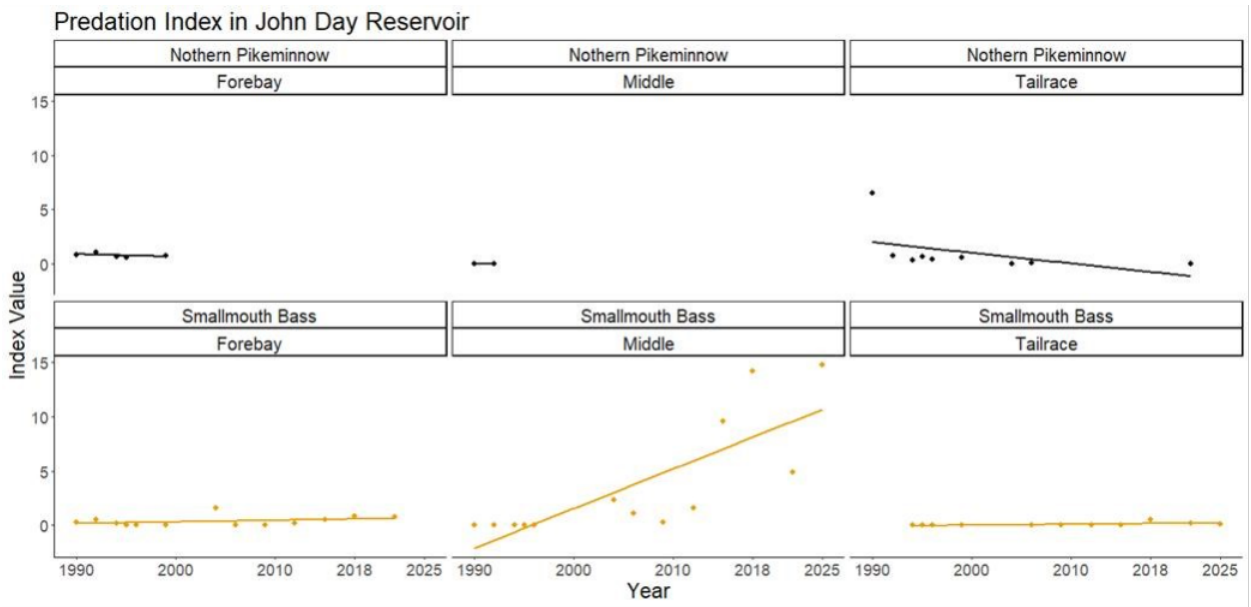

Figure 3.18. Annual spring predation index values for Northern Pikeminnow (≥ 250 mm FL) and Smallmouth Bass (≥ 200 mm FL) captured during biological evaluation in John Day Reservoir, 1990-2025. Walleye were not included due to a lack of consumption index model needed to calculate the predation index. Mean and SE were calculated for each location across the time series. Years without data indicate sampling was not conducted or sample sizes were insufficient for analyses.

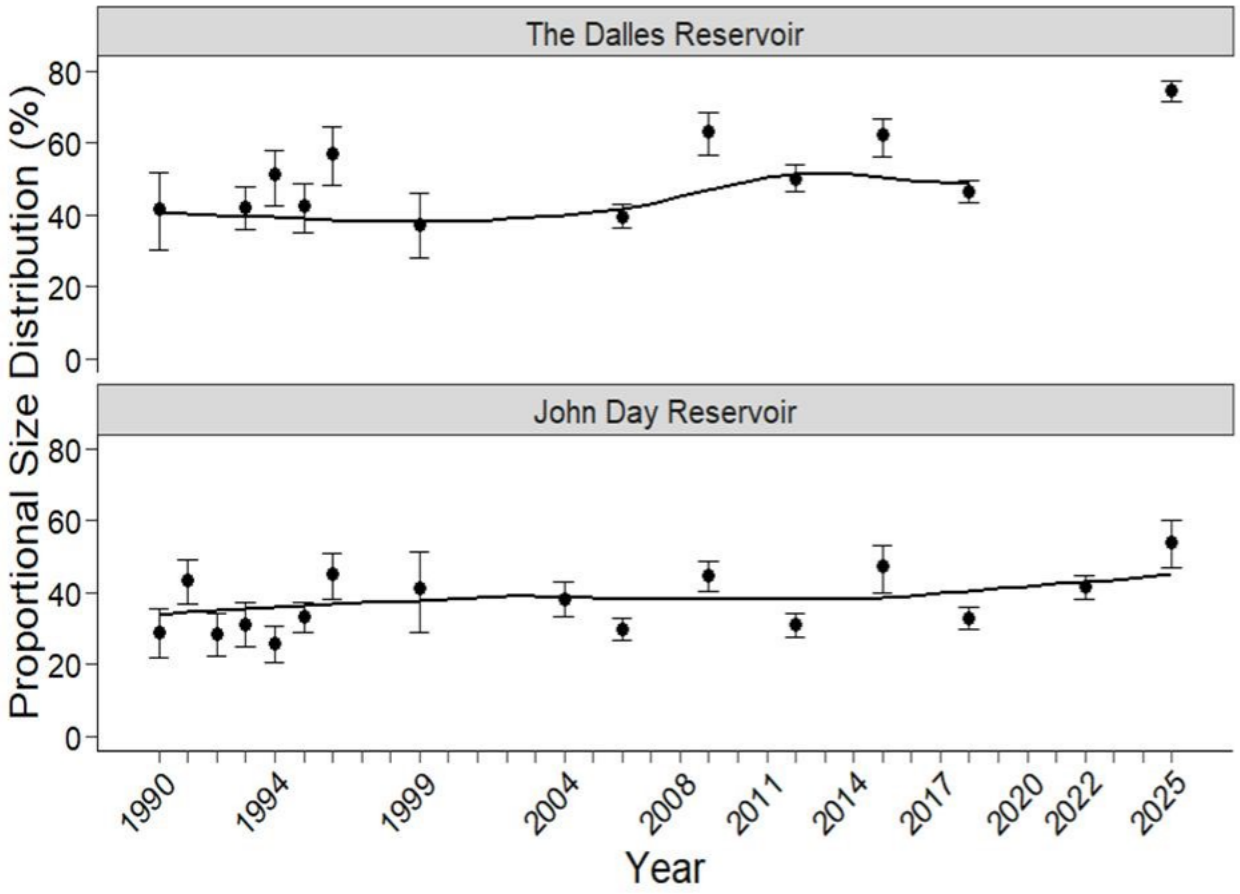

Figure 3.19. Estimates of proportional size distribution (PSD, %) of Smallmouth Bass collected during biological evaluation in The Dalles Reservoir and John Day Reservoir, 1990-2025. Error bars represent 95% bootstrap confidence intervals. Data are fit with LOWESS curves. Due to a 7-year gap in data collection for The Dalles Reservoir, trend analysis did not occur in 2025. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis (ns < 20).

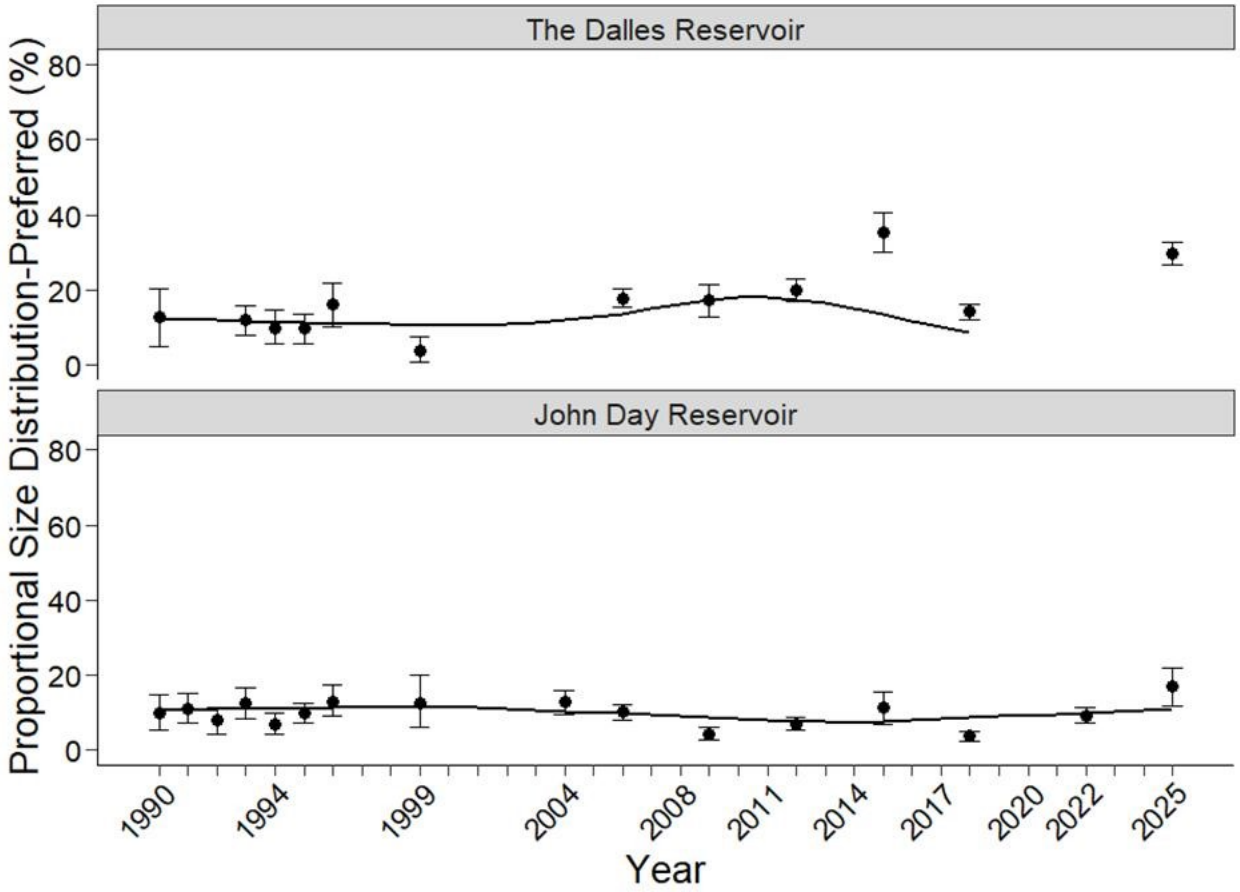

Figure 3.20. Estimates of proportional size distribution of preferred-length (PSD-P, %) Smallmouth Bass collected during biological evaluation in The Dalles Reservoir and John Day Reservoir, 1990-2025. Error bars represent 95% bootstrap confidence intervals. Data are fit with LOWESS curves. Due to a 7-year gap in data collection for The Dalles Reservoir, trend analysis did not occur in 2025. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis (ns < 20).

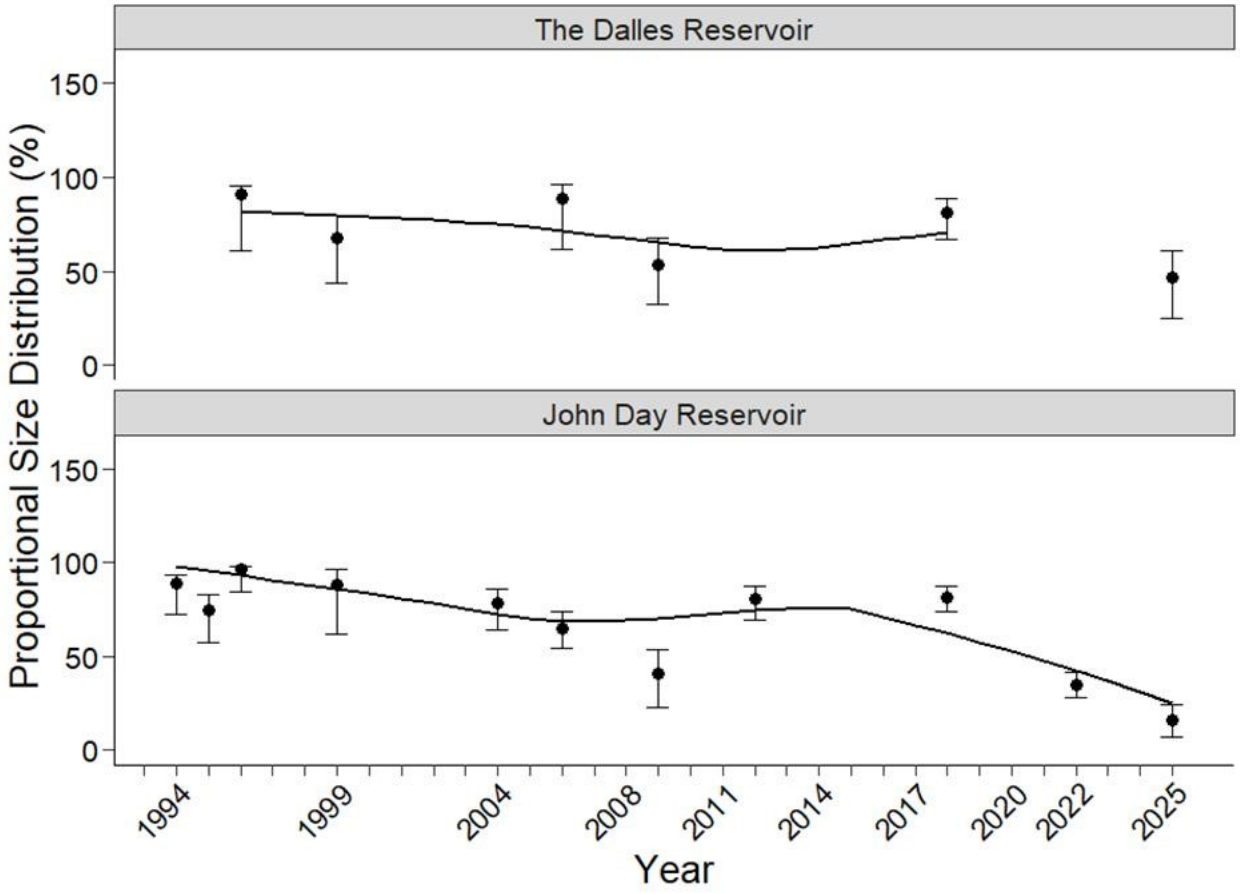

Figure 3.21. Estimates of proportional size distribution (PSD, %) of Walleye collected during biological evaluation in The Dalles Reservoir and John Day Reservoir, 1990-2025. Error bars represent 95% bootstrap confidence intervals. Data are fit with LOWESS curves. Due to a 7-year gap in data collection for The Dalles Reservoir, trend analysis did not occur in 2025. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis (ns < 20).

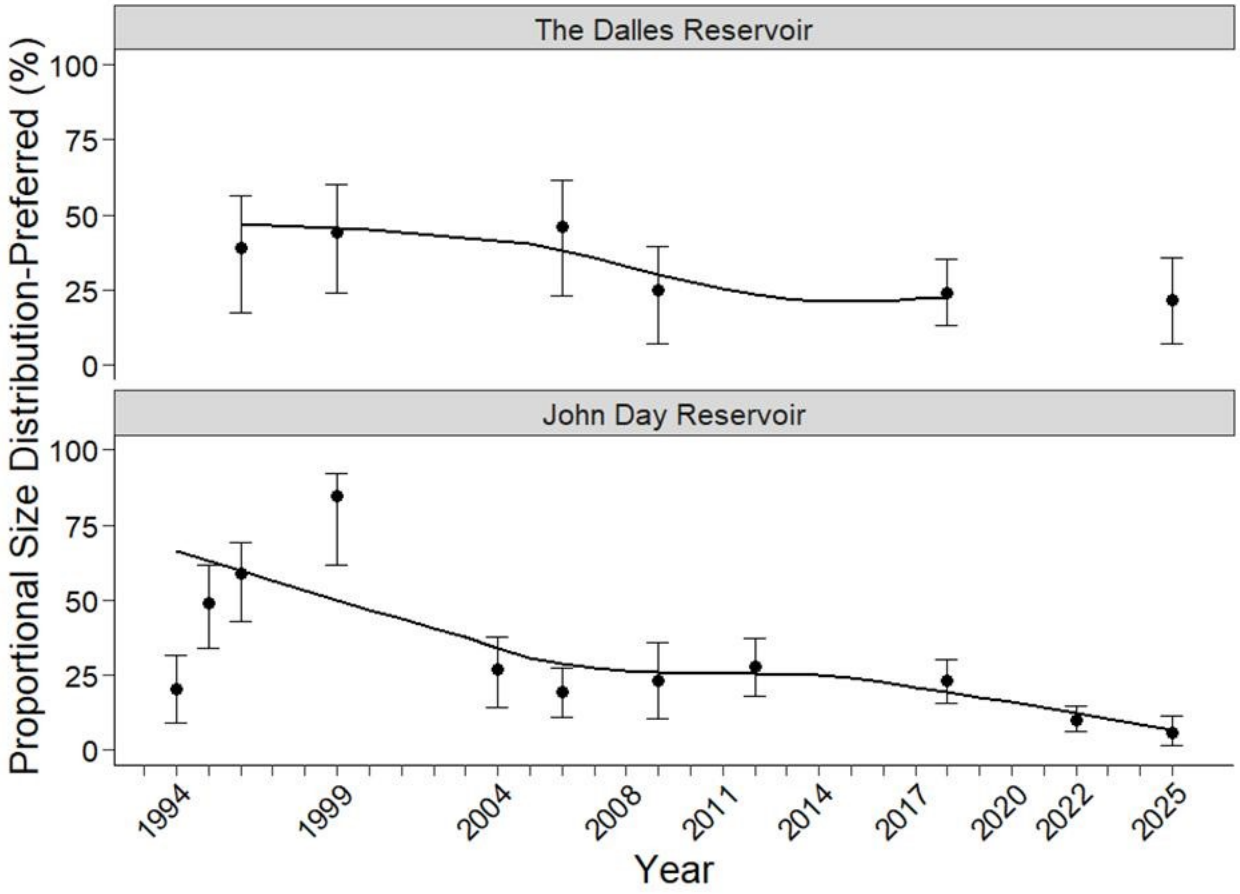

Figure 3.22. Estimates of proportional size distribution of preferred-length (PSD-P, %) Walleye collected during biological evaluation in The Dalles Reservoir and John Day Reservoir, 1990-2025. Error bars represent 95% bootstrap confidence intervals. Data are fit with LOWESS curves. Due to a 7-year gap in data collection for The Dalles Reservoir, trend analysis did not occur in 2025. Years without data indicate sampling was not conducted or sample sizes were insufficient for analysis (ns < 20).

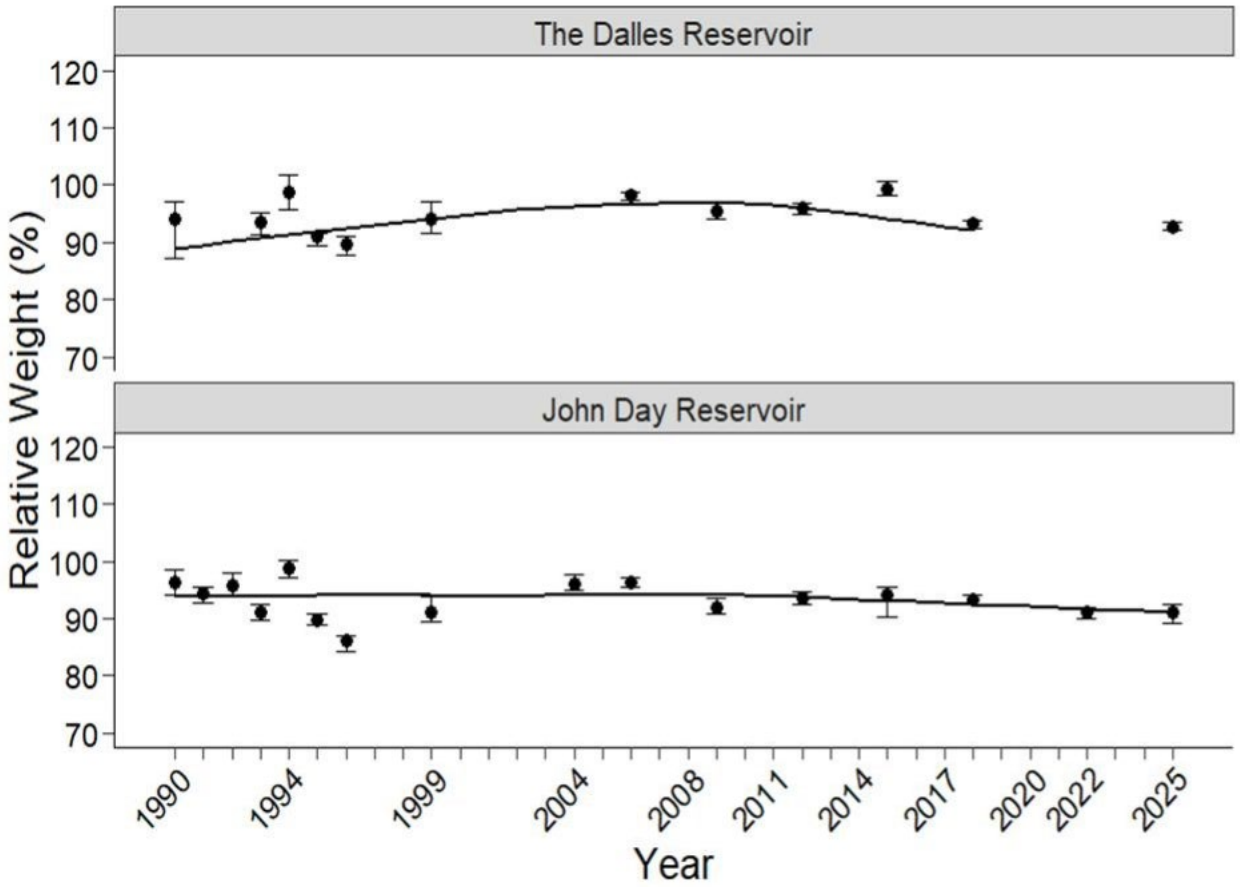

Figure 3.23. Median relative weight (Wr, %) of Smallmouth Bass collected during biological evaluation in The Dalles Reservoir and John Day Reservoir, 1990-2025. Error bars represent 95% bootstrap (percentile) confidence intervals. Data are fit with LOWESS curves. Due to a 7-year gap in data collection for The Dalles Reservoir, trend analysis did not occur in 2025. Results from a Mann-Kendall test of monotonic trend are presented for each time series. Years without data indicate that sampling was not conducted, or sample sizes were insufficient for analyses ($n < 5$).

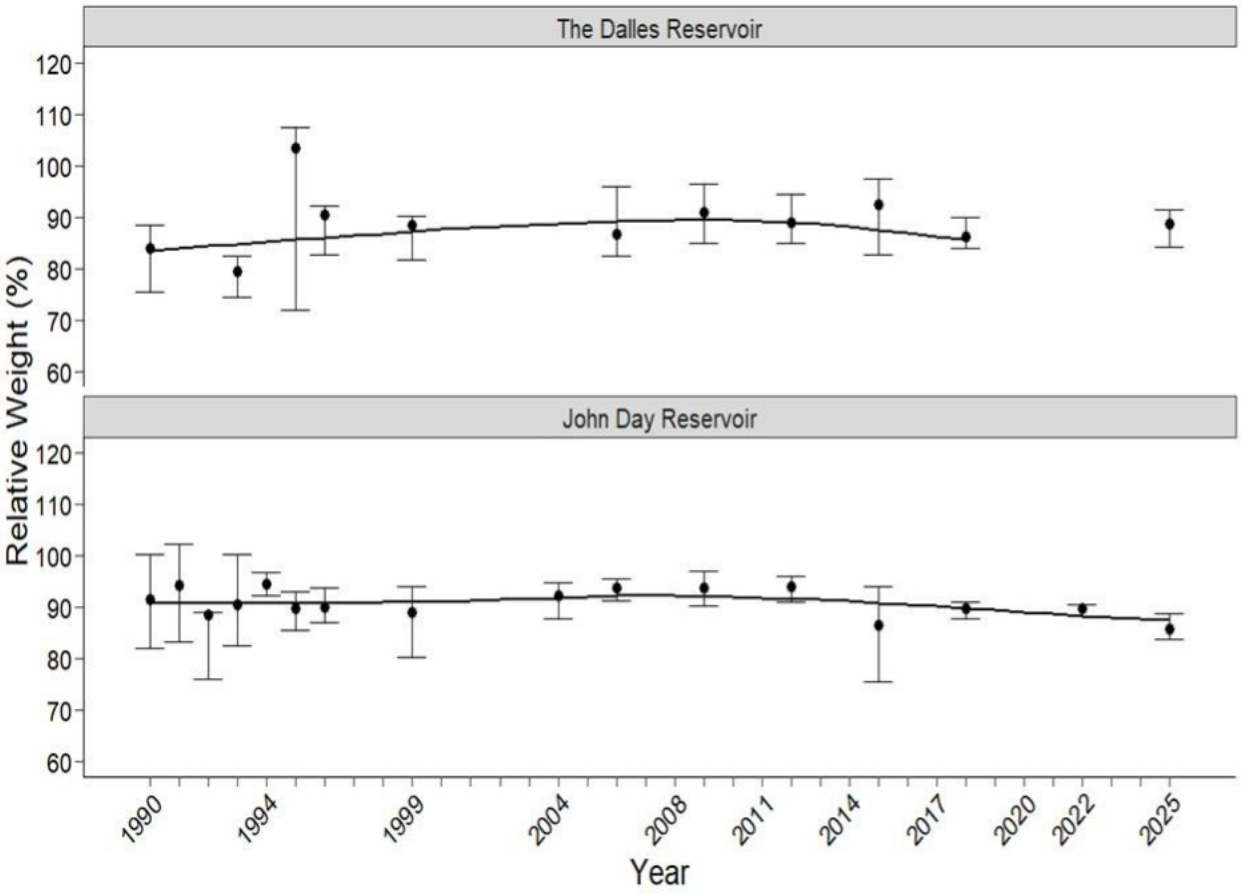

Figure 3.24. Median relative weight (Wr, %) of Walleye collected during biological evaluation in The Dalles Reservoir and John Day Reservoir, 1990–2025. Error bars represent 95% bootstrap (percentile) confidence intervals. Data are fit with LOWESS curves. Results from a Mann-Kendall test of monotonic trend are presented for each time series. Years without data indicate that sampling was not conducted, or sample sizes were insufficient for analyses ($n < 5$).

Section 4: Northern Pikeminnow Dam Angling on the Columbia River

2025 Annual Report

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4.1 ACKNOWLEDGEMENTS

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We appreciate the efforts of Kyle Beckley as the Pikeminnow Dam Angling crew leader, along with Scientific Technician Steve Lines as the primary crew as well as Scientific Technician Benjamin Veysey who also contributed significant time to 2025 dam angling activities.

We also recognize Diana Murillo and Dennis Werlau for their work on Dam Angler data entry and document verification, and Dennis Werlau for producing the Dam Angling Weekly Field Activity Reports throughout the 2025 season.

4.2 ABSTRACT

We are reporting on the 2025 Northern Pikeminnow Dam Angling (DA) component of the Northern Pikeminnow Management Program (NPMP) as implemented by the Washington Department of Fish and Wildlife (WDFW). Angling took place within the boat-restricted tailrace areas of The Dalles and John Day dams during 22 weeks from April 30th through October 10th 2025. The objectives of this project were to (1) implement a recreational-type hook and line fishery harvesting Northern Pikeminnow from within the boat-restricted zones (BRZs), where angling is unavailable to the public at The Dalles and John Day dams, (2) allocate Dam Angler effort between The Dalles and John Day dams based on Dam Angler CPUE in order to maximize harvest of Northern Pikeminnow, (3) collect, compile and report data on Dam Angler harvest, CPUE, gear/techniques and incidental catch for each project, (4) scan, record and report Passive Integrated Transponder (PIT) tag data from all Northern Pikeminnow, Smallmouth Bass, Walleye, and Channel Catfish caught by the Dam Angling crew and record with the presence of any external spaghetti tags, fin-clips, or signs of tag-loss from these fishes for use in coordination with other predation studies, (5) collect relevant biological data on all Northern Pikeminnow and other fishes caught by the 2025 Dam Angling crew.

A Dam Angling crew of 2-4 anglers harvested a combined total of 3,125 Northern Pikeminnow during from The Dalles and John Day dams during the 2025 DA season. Of those, 1,268 Northern Pikeminnow were harvested at The Dalles Dam and 1,857 were harvested at the John Day Dam. The crew fished a total of 1,123.5 hours during the 22 week fishery, averaging 142 fish per week and for a combined overall average catch per angler hour (CPUE) of 2.8 Northern Pikeminnow. At The Dalles Dam, the crew averaged 3.3 fish per angler hour, and cumulatively 20 Northern Pikeminnow per day. At the John Day Dam, the crew averaged 2.5 fish per angler hour with a cumulative crew total of 27 fish per day.

Based on the previous success of the WDFW Dam Angling Crew in implementing the Dam Angling component of the NPMP from 2010-2024, the 2025 crew continued to primarily use back-bouncing soft plastic lures with rod and reel as the primary angling method for harvesting Northern Pikeminnow from the turbine decks of The Dalles and John Day dams. Incidental species most frequently caught by the Dam Angling crew in 2025 were Smallmouth Bass *Micropterus dolomieue* and Walleye *Sander vitreus*.

4.3 INTRODUCTION

Mortality of juvenile salmonids *Oncorhynchus spp*. migrating through the Columbia River system is a major concern of the Columbia Basin Fish and Wildlife Program, and predation is an important component of mortality (Northwest Power Planning Council 1987a). Northern Pikeminnow *Ptychocheilus oregonensis*, formerly known as northern squawfish (Nelson et al. 1998), are the primary piscine predator of juvenile salmonids in the Lower Columbia and Snake River Systems (Rieman et al. 1991). Rieman and Beamesderfer (1990) predicted that predation on juvenile salmonids could be reduced by up to 50% with a sustained exploitation rate of 10-20% on Northern Pikeminnow > 275 mm FL (11 inches total length). The Northern Pikeminnow Management Program (NPMP) was created in 1990, with the goal of implementing fisheries to achieve the recommended 10-20% annual exploitation on Northern Pikeminnow >275 mm FL within the program area (Vigg and Burley 1989). The primary component of the NPMP is the Northern Pikeminnow Sport-Reward Fishery (NPSRF) implemented by the Washington Department of Fish and Wildlife (WDFW) (Burley et al. 1992). Beginning in 2010, WDFW was also contracted to conduct the Dam Angling component of the NPMP (Hone et al. 2011) and 2025 marked the 16th consecutive year WDFW has implemented this component. The Dam Angling component of the NPMP utilized a 2-4 person crew of experienced anglers using recreational-type hook and line angling techniques to harvest Northern Pikeminnow from within the boat-restricted zones (BRZ's) below The Dalles and John Day dams on the Columbia River in 2025.

The objectives of the 2025 Dam Angling component of the NPMP were to (1) implement a recreational-type hook and line fishery targeting Northern Pikeminnow and also harvesting other incidentally caught non-native predator fishes from within the boat restricted zones (BRZs), where predation on juvenile salmonids is actively occurring and angling is unavailable to the public at The Dalles and John Day dams, (2) allocate Dam Angler effort between The Dalles and John Day dams based on Dam Angler CPUE in order to maximize harvest of predatory Northern Pikeminnow, (3) collect, compile and report data on angler harvest, CPUE, gear/techniques and incidental catch for each project, (4) scan, record and report Passive Integrated Transponder (PIT) tag data from all Northern Pikeminnow, Smallmouth Bass, Walleye and Channel Catfish (or juvenile lamprey regurgitated by NPM) caught by the Dam Angling crew and record the presence of any external spaghetti or Floy tags, fin-clips or signs of tag-loss from these fishes for use in coordination with other predation studies, and (5) collect relevant biological data on all Northern Pikeminnow and other fishes caught by the 2025 Dam Angling crew.

4.4 METHODS

4.4.1. Project Area

In 2025, as a continuing supplemental component to the NPMP, Northern Pikeminnow hook-and-line removal activities were conducted at The Dalles and John Day Dams on the Columbia River utilizing Dam Angling crews (Figure 4.1). Dam Angling activities in 2025 were planned to occur during an approximately five-month season scheduled to run from May through September. All angling activities at both The Dalles, and John Day Dams were conducted within the tailrace BRZs where no public angling is permitted. For The Dalles Dam, the Dam Angling crew fished primarily along the turbine deck (Figure 4.2), and at the John Day Dam, the crew fished exclusively along the turbine deck (Figure 4.3).

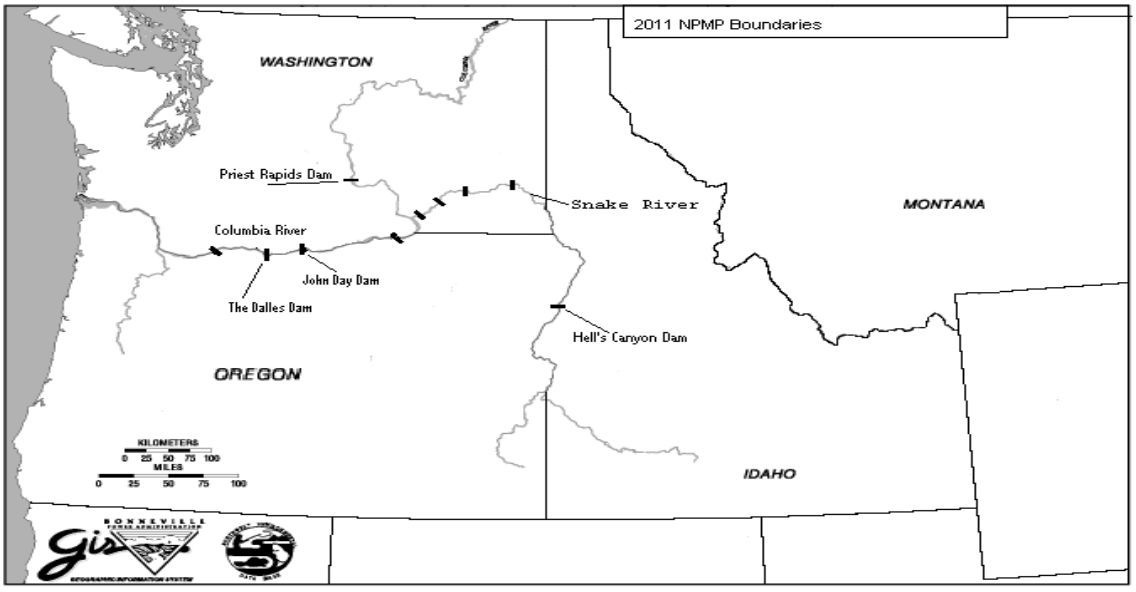

Figure 4.1. Northern Pikeminnow Management Program boundaries, including 2025 Dam Angling sites.

Figure 4.2. Angling locations for 2025 Dam Angling at The Dalles Dam

Figure 4.3. Angling locations for 2025 Dam Angling at the John Day Dam

4.4.2. The Dam Angling Season

In order to achieve the primary project objective of maximizing harvest of predatory Northern Pikeminnow in 2025, the WDFW Dam Angling crew used WDFW's Dam Angling Strategy (DAS) established in 2011 (Dunlap et al. 2012), which implemented and maintained full scale angling activities when CPUE was > 2.0 fish/angler hour, and reduced scale of angling activities when CPUE fell below 2.0 fish/angler hour.

4.4.3. The Dam Angling Crew

The 2-4 member Dam Angling crew generally worked four ten hour days a week, (usually Tuesday-Friday) during the 2025 season (Figure 4.4). Angling start times in the morning varied from approximately 4:30 am to 6:00 am at The Dalles Dam and from 5:00 am to 6:00 am at the John Day Dam. Evening start times ranged from 6:00 pm to 1:00 am. A crew leader was present each day to oversee Dam Angler safety and coordinate crew activities, to collect, record and compile data on Northern Pikeminnow harvest, other fish species caught and ensure that all NPMP project protocols and Corps of Engineers (USACE) rules were adhered to.

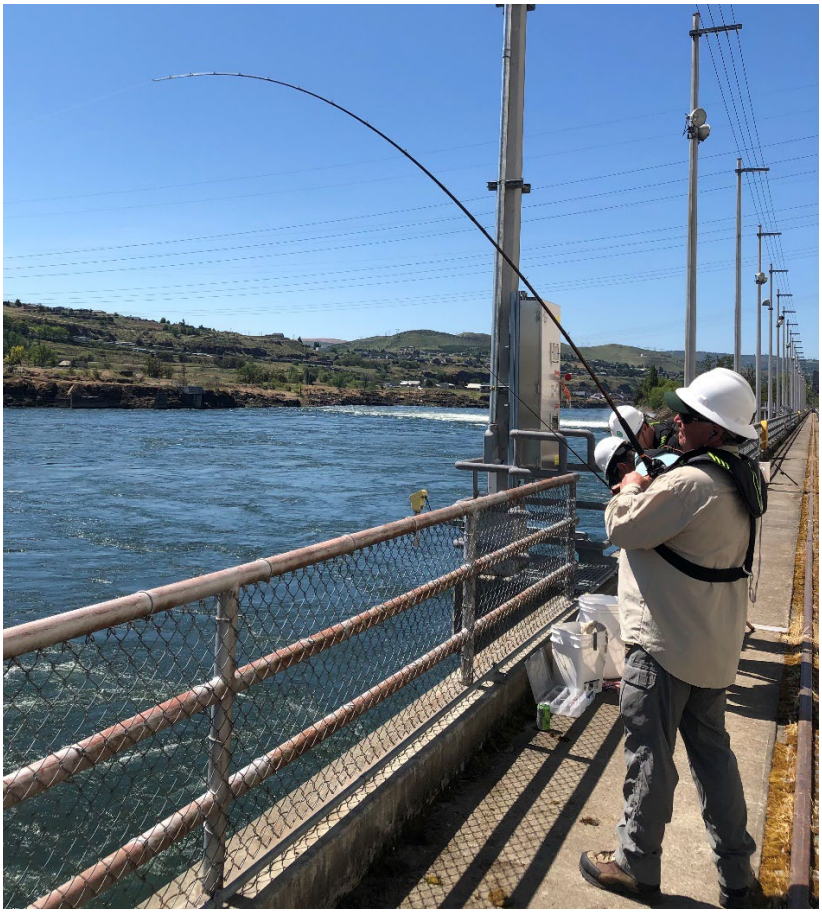

Figure 4.4. The Dam Angling Crew at John Day Dam

4.4.4 Angling Gear

Dam Anglers used Berkley Air IM8 Graphite 10’6” (2-8 oz. extra heavy casting) rods equipped with either Daiwa Lexa-HD 400 or Shimano TranX 300 series reels. Each reel was spooled with

either 15# or 20# test braided main line (Power Pro), tied to a size 7 barrel swivel and a 24”-30” monofilament leader of 15-20# Maxima (Figure 4.5). Cannonball sinkers were attached to the swivel using a 4-6” dropper line of 12# monofilament leader. Cannonball weights varied from 2-6 ounces depending on river flow. Terminal gear consisted primarily of assorted soft plastic lures rigged with two octopus style hooks (size 1 to 1/0 Gamakatsu hooks) spaced at 1 1/8” apart (Figure 4.6). Hook size varied in order to match the size of the soft plastic lure. Soft plastic lures used were in the 2-5” size range and included tubes, flukes, grubs and sassy shad.

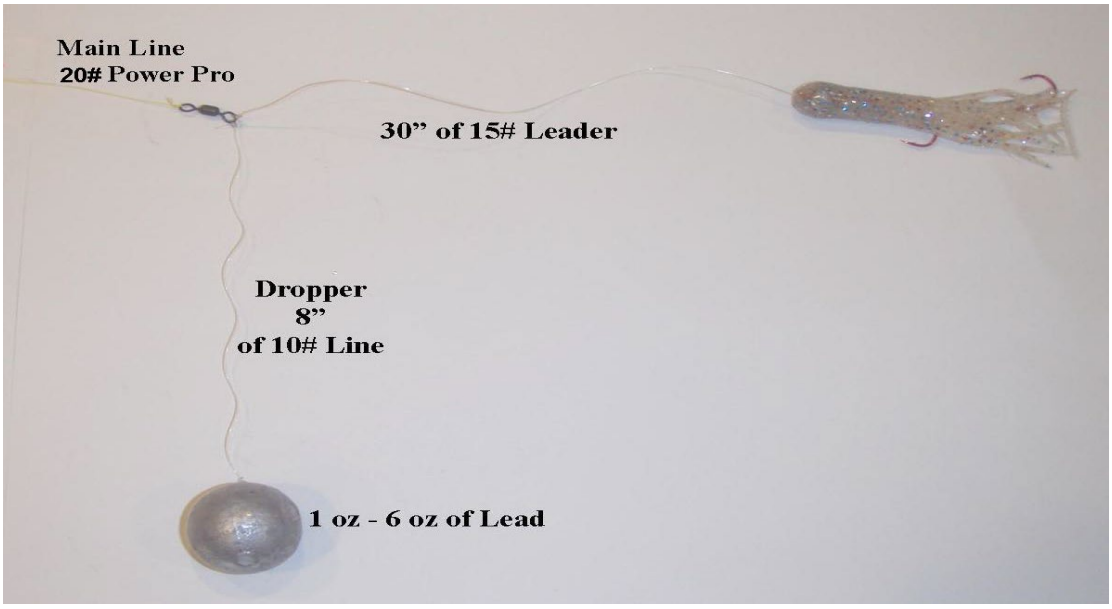

Figure 4.5. Example of typical rigging used by 2025 NPMP Dam Anglers

Figure 4.6. Examples of soft plastic tube lures used by 2025 NPMP Dam Angling Crew.

4.4.5. Data Collection

Creel data were recorded onto data sheets for each individual angler and for each angling day. Angler data sheets were then combined and summarized into daily crew totals, which were then combined into weekly crew totals submitted for each of the two dams. Collected data included total angling hours of effort per angler, Northern Pikeminnow harvest per angler, incidental catch per angler, location and hour of all caught fishes by angler, as well as specific lures used (and number of fish caught with each color/type lure by angler. Weekly catch and harvest totals (by project) for Dam Anglers were submitted to PSMFC using a Weekly Field Activity Report (WFAR) as is done for the NPSRF.

4.4.6. Biological Sampling

Fork lengths (FL) of all Northern Pikeminnow harvested by the Dam Angling crew were recorded on biological data sheets provided by the NPSRF. Technicians also examined all Northern Pikeminnow for the presence of external tags (Spaghetti, Floy, etc.), fin-clip marks, and signs of tag-loss. Complete biological data were collected from all externally tagged Northern Pikeminnow including FL, tag number, sex (determined by evisceration), and scale samples if specified.

Spaghetti or Floy tagged Northern Pikeminnow carcasses were then labeled and preserved for later data verification and/or tag recovery. External tags from harvested Northern Pikeminnow along with biological data were recorded on NPSRF tag envelopes and all tag data were submitted to WDFW Tag Lead Biologist for processing. Processed tag recovery data were then provided to ODFW for utilization in NPMP exploitation estimates. Northern Pikeminnow carcasses were separated and saved for additional ODFW biological sampling as needed.

4.4.7. PIT Tag Detection

All Northern Pikeminnow collected by Dam Anglers during 2025 were also scanned for Passive Integrated Transponder (PIT) tags. PIT tags have been used by ODFW as a secondary mark in all Northern Pikeminnow fitted with external Spaghetti or Floy type tags (beginning in 2003) as part of the NPMP's biological evaluation activities (Takata and Koloszar 2004), and as a primary mark beginning in 2022. Northern Pikeminnow harvested by anglers participating in the NPSRF have also been found to ingest juvenile salmonids which have been PIT tagged by other studies within the basin (Glaser et al. 2001). Dam Angling technicians were required to scan 100% of all harvested Northern Pikeminnow for PIT tags using Biomark portable transceivers (model #HPR.PLUS.04V1). Technicians also scanned all incidental catches of Walleye, Smallmouth Bass and Channel Catfish for PIT tags from ingested juvenile salmonids. In addition, any juvenile lamprey known to come from these fish were also scanned for PIT tags. Scanning began on the first day of dam angling and continued throughout the duration of dam angling activities. Technicians individually scanned all Northern Pikeminnow for PIT tag presence, and complete biological data were recorded from all Northern Pikeminnow with positive readings. All Northern Pikeminnow with PIT tags were labeled and preserved for later dissection and tag recovery. All PIT tag data were verified after recovery of PIT tags by WDFW Tag Lead Biologist, entered into the PIT Tag Information System (PTAGIS) and provided to ODFW as required.

4.4.8. Northern Pikeminnow Processing

During biological sampling, all Northern Pikeminnow were caudal clipped as an anti-fraud measure to reduce the possibility of previously processed Northern Pikeminnow being submitted to the Sport-Reward Fishery for payment. Sampled Northern Pikeminnow were iced and transported to cold storage facilities from which they were ultimately delivered to rendering facilities for final disposal.

4.5 RESULTS AND DISCUSSION

4.5.1. Combined The Dalles / John Day Dam Results

4.5.1.a. 2025 Dam Angling Season

The 2025 Dam Angling Season took place from April 30th through October 9th. Total harvest for The Dalles and John Day dams combined was 3,125 Northern Pikeminnow in 2025 compared to 3,413 in 2024 (Hone et al. 2025). There were 1,123.5 angling hours spent conducting Dam angling in 2025 with a combined angler CPUE of 2.8 fish per angler hour. Peak weekly harvest occurred in week 25 (Figure 4.7). The Dam Angling crew first achieved the 2.0 CPUE goal per DAS

protocol (Dunlap et al. 2012) in week 22 during the 2025 season and maintained that CPUE level through week 30 (Figure 4.8). Weeks when CPUE was below the 2.0 fish/angler hour goal were typically due to deployment of limited crews (< 50% effort) for "prospecting" purposes to locate and/or determine if catchable numbers of fish were present and/or available in order to schedule additional angling effort.

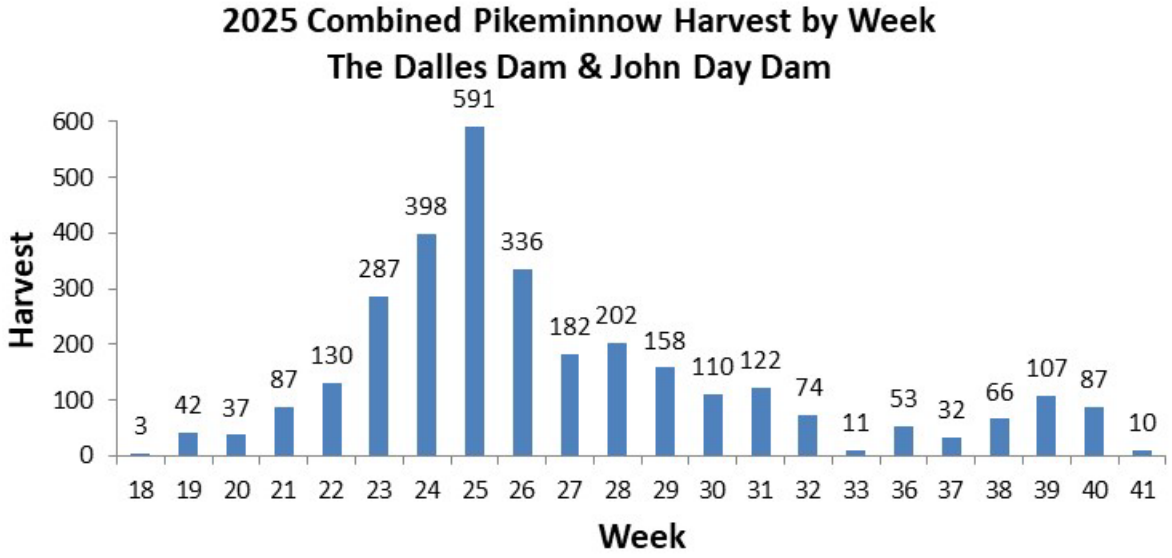

Figure 4.7. 2025 Weekly harvest of The Dalles (TD) and John Day (JD) Dams combined

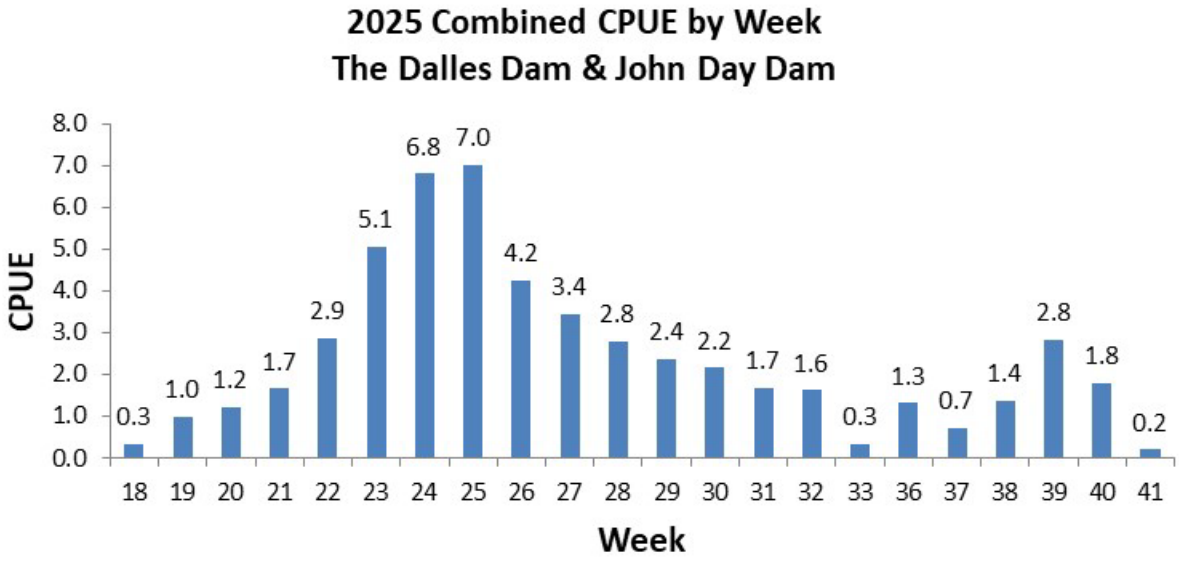

Figure 4.8. 2025 Combined Weekly CPUE (fish/angler hour) for The Dalles (TD) and John Day (JD) Dams.

4.5.1.b. Angling Gear and Technique

The 2025 Dam Angling crew primarily targeted fishing areas and fishing times at each dam that had been productive in past years. This consisted primarily of fishing from the turbine deck during early morning and evening hours. Our top producing lure in 2025 was the 2.5" Gitzit tube (a soft plastic lure) in Smoke/Black Copper Glitter color.

4.5.1.c. Incidental Catch

The Dam Angling crew incidentally caught the fish species listed in Table 4.1 while targeting Northern Pikeminnow at The Dalles and John Day dams in 2025. Data from all incidentally caught fish were recorded and all incidentally caught fish other than Smallmouth Bass, Walleye, and Channel Catfish were released in 2025. All Smallmouth Bass, Walleye and Channel Catfish were harvested and removed according to the WDFW Non-native Predator Policy approved by the Washington Fish and Wildlife Commission (wdfw.wa.gov). Incidental species most often caught in 2025 were Walleye *Sander vitreus* and Smallmouth Bass *Micropterus dolomieue*. The Dam Angling crew also observed numbers of juvenile lamprey *Entosphenus spp*. and/or *Lampetra spp.* regurgitated by Northern Pikeminnow, Smallmouth Bass and Walleye caught at The Dalles Dam and John Day Dam during May and June 2025 (Figure 4.9).

Figure 4.9. Juvenile lamprey regurgitated by Northern Pikeminnow

Table 4.1. 2025 WDFW Dam Angler incidental catch by project

Incidental Catch

Species	The Dalles Dam	John Day Dam
Smallmouth Bass	234	594
Walleye	44	426
Sculpin	4	7
American Shad	16	38
Channel Catfish	0	8
Sucker	0	2
White Sturgeon	0	1

4.5.2. The Dalles Dam

4.5.2.a. Harvest

The Dam Angling crew harvested 1,268 Northern Pikeminnow in 22 weeks of Dam Angling at The Dalles Dam in 2025. Weekly harvest for the Dam Angling crew averaged 58 fish per week during the 2025 season (Figure 4.10).

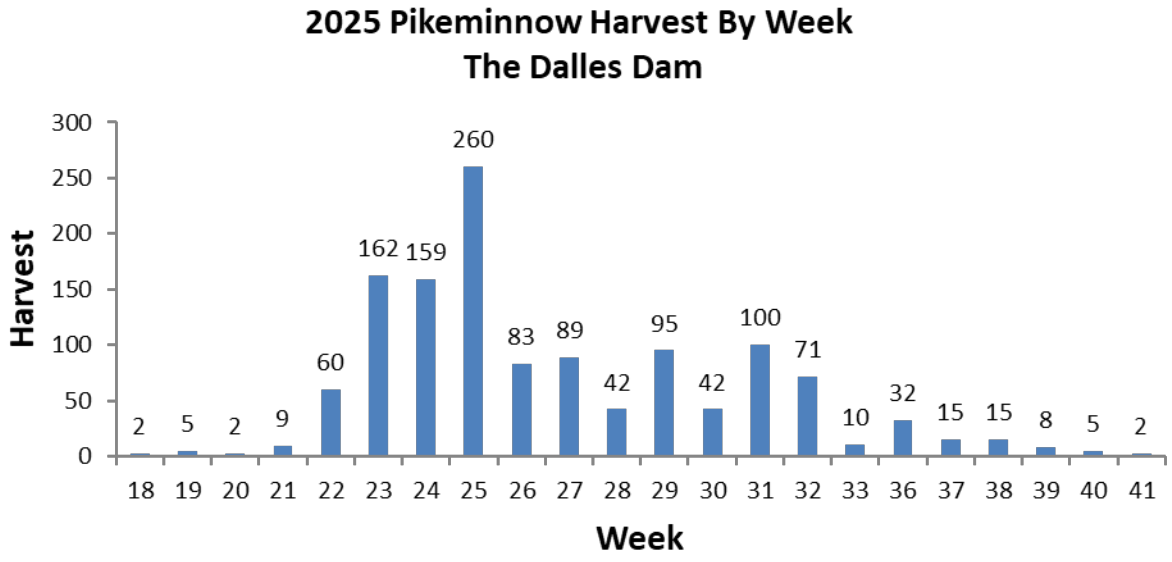

Figure 4.10. 2025 Weekly Dam Angler harvest of Northern Pikeminnow at The Dalles Dam

4.5.2.b. Effort

The Dam Angling crew fished 62 days at The Dalles Dam over 22 weeks in 2025, expending 381.3 angler hours of effort in 2025. This equaled 34% of the combined effort total for Dam Angling at both projects in 2025.

4.5.2.c. CPUE

The Dam Angling crew harvested 1,268 Northern Pikeminnow in 381.3 angler hours at The Dalles Dam in 2025 for an overall average CPUE of 3.3 fish/angler hour (Figure 4.11). Peak weekly CPUE at The Dalles Dam occurred during week 25.

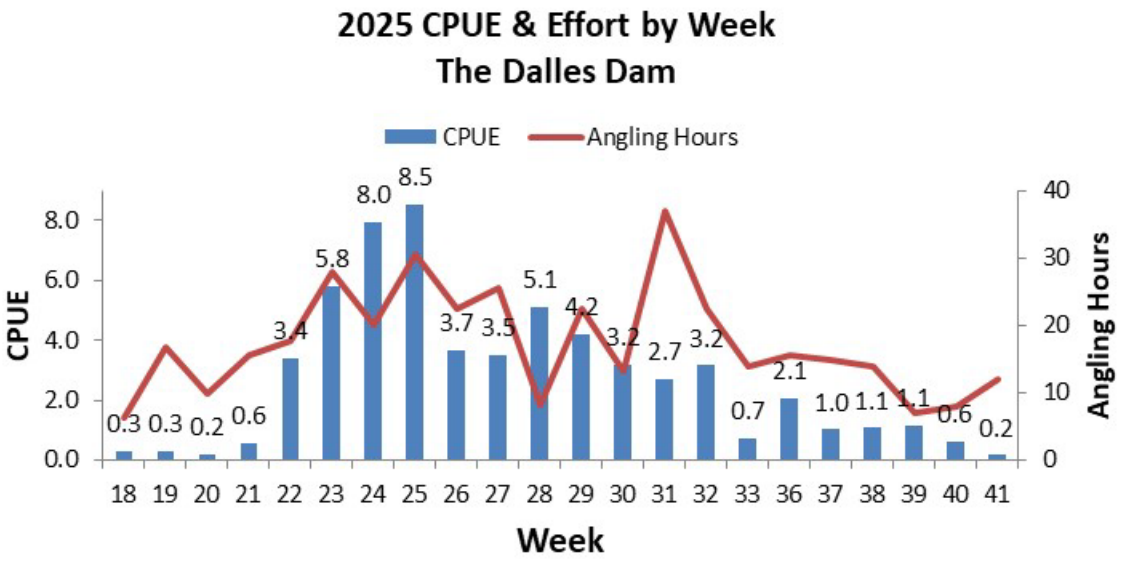

Figure 4.11. 2025 Weekly Dam Angler CPUE and Effort at The Dalles Dam

4.5.2.d. Fork Length Data

Fork lengths were recorded from 1,266 (99%) Northern Pikeminnow harvested by the Dam Angling crew at The Dalles Dam during the 2025 Season. The length frequency distribution of Northern Pikeminnow harvested at The Dalles Dam in 2025 is presented in Figure 4.12. Mean fork length for Northern Pikeminnow caught at The Dalles Dam in 2025 was 353 mm. By comparison, mean fork length for Northern Pikeminnow from the John Day Dam was 378 mm and mean fork length for the 2025 NPSRF was 275 mm (Dunlap et al. 2026).

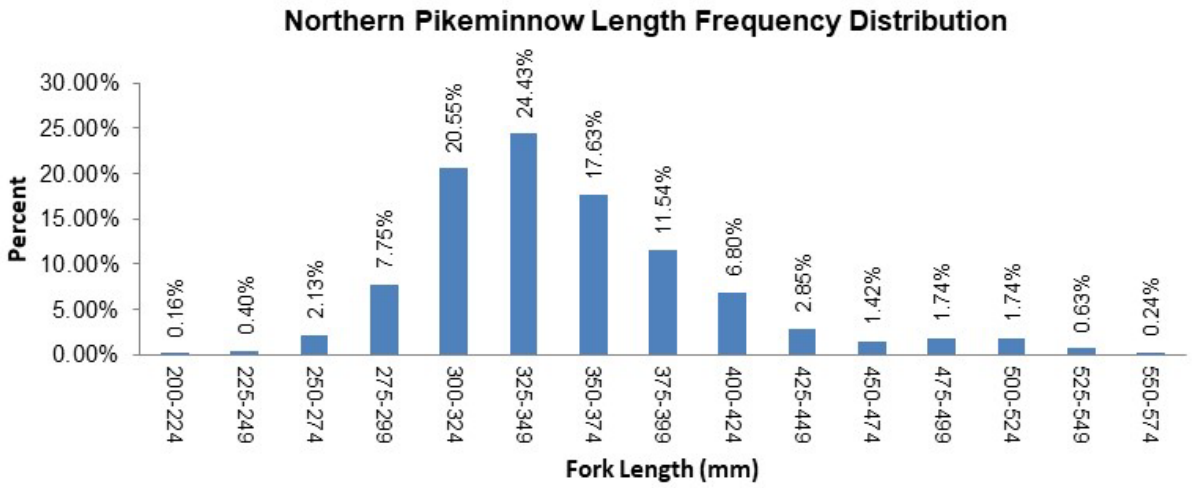

Figure 4.12. Northern Pikeminnow length frequency distribution at The Dalles Dam in 2025

4.5.3. John Day Dam

4.5.3.a. Harvest

The Dam Angling crew harvested 1,857 Northern Pikeminnow over 22 weeks at the John Day Dam in 2025, with peak weekly harvest occurring in week 25 (Figure 4.13).

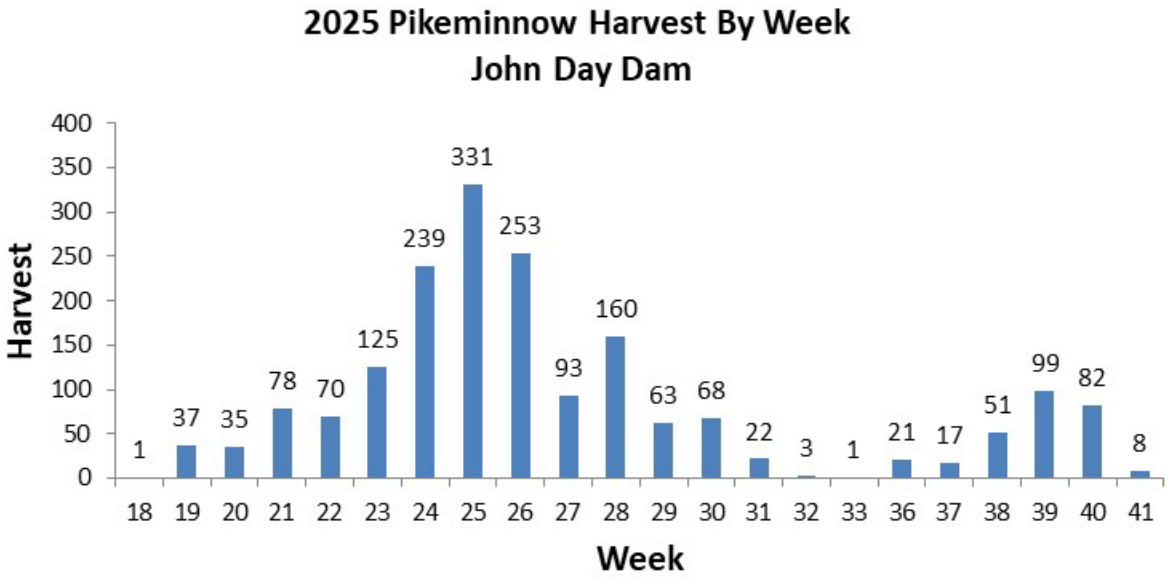

Figure 4.13. 2025 Weekly Dam Angler harvest of Northern Pikeminnow at the John Day Dam

4.5.3.b. Effort

The Dam Angling crew fished 70 days at John Day Dam over 22 weeks in 2025, expending 742.3 angler hours of effort. This equaled 66% of total combined Dam Angling effort for both projects in 2025.

4.5.3.c. CPUE

The Dam Angling crew harvested 1,857 Northern Pikeminnow in 742.3 angler hours at the John Day Dam in 2025 for an overall average CPUE of 2.5 fish/angler hour (compared to 3.3 at The Dalles Dam). Peak weekly CPUE at the John Day Dam occurred during weeks 24 & 25 (Figure 4.14).

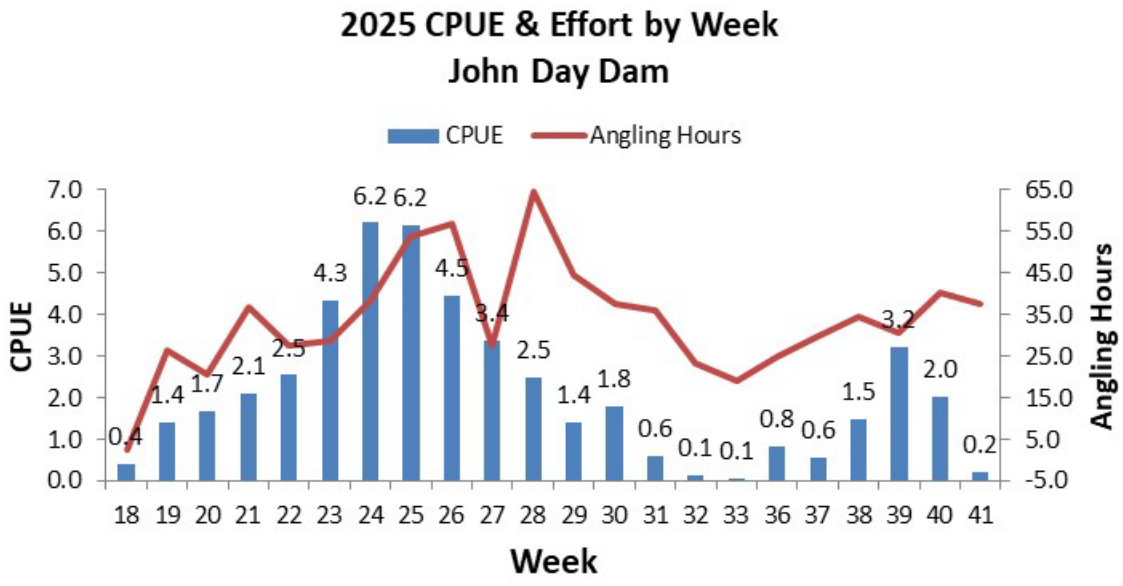

Figure 4.14. 2025 Weekly Dam Angling CPUE at John Day Dam

4.5.3.d. Fork Length Data

Fork lengths were recorded from 1,850 (99%) Northern Pikeminnow harvested by the Dam Angling crew at the John Day Dam during the 2025 Season. The length frequency distribution of harvested Northern Pikeminnow from the John Day Dam in 2025 is presented in (Figure 4.15). Mean fork length for Northern Pikeminnow from the John Day Dam in 2025 was 378 mm compared to 353 mm at The Dalles Dam, and 275 mm for the 2025 NPSRF (Dunlap et al. 2026).

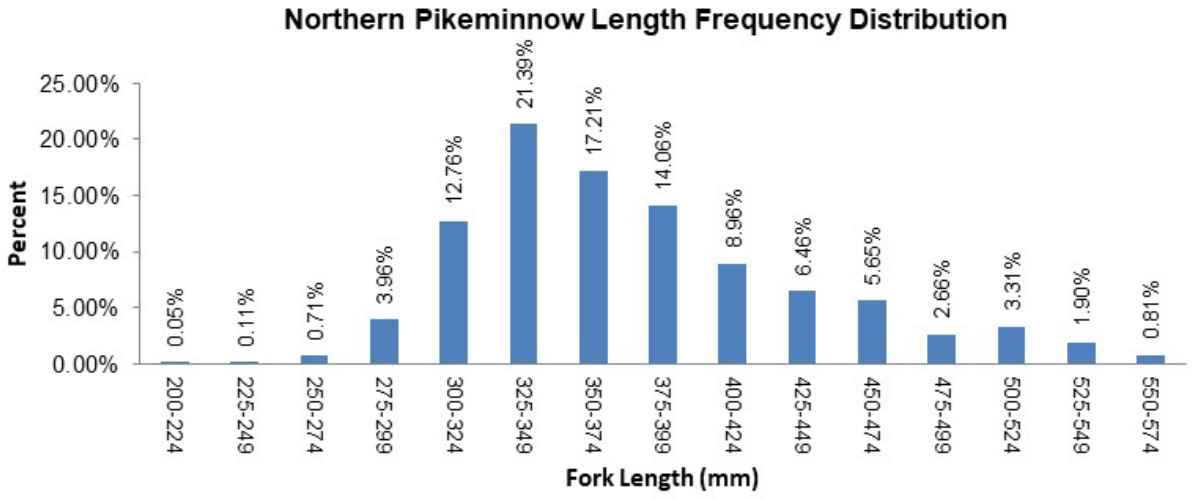

Figure 4.15. Northern Pikeminnow length frequency distribution at the John Day Dam in 2025

4.6 SUMMARY

Combined 2025 DA harvest was 3,125 NPM compared to 3,413 in 2024. During the core harvest period of late May-July 2025 (weeks 22-30), Dam Angling combined CPUE remained above the 2.0 CPUE goal and overall Dam Angler CPUE for the season was 2.8 fish/angler hour.

Mean Fork lengths for Northern Pikeminnow harvested by the 2025 Dam Angling crew at The Dalles and John Day dams were considerably larger than the mean fork length for harvested NPSRF. Mean fork length was 353 mm at The Dalles Dam and 378 mm at the John Day Dam, compared to 275 mm from the 2025 NPSRF.

While targeting Northern Pikeminnow, the 2025 Dam Angling crew incidentally harvested and removed a combined total of 828 Smallmouth Bass, 470 Walleye, and 8 Channel Catfish. The Dam Angling crew also caught and released 54 American Shad, 11 Sculpin, 2 Suckers and 1 White Sturgeon between the two projects.

4.7 RECOMMENDATIONS FOR 2025

1.) Maintain the Dam Angling component of the NPMP to remove predatory Northern Pikeminnow from the Boat Restricted Zones in the tailrace areas of The Dalles and John Day dams where predation on juvenile salmonids is actively occurring and NPSRF participants are not allowed.

2.) Continue to investigate, locate, and further develop Northern Pikeminnow angling techniques and areas in 2026 in order to identify additional harvest and exploitation opportunities of NPM in areas not currently fished or available.

3.) Continue to have the Dam Angling crew retain, collect data, and harvest/remove incidentally caught Smallmouth Bass, Walleye, and Channel Catfish according to WDFW's Non-Native Predator Policy.

4.) Plan for 2026 Dam Angling activities to occur during the standard May-September Dam Angling season with a focus on maximizing Dam Angler effort during peak CPUE weeks.

5.) Continue to utilize the 2.0 CPUE goal (DAS) to allocate Dam Angler effort between projects in order to maximize angler harvest of Northern Pikeminnow.

6.) Continue to use HPR PIT tag scanners for scanning other incidentally caught predator fishes for PIT tags and improve data collection in the areas of enumerating juvenile lamprey encountered in fish caught by Dam Anglers in 2026.

7.) Continue to investigate conducting Pikeminnow Dam Angling at other Columbia and Snake River dams as funding and resources allow, or during non-peak times at TD and JD dams. Offer Dam Angler assistance to other research projects wishing to obtain Northern Pikeminnow and other fishes from BRZ areas to determine project feasibility and/or as a possible step to adding additional dams to the DA project.

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5. Appendix A: Coded Wire Tag Detections

5.1 INTRODUCTION

Juvenile salmonids have been coded wire tagged (CWT) for decades by numerous agencies (Nandor et al. 2010). The recovery of these CWTs in piscine predator digestive tracts may provide an additional source of stock information from predated juvenile salmonids in the Columbia River Basin and may provide a mechanism to enhance estimates of predation to juvenile salmonids. During the 2024 field season we tested the ability to retrieve ingested CWTs from diet samples of known piscine predators and investigated the potential insight on predation of juvenile salmonids. If we were able to retrieve CWTs from our collected samples, we may then be able to obtain additional information about the impacts of piscine predation on juvenile salmonids.

5.2 METHODS

Contents of diets from Northern Pikeminnow (*Ptychocheilus oregonensis*), Smallmouth Bass (*Micropterus dolomieu*), and Walleye (*Sander vitreu*s) collected during biological evaluation field activities and the Dam Angling Fishery were examined to quantify relative consumption of juvenile salmonids. All samples were scanned with Northwestern Marine Technologies CWT T-wand and V-board to detect metallic materials. Frozen field samples that contained metal were thawed in the laboratory then a pencil magnet was used to retrieve CWT(s) in the sample. If no CWT was found, the contents of each sample bag were then poured into a 3-tier sieve stack consisting of a 425 µm, 230 µm, and a final solid catch pan and rinsed through with water. The pencil magnet was again used on each sieve to collect any CWTs that may have been missed initially. CWT codes were then recorded in a database and the Regional Mark Information System (RMIS) was queried to acquire stock information (e.g., species, rearing location, and location and date of release).

5.3 RESULTS

In the spring of 2024, ODFW collected 726 stomach contents from Smallmouth Bass (n=443), Walleye (n=54) and Northern Pikeminnow (n=207) during our biological evaluation in Bonneville Reservoir and Below Bonneville Dam. During the Dam Angling Fishery, we collected 708 stomach contents from Smallmouth Bass (n=139), Walleye (n=59) and Northern Pikeminnow (n=510). Using our updated methods, we were able to successfully detect and obtain 16 CWTs from Northern Pikeminnow (n=13, 11 from DAF and 2 from Biological Monitoring) and Smallmouth Bass (n=3 all from DAF) through our laboratory process (Table 1). No CWTs were recovered from Walleye.

5.4 DISCUSSION

In 2023, we were able to develop field and lab protocols to capture CWTs in piscine predator digestive tracts. Those data were summarized and presented at a scientific conference (Chambliss et al. 2024). In 2024, we once again successfully utilized these methods to collect CWTs. As each year and each area is different, there are plans to continue testing methods for

collecting CWTs to evaluate the utility of these data to better understand predator-prey dynamics. CWTs contain stock information, including species, run type, evolutionarily significant units, release location and date, and hatchery of origin. This information paired with catch data of the predator, including species, size, and catch date could help resource managers better understand the dynamics of piscine predation and inform resource management decisions.

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