

# WDFW Fisheries Monitoring

## Report to the Legislature

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Washington  
Department of  
**FISH &  
WILDLIFE**

December 2024



State of Washington  
DEPARTMENT OF FISH AND WILDLIFE

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December 16, 2024

The Honorable Timm Ormsby  
Chair, House Appropriations  
315 John L. O'Brien Building  
Post Office Box 40600  
Olympia, WA 98504-0600

The Honorable June Robinson  
Chair, Senate Ways & Means  
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The Honorable Kristine Reeves  
Chair, House Agriculture &  
Natural Resources  
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The Honorable Sharon Shewmake  
Chair, Senate Agriculture,  
Water, Natural Resources, & Parks  
213 John A. Cherberg Building  
Post Office Box 40442  
Olympia, WA 98504-0442

Dear Chairs,

I am writing to provide you with the Washington Department of Fish and Wildlife's (Department) report to the Legislature regarding fisheries monitoring in Puget Sound and on the Washington coast.

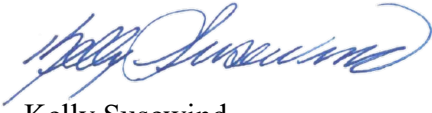
In 2022, the Legislature directed the Department—through provisos contained within Engrossed Senate Bill 5693—to monitor a variety of fisheries in Washington including recreational salmon and steelhead harvest in freshwater streams and rivers, salmon harvest from the ocean, commercial salmon harvest, and recreational shellfish and Dungeness crab harvest. This funding also supports monitoring and evaluation of salmon and steelhead hatcheries in Western Washington as well as measuring salmon productivity in freshwater systems to demonstrate salmon recovery.

This ongoing investment in monitoring has allowed the Department to further expand its monitoring efforts in Puget Sound and on the coast. Staff can now monitor more fish populations and river basins, develop strategies to address information gaps, devote more resources to data collection, study freshwater and marine productivity, and conduct more creel surveys. The following report contains a summary of the work completed since the last submittal and progress updates on each of the different areas of monitoring.

The Department appreciates this critical investment in Washington fisheries and looks forward to sharing the cumulative results of our enhanced monitoring of these fisheries in the final report due December 2025.

If you have any questions about this report, please reach out to our new Legislative Director, Melena Thompson, at (564) 791-2755.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kelly Susewind". The signature is fluid and cursive, with a large initial "K" and a long, sweeping underline.

Kelly Susewind  
Director

# WDFW Fisheries Monitoring

## 2024 Report to the Legislature

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# Background

During the 2022 legislative session, the Washington State Legislature directed the Washington Department of Fish and Wildlife (Department/WDFW)—through provisos contained within the Engrossed Senate Bill 5693—to monitor a variety of fisheries in Washington state. The following report provides updates on the monitoring work that has been completed with the funding from these provisos during the reporting period December 2023 through November 2024.

## Monitoring provisos

(43) \$3,802,000 of the general fund—state appropriation for fiscal year 2023 is provided solely to monitor recreational salmon and steelhead harvest in freshwater streams and rivers in Puget Sound and along the Washington Coast.

(44) \$2,116,000 of the general fund—state appropriation for fiscal year 2023 is provided solely to monitor salmon harvest from the ocean and Puget Sound.

(45) \$994,000 of the general fund—state appropriation for fiscal year 2023 is provided solely to monitor salmon harvest from commercial fisheries.

(50) \$4,283,000 of the general fund—state appropriation for fiscal year 2023 is provided solely to develop a monitoring and evaluation program for salmon and steelhead hatcheries in Western Washington with the goal to improve survival of hatchery fish to adult returns and adaptively manage hatchery programs to better achieve management goals, including rebuilding natural fish populations for conservation purposes and increasing fishing opportunities.

(51) \$2,392,000 of the general fund—state appropriation for fiscal year 2023 is provided solely to conduct fish in/fish out monitoring for the purposes of measuring freshwater systems salmon productivity for purposes of salmon recovery.

(52) \$1,040,000 of the general fund—state appropriation for fiscal year 2023 and \$295,000 of the limited fish and wildlife account are provided solely to monitor recreational shellfish harvest in Puget Sound.

(53) \$710,000 of the general fund—state appropriation for fiscal year 2023 is provided solely to monitor recreational Dungeness crab harvest along the Washington Coast.

## Reporting proviso

(71) The Legislature intends to fund the monitoring items contained in subsections (43) through (45) and (50) through (53) of this section through fiscal year 2025. A brief status report of the data collected and findings from each monitoring item funded in this section is due to the appropriate committees of the Legislature by December 1 of each fiscal year through 2025.



# Freshwater Salmon Harvest

The freshwater salmon harvest proviso (43) directed the Department to monitor recreational salmon and steelhead harvest in freshwater streams and rivers in Puget Sound and along the Washington Coast.

## Budget Overview

This proviso provides \$3.8 million annually to enhance freshwater monitoring activities including fisheries sampling, as well as juvenile and adult trapping activities to enhance productivity estimates in targeted Western Washington rivers. This investment will enhance the agency’s fisheries sampling and monitoring in several rivers and strengthen our understanding of fisheries impacts in real time and of the productivity of freshwater environments.

## Progress Updates

### Freshwater sportfish monitoring – salmon harvest impacts

This section will summarize the Department’s ongoing work to develop a sport fishery monitoring program for directed freshwater salmon and steelhead fisheries in the Puget Sound and Washington Coast regions from December 2, 2023 through December 1, 2024. This monitoring program was initiated through annual fishery planning discussions with the Washington Treaty Tribes to better understand fishery impacts (i.e., both incidental and directed catch) and angler effort dynamics of freshwater fisheries.

A key impact of this work is that fishery monitoring, where implemented through legal requirements and co-manager agreements, enables fishing opportunity. During the reporting period, WDFW monitored 12 fisheries for salmon harvest impacts within seven major river basins (Table 1). The information collected from this work is vital to in-season implementation and future planning of salmon fisheries, to ensure they stay consistent with allowable Endangered Species Act (ESA) and conservation objectives.

**Table 1. Freshwater salmon fisheries prosecuted and monitored by WDFW during the December 2, 2023 through December 1, 2024 reporting period.**

Region	River Basin	Target Species	Start Date	End Date
North Puget Sound	Skagit	Hatchery spring Chinook (lower river)	4/24/2024	5/31/2024
North Puget Sound	Skagit	Hatchery spring Chinook (upper river)	5/29/2024	7/15/2024
North Puget Sound	Skagit	Sockeye	6/16/2024	7/15/2024



South Sound and Washington Coast	Puyallup (Puyallup River and Carbon River)	Hatchery Chinook, coho, pink	8/16/2024	10/31/2024
North Puget Sound	Snohomish	Coho, pink	9/21/2024	10/31/2024
North Puget Sound	Stillaguamish	Coho, pink	9/21/2024	10/31/2024
North Puget Sound	Skagit	Coho, pink	9/1/2024	11/30/2024
North Puget Sound	Green	Hatchery Chinook, coho, pink	8/20/2024	12/31/2024
South Sound and Washington Coast	Quillayute	Chinook, coho	9/1/2024	12/15/2024
South Sound and Washington Coast	Chehalis (Humptulips)	Hatchery Chinook, coho, pink	9/1/2024	12/16/2024
South Sound and Washington Coast	Chehalis	Hatchery Chinook, coho, pink	9/16/2024	12/16/2024
South Sound and Washington Coast	Chehalis (Satsop)	Hatchery Chinook, coho, pink	10/1/2024	12/16/2024

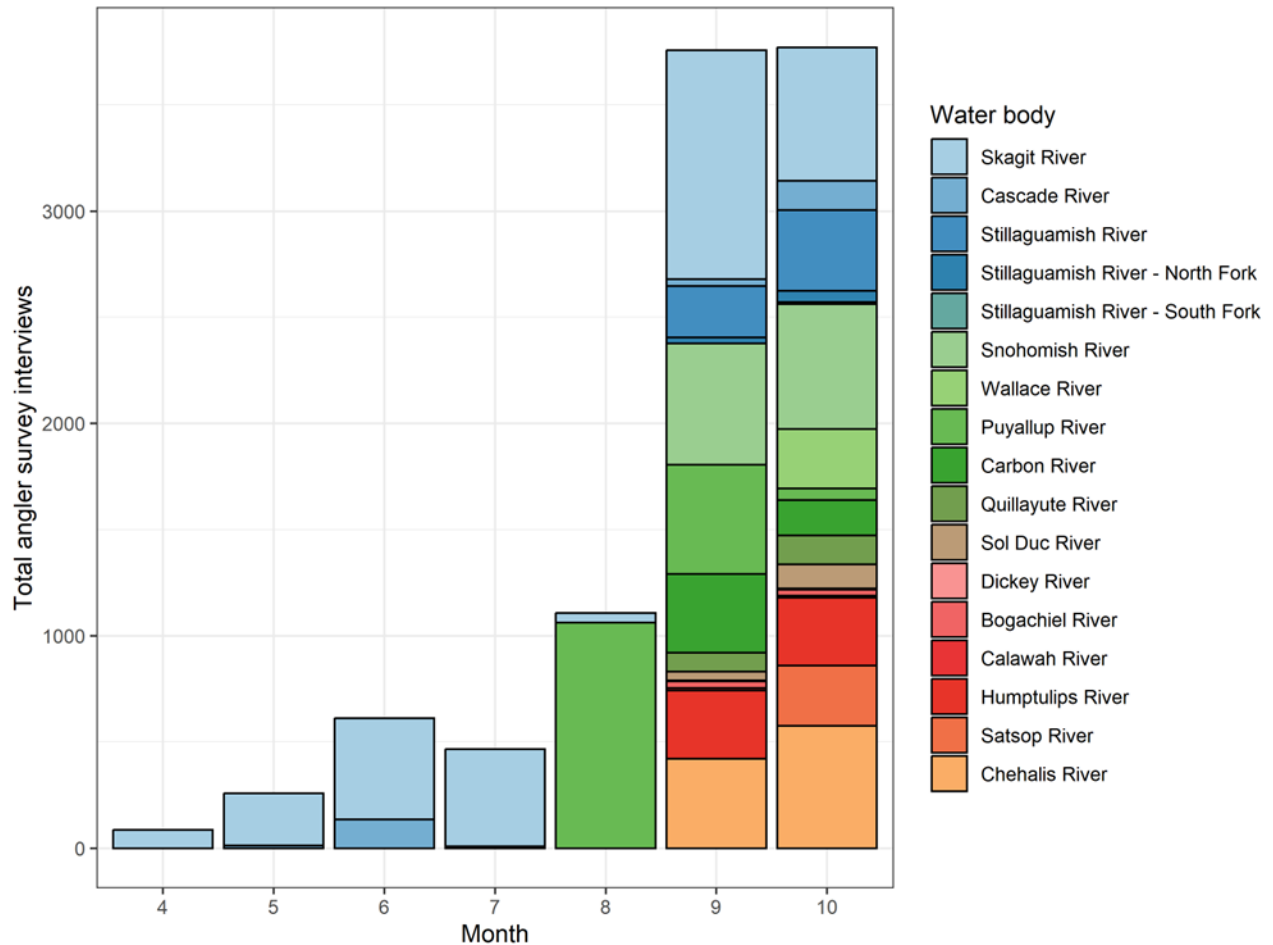
To implement this work, WDFW hired new staff, including both permanent biologist and support positions and non-permanent scientific technicians with job duties directly supporting freshwater salmon harvest monitoring. Angler census counts were completed with aerial helicopter surveys to monitor effort in fisheries, where boat-based counts were logistically infeasible.

Angler survey interview data is essential for estimating catch and impacts during monitored freshwater salmon fisheries. Since 2021, investments to improve WDFW’s monitoring capacity have increased the number of angler contacts and interviews obtained across a diverse range of river systems and seasons (Table 2, Figure 1). By monitoring for all species encountered, we are improving our understanding of fishery impacts across a range of water bodies and fishery stocks of management concern.

**Table 2. Number of angler interviews obtained during freshwater salmon fisheries monitored by WDFW in the Puget Sound and on the Washington Coast regions from 2021-2024.**

Year	Total # of Angler Interviews
2021	6,972
2022	11,813
2023	14,981
2024	10,063

**Figure 1. Monthly sum of angler interviews obtained during freshwater salmon creel surveys during the December 2, 2023 through December 1, 2024 reporting period.**



## Next Steps

With the continued support of the Washington State Legislature, Tribal co-managers, the Governor’s Office, and user groups, WDFW plans to implement a similar level of monitoring effort during freshwater salmon seasons from December 2, 2024 through December 1, 2025, relative to work completed in current reporting period.

The location and season of fisheries is subject to change based upon co-manager discussions and in-season management actions, but the focus of our monitoring will again center on key fishery stocks across Puget Sound and the Washington Coast.

## Population monitoring – Skagit River sonar project

### Skagit River Hydroacoustic Monitoring

Understanding the run timing of Baker Lake sockeye is critical to effective in-season management of both state and Tribal fisheries in the Skagit River. Traditionally, in-season management is based on

returns of sockeye to the Baker Lake upriver fish trap (UFT) at the Baker River, located approximately 52 miles upriver from the mouth of the Skagit River. Using the Baker Lake UFT to assess the sockeye population produces a comprehensive assessment of fish entering Baker Lake, since all sockeye are trapped and transported upstream. However, this means that in-season run size and run timing are assessed when fish are already upstream of the majority of Skagit River sockeye fishing grounds.

In 2023, in coordination with Skagit River Tribal co-managers, WDFW initiated a hydroacoustic monitoring project to enumerate returning sockeye salmon. The long-term goal of this project is to develop an index of run size and run timing to inform in-season management of Skagit River sockeye. Hydroacoustic monitoring has proven effective at detecting adult salmonids in systems throughout the Pacific Northwest, and is currently used to assess sockeye salmon returns to the Fraser River in Canada. The goal of the initial pilot year of this study was to determine the feasibility of using a hydroacoustic array to monitor and enumerate returning sockeye salmon.

## **Methods and Materials**

The initial two years of the Skagit River hydroacoustic project primarily utilized the ARIS Explorer 1200, a multibeam imaging SONAR (SoundMetrics, Inc., Bellevue, WA). The ARIS 1200 can effectively detect adult salmon out to 35 meters from the transducer face, while also providing data on individual fish length, directionality of movement, swim speed, and other behaviors such as predator prey interactions.

In 2023, one ARIS 1200 unit was deployed from a private fishing dock located approximately 15 miles upstream from Skagit Bay. In 2024, the study site was moved upriver to a new location, approximately 21 miles upstream of Skagit Bay. In 2024, a second ARIS 1200 unit and a 200 kHz split-beam SONAR (Biosonics, Inc., Seattle, WA) were experimentally deployed in attempt to achieve more comprehensive vertical and cross-river coverage of the water column. Split-beam systems can detect targets at much greater range (more than 200 meters from the transducer face), but lack the high-resolution data provided by the ARIS 1200. Therefore, using these two systems in tandem provides more robust coverage of the entire river. Deployment of the second ARIS 1200 and the split beam system is still being fine-tuned, and will be implemented in the third year of this study, planned for 2025.

Two technicians (WDFW Scientific Technician-2) were employed from late-May through September 2024 to assist with SONAR deployment, daily operation of the acoustic array, and gear maintenance, and to review ARIS data files throughout the study season. Technicians conducted initial data review on a subset of data files to identify and enumerate individual sockeye salmon, and to validate semi-automated data processing performed on all data files. Technicians also analyzed a subset of individuals to determine length distribution of returning sockeye salmon.

Semi-automated data processing was performed on all ARIS data files using Echoview (v14, Echoview Software, Hobart, Tasmania, Aus), which allows for batch-processing of acoustic data, providing standardized, consistent results in less time than it takes for visual review. Individual fish targets were identified as “likely sockeye” if they met a set of criteria comprising 1) fork length 48-65 centimeters, 2) swim speed 0.2-1.5 meters per second, 3) detection through at least  $\frac{1}{4}$  of the SONAR beam, and 4) less than 40 seconds spent transiting the SONAR beam (indicating consistent, directional movement).

For all hydroacoustic monitoring efforts, ground truthing acoustic detections is essential to confirm species presence and effectively distinguish target from non-target species. In the 2023 pilot season, no direct ground truthing methodology was implemented, and instead information was gleaned from nearby creel sampling, observations from anglers and regional staff, and the Baker Lake UFT counts. In 2024, a test fishery was implemented to more effectively groundtruth acoustic detections. The non-retention test fishery (50 meter drift tangle net, 4 5/8" mesh) occurred 0.5 kilometers downstream of the hydroacoustic monitoring site and was conducted once per week for seven weeks during the peak of the sockeye return (management weeks 25-31). All fish collected were identified to species, measured, and assessed for clip status, condition, and sex when possible. Prior to live release, fish were marked to identify recaptured individuals. Using test fishery catch data, a weekly sockeye adjustment factor was calculated based on the proportion of sockeye-sized fish caught that were confirmed to be sockeye. This adjustment factor was applied to acoustically derived daily counts of "likely sockeye" to produce in-season SONAR counts of sockeye salmon.

## **2024 Results**

Deployment of the hydroacoustic array began in mid-June 2024, during which time sockeye had already been observed at Baker Lake UFT, therefore missing the start of the run. During the initial week of deployment in 2024, there were already between 30 and 60 acoustically enumerated sockeye reported from the subset of analyzed data daily (Figure 2). The peak in daily counts at the hydroacoustic site occurred in early July, and tapered through the end of July and into mid-August when gear was removed (Figure 2). Recommendations for 2025 include earlier deployment to detect the beginning of the run.

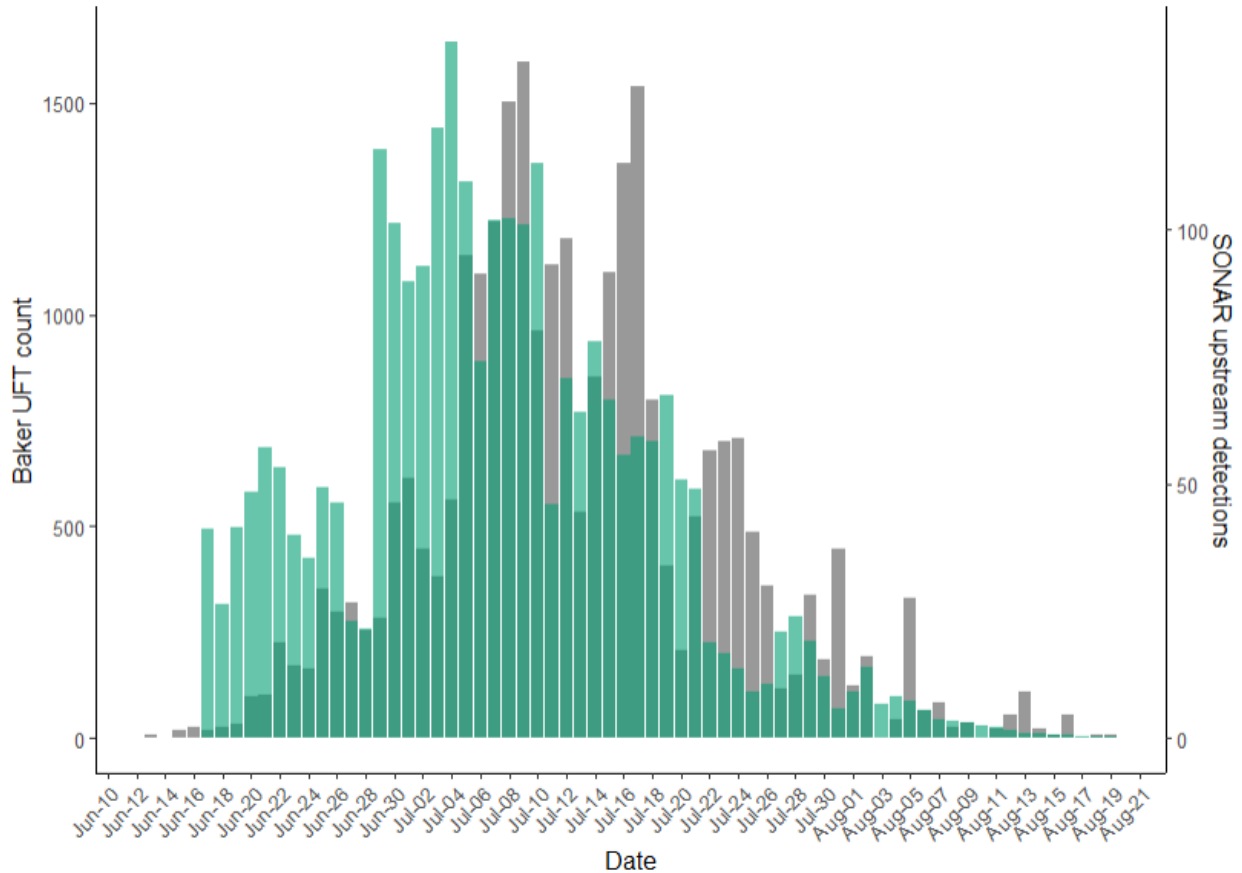
Test fishing was successful in catching sockeye in the Skagit River, and no mortalities were recorded for any species during the pilot year (Table 3). Count of sockeye ranged from zero to over 30 for a given test fishing date, with sockeye as a proportion of total catch ranging from zero to one (Figure 3). During the final week of test fishing, no sockeye were collected. However, sockeye were still being collected at the Baker Lake UFT; therefore zero sockeye catch in the test fishery likely reflected low counts and shifting distribution later in the season, rather than an absence of sockeye from the system. To adjust for this presumed lower abundance during the last week of test fishing, we amended the sockeye adjustment factor by averaging the last two weeks catches to account for low, but not zero abundance in the system (Figure 3).

Preliminary results from the first two years of hydroacoustic monitoring on the Skagit River indicate that sockeye were effectively detected and enumerated throughout the study seasons. In addition, correlations were observed between acoustic counts of sockeye and counts at the Baker Lake UFT. The first sockeye was reported at the Baker Lake UFT in mid-June, with a peak in daily counts observed in the second and third weeks in July (Figure 2). This provides some inference about the travel time between the hydroacoustic site and the Baker Lake UFT, with an observed lag time of approximately seven days in 2024 (Figure 2). Additional data are required to corroborate this finding. Future years of this study will continue to explore correlations in counts and travel time between the hydroacoustic site and the Baker Lake UFT, which could provide valuable in-season data for management of the Skagit River sockeye fisheries.

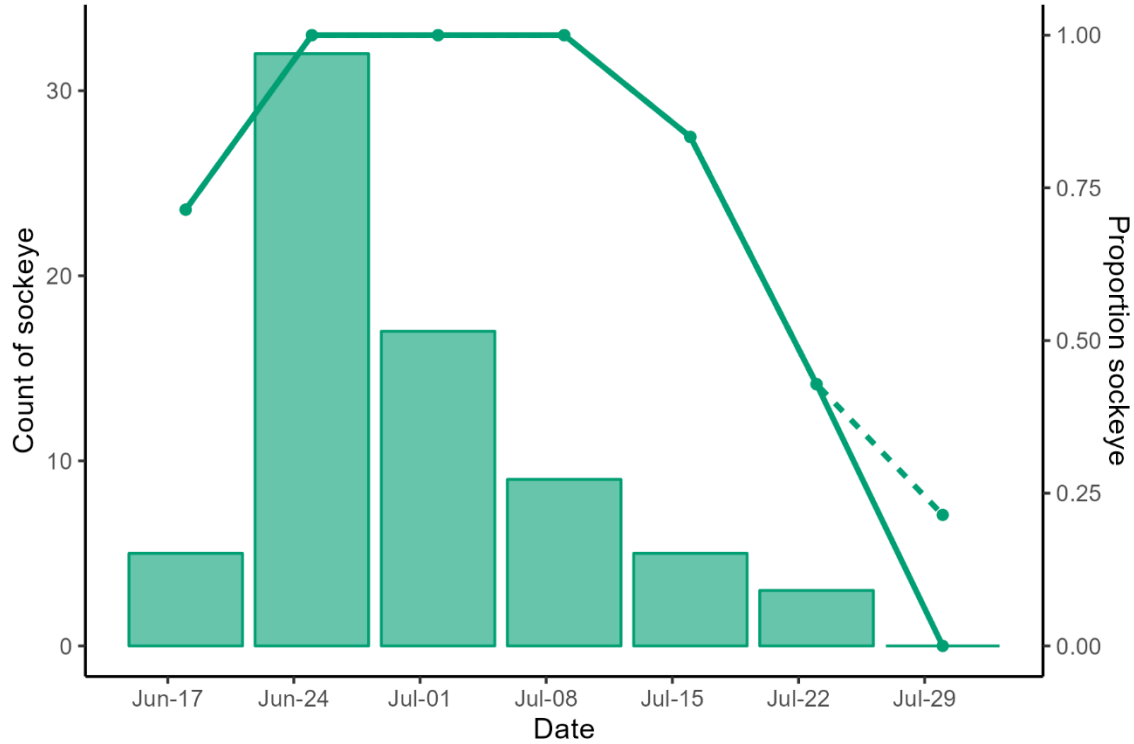
**Table 3. Results of Skagit River drift tangle net test fishery during the 2024 sampling season.**

Species	Count	Count 48-65 cm	Proportion 48-65 cm	Mortalities
Sockeye salmon	73	70	0.843	0
Chinook salmon	19	4	0.048	0
Pink salmon	10	7	0.084	0
Bull trout	3	2	0.024	0
<b>TOTAL</b>	<b>91</b>	<b>83</b>	<b>1.00</b>	<b>0</b>

**Figure 2. Comparison of daily sockeye counts at the Baker Lake UFT during June through August 2024 (gray bars) to daily SONAR counts at the Skagit River hydroacoustic site (green bars). SONAR counts of sockeye are adjusted for proportion of sockeye collected in the weekly test fishery.**



**Figure 3. Count of sockeye (bars) and percentage of sockeye (line) in the weekly Skagit River test fishery, used to determine weekly sockeye adjustment factor applied to acoustic detections. Note that there were no sockeye collected in the July 29 test fishery, so a two-week average was calculated using the previous week's data (dashed line).**



# Ocean and Puget Sound Salmon Harvest

Proviso (44) directed the Department to monitor salmon harvest from the ocean and the Puget Sound.

## Budget Overview

This proviso provides \$2.1 million annually to enhance existing salmon fishery monitoring programs occurring in the ocean and Puget Sound. Mixed stock salmon fisheries management in the coastal and interior marine waters of Washington involves intensive sampling and monitoring to meet strict harvest guidelines to offer salmon fisheries opportunity while staying within agreed to conservation objectives required under the Endangered Species Act, the Pacific Salmon Treaty, and the US vs. WA and US vs. OR court decisions. As recreational fishing opportunities directed at salmon diminish and an increasing population demands access to abundant hatchery stocks, the need for robust and timely information regarding fisheries impacts is imperative. This funding is intended to complement existing funding and boost monitoring capability through increased staffing and one time equipment purchases.

## Progress Update

Monitoring mixed stock marine area salmon fisheries has been a priority since the listing of Puget Sound Chinook as threatened under the Endangered Species Act in 1999. A new [Chinook Resource Management Plan](#) developed by the State and Tribal co-managers was submitted to National Oceanic and Atmospheric Administration (NOAA) fisheries in 2022 that includes strict limits on co-manager fisheries that have significant impacts on several Chinook stocks of concern, particularly Chinook from the Stillaguamish River. Robust monitoring programs allow for fisheries to occur while ensuring that fisheries impacts on listed stocks do not impede recovery goals.

There are several important parts of the sampling and monitoring programs that are vital to providing the needed information to scientists and managers for evaluation of these fisheries. The most important need is for staff to interview anglers about their fishing trips. In Puget Sound, staff also work on the water during these fisheries in agency boats, conducting recreational test fisheries and effort surveys which inform management decisions during the season. In ocean fisheries staff conduct observations aboard charter vessels to meet monitoring requirements and provide quality on-water encounter data. For the 2024 fishing season, WDFW was able to hire staff required for ocean and Puget Sound fishery monitoring needs. We were also able to purchase seven new vessels to conduct this work throughout Puget Sound and hire the staff to ensure basic monitoring levels were maintained or improved. The table below shows the increasing number of angler interviews and hours conducting on-the-water monitoring in Puget Sound in the recent four-year period. This funding is vital to maintaining fishing opportunities throughout Puget Sound and the Washington Coast.



**Table 4. Number of angler interviews and total hours on-the-water conducted in the Puget Sound over the 2020-2023 period.**

<b>Year</b>	<b>Total # of Angler Interviews</b>	<b>Total # of Hours on-the-water</b>
2020	42,315	1,508
2021	45,815	2,929
2022	42,447	4,101
2023	51,910	4,884
2024	50,591	4,735

## **Next Steps**

Moving into 2025, we will continue to focus on recruiting and training permanent and non-permanent staff, so we are fully staffed for monitoring in the coming season. Initial planning for sampling and monitoring the 2024-25 fishing season is under way.

# Commercial Salmon Harvest

Proviso (45) directed the Department to monitor salmon harvest from commercial fisheries.

## Budget Overview

This proviso provides \$994,000 annually to enhance monitoring of commercial chum salmon fisheries occurring in Puget Sound. WDFW developed a broad strategy with tribal co-managers to address information gaps and devote resources to expanded data collection associated with both State and Tribal commercial fisheries directed at chum salmon.

## Progress Update

Puget Sound co-managers met to discuss commercial salmon harvest during the annual North of Falcon (NOF) process in 2022, 2023, and 2024 and developed a monitoring and sampling plan to address informational gaps, meet conservation goals, and build a sustainable and comprehensive fisheries management plan for Puget Sound chum salmon. The co-managers developed monitoring and sampling plan included the following objectives:

- a) Expand our seasonal commercial test fisheries program in Central and South Puget Sound,
- b) Expand our onboard monitoring and scale sampling in chum directed commercial fisheries,
- c) Expand our tissue sampling and collections in chum directed commercial fisheries and test fisheries to build a real-time in-season stock composition assessment program,
- d) Improve management of our commercial fisheries and observer databases and assist our commercial team with commercial fisheries related data requests, and
- e) Build assessment tools for short-term and long-term evaluation of chum stocks of conservation concern.

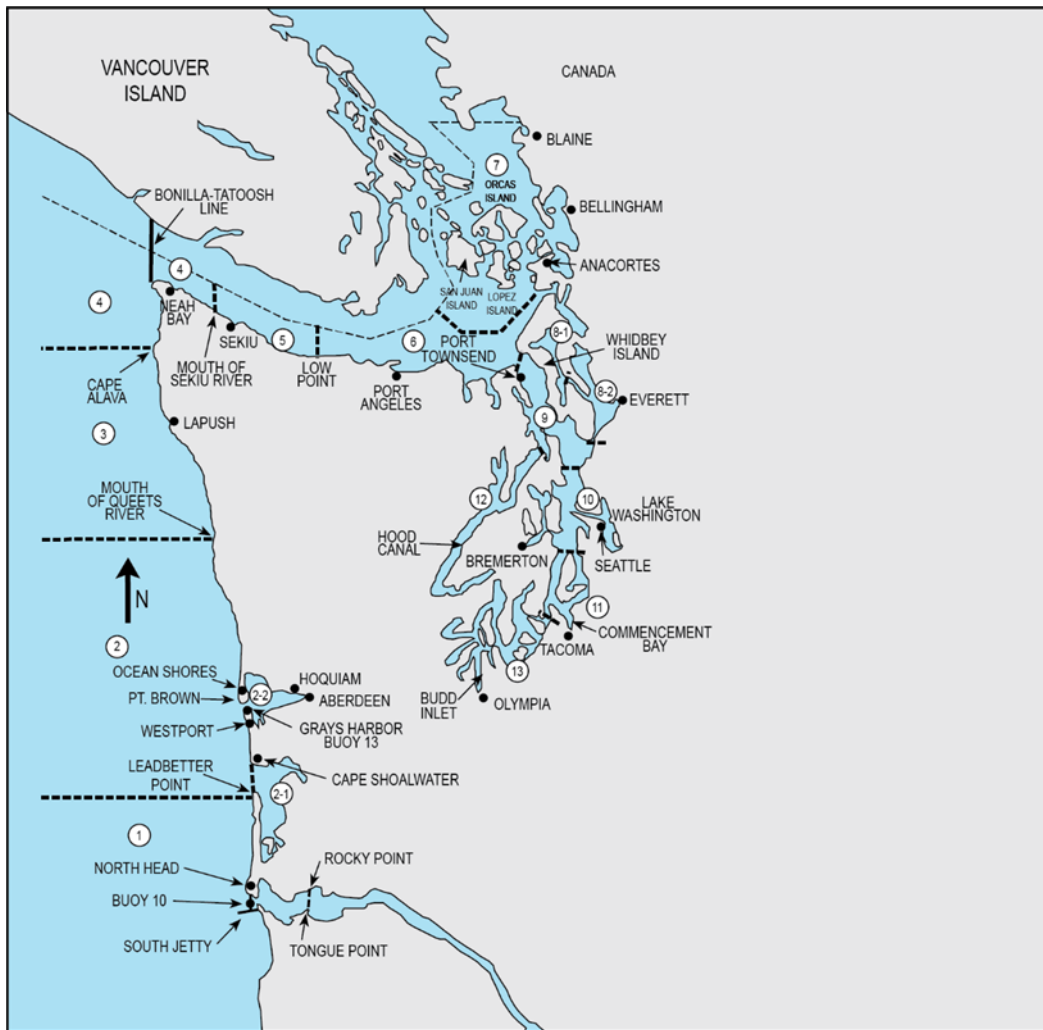
To address objective a), WDFW contracted and commissioned two commercial test fishing vessels in 2022, one for Marine Area 11 (Tacoma-Vashon Island) and one for Marine Area 9 (Admiralty Inlet) north of the Hood Canal Bridge. WDFW expanded that effort to three commercial test fishing vessels in 2023 and 2024, two for Marine Area 11 (Tacoma-Vashon Island) to cover commercial fishing areas in different migratory passages and one for Marine Area 9 north of the Hood Canal Bridge.

These vessels were successful in collecting up to 200 tissue and age samples each week in 2022, 2023 and 2024, informing comanagers in-season with fisheries management decisions in both Hood Canal and Central and South Sound. For objective b), WDFW purchased a commercial monitoring vessel (\$370,000) to transport staff and ensure fisheries observer coverage across all concurrent commercial fisheries.

Additionally, WDFW hired 11 non-permanent Scientific Technician two staff members, one Career Seasonal Scientific Technician 2, and one Career Seasonal Scientific 3 Technician 3 to support the operation of the additional monitoring vessel and additional sampling and logistics needs for the May through December timeframe annually (Puget Sound commercial salmon seasons). The addition of the

commercial monitoring vessel and observers allowed WDFW to improve spatial and temporal monitoring from directed mixed-stock commercial chum, pink, and sockeye fisheries, observe daily effort and catch, record bycatch, and sample catch onboard commercial fishing vessels in-season. For objective c), WDFW contracted the agency’s Molecular Genetic Lab to process tissue samples in-season and post-season (charged per sample) and provided four months of support for a Research Scientist I to prioritize and process the chum tissue samples. For objective d) and e), WDFW hired a career-seasonal Fish and Wildlife Biologist 2 to lead one of the new test fishery operations, to build tools to evaluate chum population status in- season to support fishery managers (i.e., weekly commercial fishery data distribution R-markdowns and shiny application), and to support development of a comprehensive chum management report for NOF 2024.

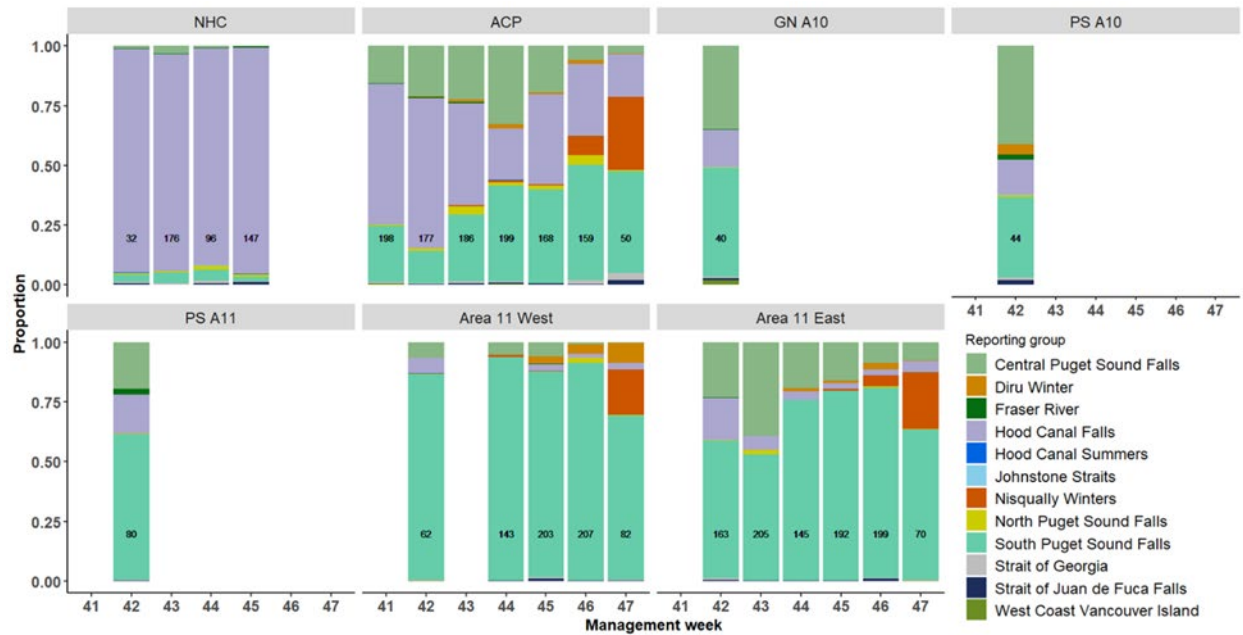
**Figure 4. Map of the Marine Areas in Washington state.**



During the 2022 and 2023 commercial chum seasons, we collected 6,697 tissue samples from directed and test fisheries in Marine Area 9 and Marine Area 10 (Seattle-Bremerton Area), analyzing 5,044 of those samples. Preliminary results were summarized and provided to co-managers during NOF 2024, to

better understand composition within commercial chum directed fisheries and how they change from management week 42 to 46 (Figure 5).

**Figure 5. Chum genetic stock composition from tissue samples collected during chum test fisheries in Marine Areas 9 and 11, and state commercial chum directed fisheries in Marine Areas 10 and 11 in 2023.**



Results indicated that stocks of concern, such as South Puget Sound wild winter chum, were detected in commercial fishing areas in week 46. Using data from these and historical collections, WDFW commercial staff built a model to estimate the expected proportion of South Puget Sound wild and hatchery winter chum (Figure 6, Figure 7).

During our 2024 commercial chum season, we have collected approximately 300 samples from directed and test fisheries in Marine Areas 10 and 11, and plan to collect up to 2,700 by the end of season. In 2024, the genetics lab will process and analyze an additional 1,200 samples from tribal co-managers to support in-season estimates. The season is in early stages, and we are awaiting in-season results. Analyses from these results were developed to reduce impacts to stocks of concern. For example, in-season assessments of expected proportion of winter chum were produced to limit impacts below co-manager agreed-to exploitation rates (Figure 7).

Figure 6. Pre-season model estimated expected proportion of hatchery and wild winter chum salmon in Marine Areas 9 and 10.

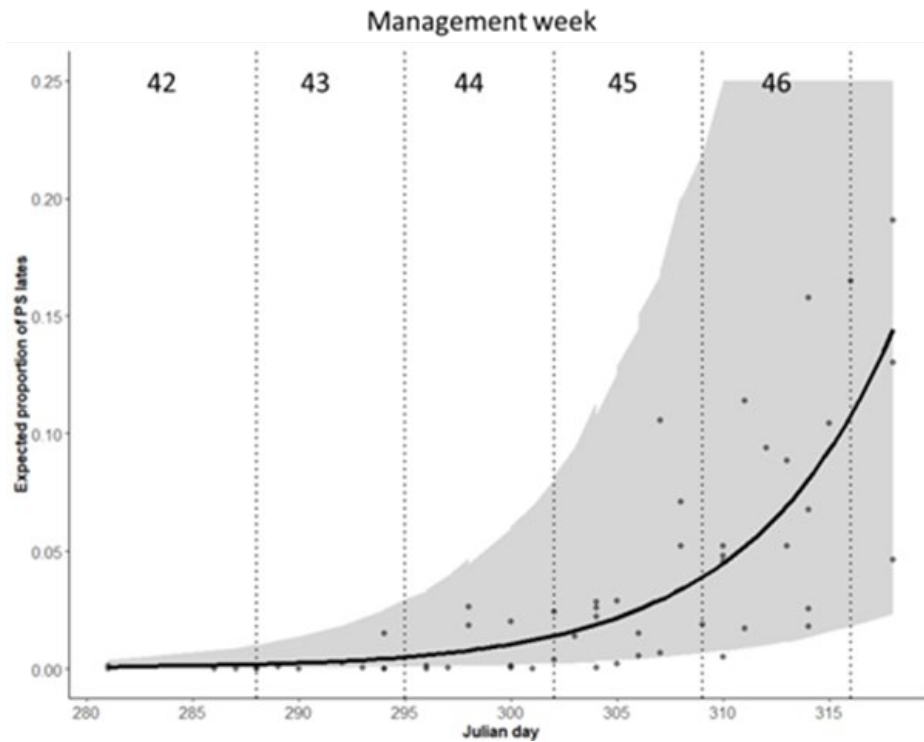
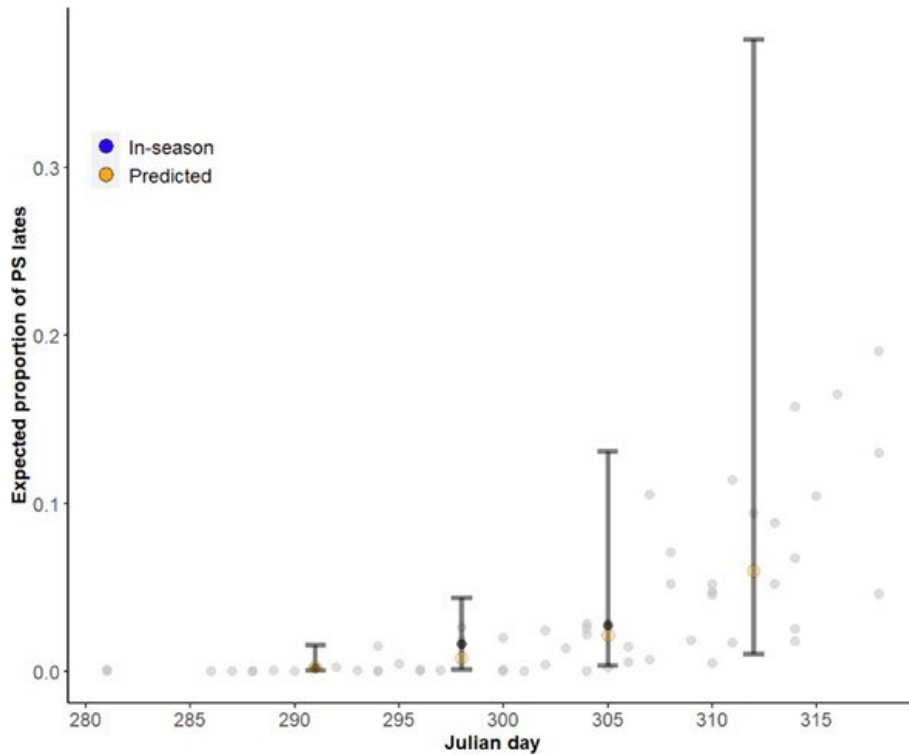


Figure 7. In-season estimates and model estimated proportions with 95% confidence intervals of hatchery and wild winter chum salmon by Julian day in Marine Area 9 and 10 in 2023.

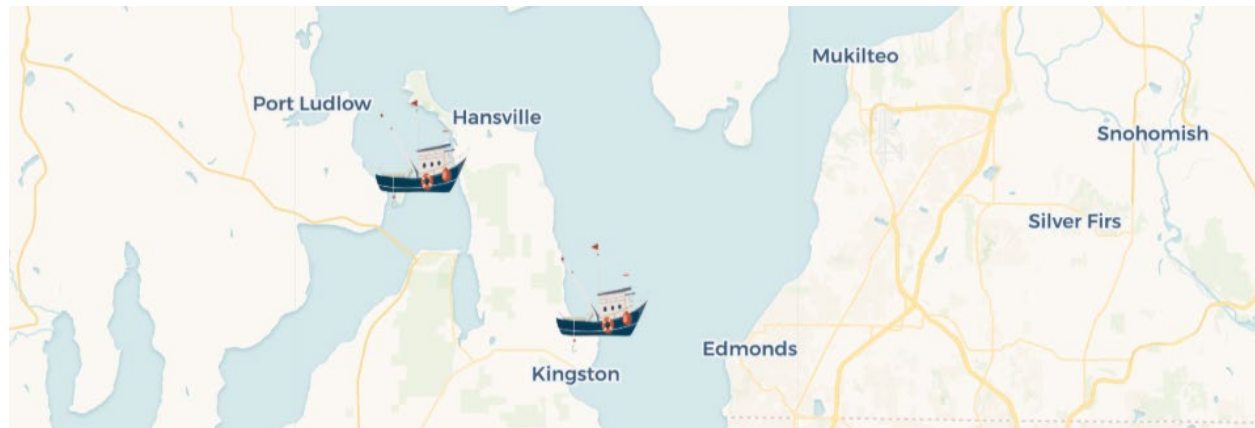


## Next Steps

During our 2023 commercial chum season, our Fish and Wildlife Biologist 2 also built a tool to review test catch in-season, to support fishery managers and provide information in real-time to the public. The application is still under development, but a preview output is currently available here (Figure 8):

[https://elsatoskey.shinyapps.io/WDFW\\_In\\_Season\\_Chum\\_Test\\_Fishing\\_App/](https://elsatoskey.shinyapps.io/WDFW_In_Season_Chum_Test_Fishing_App/)

**Figure 8. South Puget Sound Chum Test Fisher Application.**



During NOF 2024, we worked with tribal co-managers to finalize a state of science report on chum salmon returning to Puget Sound, and documented genetic data collection, processing, and updates across collections funded by this proviso. The report is anticipated to be published by WDFW in 2024.

# Hatchery Production Evaluation

Proviso (50) directed the Department to develop a monitoring and evaluation program for salmon and steelhead hatcheries in Western Washington with the goal to improve survival of hatchery fish to adult returns and adaptively manage hatchery programs to better achieve management goals, including rebuilding natural populations for conservation purposes and increasing fishing opportunities.

## Budget Overview

One of the priorities for state and tribal co-managers in Governor Inslee's Salmon Strategy was development of a comprehensive hatchery monitoring and evaluation program for our westside hatcheries. Development of a centralized database accessible for all WDFW staff has begun. When this database is completed, it will replace the existing FishBooks system. The 2022 supplemental budget included \$4.3 million in ongoing funding to develop a robust monitoring program similar to what exists for WDFW hatchery programs in Eastern Washington funded by hydropower mitigation contracts. The current funding level has allowed the Agency to hire staff and provide them with vehicles to assist on regional projects and at hatchery facilities. Unfortunately, these funds do not adequately support supplies, travel, and staffing needs to reach full implementation of Phase 1 as described in the Hatchery Monitoring & Evaluation (M&E) Plan. In the interim we are working with regional teams in an attempt to share costs and increase fiscal responsibility.

## Progress Update

The Department completed the first task of recruiting and hiring the program lead for this work in March 2023. The process of hiring the supporting core team commenced immediately after that and those eight cross-regional Hatchery M&E lead positions were filled by mid-July. During July and August, this group hosted meetings at both the regional and complex levels to bring together staff from all divisions to discuss the vision, plan, and next steps regarding hatchery monitoring and evaluation program. Hatchery M&E leads were able to quickly onboard 16 Scientific Technicians and assist at hatchery facilities during the first salmon and steelhead spawning season while providing the necessary operational experience to develop protocol and procedure documents for each program. Staff were also able to assist regional teams with projects related to hatchery production and evaluation across Western Washington.

Implementation of Phase 1 is still ongoing, as we are currently at the midpoint of the first full spawning season to be included in this new program. To date, the M&E staff have been able to provide additional support onsite at the hatcheries across the western regions of Washington state and lay important groundwork for the years ahead, including important cross-training efforts, additional staffing, and real-time observations of processes and procedures that directly impact our IT-related efforts to build an inclusive database for long-term data management and analysis. Hatchery M&E leads have worked in their respective areas with hatchery facility managers and staff to develop protocols and procedures for



each of their facilities. That material has been included in the hatchery M&E Plan. The detailed M&E plan, inclusive of all phases of the program, has been created.

The Hatchery M&E Program is a large complex project that involves staff and data from nearly all components of the Fish Program. As such, a phased approach was selected to implement the program. An additional funding request, meant to address the needs to fully implement Phase 1 (In-hatchery survival) and move on to Phase 2 (Out-of-hatchery survival), has been developed. However, due to an overall Agency budget level and pre-existing budget requests, the funding request was not able to be submitted for consideration. A comprehensive Hatchery M&E Plan that describes the components in Phase 1 & 2, as well as a proposed budget that presents the necessary staffing and resources required to complete this important work across Western Washington has been developed and will be submitted as WDFW addresses other high priority funding requests.

Despite some of the funding constraints, staff have still provided support to the regions, headquarters, and hatchery staff over the past year. They have participated in day-to-day activities at hatcheries, assisted with biologic sampling, spawning, rearing, and planting of fish production, as well as working with hatchery staff to document what and how things are occurring at their facilities. They have also assisted with/led the development of Hatchery and Genetic Management Plans (HGMPs), contributed to hydropower company's transition plans and M&E plans, supported modeling efforts for Mitchell Act consultation in the lower Columbia River, completed analyses using coded wire tag (CWT) data, gathered data for and reported on terms and conditions, and given multiple presentation at professional meetings to share knowledge gained about performance of WDFW hatchery programs.

## **Next Steps**

In Fiscal Year (FY) 2026 we will be working on standardized reporting for all hatchery facilities in Western Washington to make it possible for comparison of program performance at the watershed, complex, regional, and state levels. These reports will show status and trends of hatchery performance over recent years and highlight any changes to programs that explain shifts in trends. This year hatchery M&E leads gathered data regarding all their programs to address the three monitoring questions in Phase 1 of the Hatchery M&E Plan: 1) Did life-stage specific survival within the hatchery meet expected survival standards? 2) Were the release goal number, timing, and location of fish from WDFW facilities met? 3) What was the smolt quality of fish released by WDFW facilities? This is the first time where we have all the data available in a single location. Having to gather this data via FishBooks and through working with facility managers and hatchery staff helped us identify several gaps in existing data that will be incorporated into the new electronic database, Hatchery Management System (HMS). When the HMS database and necessary connections to other WDFW databases are complete, we will start developing dashboards for in-season reporting at each of the hatchery facilities. This monitoring program will allow us to answer critical questions about survival of hatchery fish and better understand/explain their role in meeting management goals (i.e., harvest or conservation and recovery of wild populations) by allowing us to compare the effectiveness of our programs at achieving not just hatchery survival and production goals but also out-of-hatchery survival metrics.

We will continue to advocate for an opportunity to put a funding request forward to get to full implementation of Phase 1 and Phase 2. The comprehensive plan includes monitoring of post release survival (i.e., smolt-to-adult return) and several other hatchery performance metrics in Phase 2. A host of analytical approaches will be used to monitor hatchery programs in-season to improve management opportunities and create a common understanding of status across staff in the regions and headquarters. Westside Hatchery Monitoring and Evaluation staff will continue to support regional teams' needs whenever they are available. Staff have taken the required safety training courses and procured the proper Personal Protective Equipment (PPE) to help expand regional capacity.

## **Summary**

Core staff to implement the Hatchery M&E Program efforts per the proviso have been hired and Phase 1 work has begun. A comprehensive plan outlining the phases and monitoring questions has been created and shared through the westside regions. Phase 1 is currently in its first full spawning cycle and strong foundation documentation has been created. The full implementation of Phase 1 as well as Phase 2 of the program have been limited due to lack of funding. Alternative funding and cost-saving opportunities are being explored while pre-existing Agency priorities are being addressed. Once funding is available, full implementation of the Hatchery M&E Program will be possible with minimal delays.

# Fish Migration Fish In/Fish Out (FIFO)

Proviso (51) directed the Department to conduct FIFO monitoring for the purpose of measuring freshwater systems salmon productivity to demonstrate salmon recovery.

## Budget Overview

This proviso provides \$2.4 million annually to expand FIFO monitoring efforts for salmon and steelhead populations across Western Washington. This investment aims to improve the agency's monitoring capabilities and deepen our understanding of freshwater and marine productivity by addressing critical data gaps and supporting new initiatives. First to ensure the continuity of existing core adult and juvenile salmonid monitoring efforts, a portion of the funding was used to stabilize sites that previously operated with unstable or partial funding. Sites that are now fully funded on an ongoing basis include Snow Creek, Salmon Creek, Duckabush, Touchet, Grays River, and Wind River. The funds also support several new projects aimed at addressing key data needs. These include an adult salmon abundance estimation project on the Samish River, a genetic baseline study for Chinook in the Skagit River, and the creation of a new Sonar Team for the Washington Coast to enhance monitoring capacity. Additionally, the funding supports new staff positions dedicated to developing metrics and indicators that connect fish productivity with habitat data. These efforts will enable WDFW to establish baseline metrics to better assess the impacts of habitat restoration and integrate salmon recovery into land use policies.

## Progress Update

The following progress updates highlight key accomplishments from the past year, funded by the Fish Migration Monitoring proviso. This report covers ongoing projects focused on enhancing data integration between fish populations and their habitats, testing innovative methods for adult salmonid monitoring, and establishing genetic baselines for species of conservation concern. Through collaborative efforts with federal, tribal, and academic partners, these projects are generating valuable insights to support more effective management and conservation of salmon and steelhead populations.

## Linking fish and habitat data

Over the past year, the planning team initiated two complementary projects to explore methods for linking fish and habitat data. Both projects are now underway.

The first project focuses on advancing the Habitat Assessment and Restoration Planning (HARP) model in partnership with NOAA Fisheries' Northwest Science Center, with a long-term goal of integrating HARP's high-resolution habitat data into an Integrated Population Model (IPM). The HARP model uses empirical data and habitat metrics from literature to establish functional fish-habitat relationships, estimating life-stage-specific carrying capacities and productivity to identify key restoration actions. The IPM, meanwhile, integrates various fish data sources into a life-cycle model, estimating population parameters like carrying capacity and productivity. Comparing habitat-based estimates from HARP with fish-driven IPM estimates increases confidence when results align. The primary objective is to

incorporate habitat data—such as floodplain area and stream temperature from previous HARP work—into the IPM framework, enhancing insights into habitat-fish demographic relationships. The data-intensive IPM process is in early development for Stillaguamish Chinook salmon, while HARP efforts continue in the Upper Columbia River basin to analyze habitat data in the Wenatchee, Entiat, and Methow River basins.

The second project takes a bottom-up, multi-phased approach. The first phase, completed this past year, involved compiling a comprehensive inventory of juvenile fish data collected at the 48 smolt traps WDFW operates across the state. The survey asked trap operators questions such as which salmonid and non-salmonid fish species they encountered and which measurements, sampling, and tagging they performed on each salmonid species. This inventory provides a clearer picture of the extent and location of WDFW juvenile fish data so that we can leverage spatial habitat data also collected by WDFW (i.e., High Resolution Change Detection) to better understand relationships between populations and their habitats.

Together, these efforts aim to advance the understanding of fish-habitat relationships and enhance the effectiveness of conservation and policy initiatives.

## **Adult steelhead abundance methods**

This past year our team began a multi-year project on the Samish River, testing a variety of methods to monitor adult returns of winter steelhead. We installed a Riverwatcher camera in the existing fish ladder at the Samish River weir, allowing us to accurately count how many steelhead migrated upstream of that point, and providing a rare opportunity to generate a true abundance to compare other methods to. We trapped and marked, with Passive Integrated Transponder (PIT) tags, a portion of the fish at the weir, and conducted a mark-recapture monitoring study using angling surveys. In addition, we deployed a SONAR camera near the weir and have been reviewing the data collected from that. Finally, we conducted redd surveys by foot and raft, in both the limited areas that had been surveyed historically and in as many areas of the watershed where steelhead might be found as possible. We utilized electronic data capture wherever we could, streamlining the data pipelines and reducing transcription errors.

## **Adult sonar monitoring**

During the past year, the team completed two monitoring projects: winter steelhead in the Clearwater River (Queets watershed) and summer coho in the Sol Duc River (Quillayute watershed). The SONAR team established project locations, developed sampling protocols, and collaborated with federal, academic, and tribal partners, including the Quileute Tribe and Quinault Indian Nation. Both projects aim to provide alternative escapement estimates for ongoing fish population management. A final report for the 2023 Sol Duc summer Coho Salmon SONAR monitoring season is in review, with data being finalized for the 2023-2024 Clearwater River winter steelhead season and the 2024 Sol Duc River summer coho season. A key finding from the Sol Duc River project showed coho passage was more than double the redd-based escapement estimate, aligning with similar trends observed in other rivers

(Dungeness and Elwha) where similar SONAR projects have been implemented. These results suggest potential underestimation in traditional redd-based methods.

## **Skagit River Chinook genetic baseline**

Over the past year, team members of the Skagit River stock assessment crew, performed quality assurance and quality control on Chinook salmon DNA tissue samples collected in 2023, and prepared for, implemented, and collected additional DNA samples in 2024 throughout the Skagit River basin. The crew completed sample collection in late October 2024 taking the last DNA samples from the six wild Chinook salmon stocks of the Skagit Basin as spawning by the latest-timed Skagit River Chinook salmon was nearing completion. The project successfully met its goal of collecting at least 1,250 Chinook DNA samples across all Skagit Chinook populations.

## **Next Steps**

### **Linking fish and habitat data**

In the coming year, collaboration with NOAA Fisheries will continue on the Upper Columbia River HARP model, focusing on habitat analysis and life-cycle model development. This work will involve compiling data on Upper Columbia River salmon, including age structure, hatchery operations, and life-history patterns. Additional efforts will focus on advancing the Stillaguamish River Chinook IPM by first finalizing a model based solely on empirical fish data. Once reliable, HARP-based habitat data will then be incorporated into the Stillaguamish River IPM.

At the same time, a systematic literature review has been initiated to examine relationships between salmonid population characteristics (e.g., life history and size variation among individuals) and habitat attributes (e.g., land cover change, river complexity). This review places particular emphasis on habitat changes influenced by policy, including land use, hydraulic project approvals, in-water work, and restoration. The focus is on questions and hypotheses that leverage existing WDFW fish and habitat data, maximizing spatial and temporal scope. For instance, one question under consideration is how variation in juvenile coho body size relates to migration timing and habitat complexity across watersheds. To address such questions, collaboration with trap operators will be established to census and synthesize relevant raw data in areas where detailed spatial habitat change maps are available.

### **Adult steelhead abundance methods**

To develop a robust comparison, we anticipate needing at least two more years of data before making any preliminary comparisons, although eight to 10 years of data would be ideal as we would be able to see how different methods perform during different environmental conditions or fish return years. However, once a preliminary comparison is completed we do anticipate being able to provide recommendations in how monitoring can be improved in other watersheds, both for steelhead and potentially for other species as well. Many of the steelhead and Chinook populations in Puget Sound are listed as threatened or endangered under the Endangered Species Act. Providing the most accurate abundance estimates is crucial for evaluating ongoing recovery efforts as well as fishery forecasting and

management, but many of the current monitoring methods were developed decade ago and could potentially be improved. Developing a field crew with experience deploying SONAR, electronic data capture for redd surveys, and effective mark-recapture techniques will greatly benefit other basins in the region as well as around the state as the Samish crew shares their expertise and lessons learned over the years.

### **Adult sonar monitoring**

The team has gained valuable experience operating SONAR in remote coastal rivers under challenging conditions without access to power and with variable streamflows. They developed innovative methods, such as using cameras and hook-and-line sampling to document species composition, and standardized data review processes, though reviewing SONAR imagery remains time-intensive. Future efforts will focus on improving data review efficiency through advanced software or AI technologies in collaboration with academic partners. The team will continue working with co-managers to provide in-season fish passage data to support fisheries management. SONAR monitoring offers several advantages: it is non-invasive, does not disrupt fish behavior, and operates continuously. While the team currently has two ARIS Explorer 1800 units, only one can be deployed due to limited staffing. Increasing capacity to operate both units will expand monitoring efforts and enhance the use of this promising technology to produce robust abundance estimates for fisheries management.

### **Skagit River Chinook genetic baseline**

The next step in this project involves processing and analyzing the samples to assess their effectiveness in updating and refining the Skagit River Chinook salmon genetic reference baseline. This work will be carried out in the WDFW Molecular Genetics Laboratory, where laboratory technicians will process the samples to produce individual genotypes. Laboratory geneticists will then evaluate these genotypes to determine their accuracy and precision in identifying Chinook salmon from each of the six Skagit Basin stocks.

# Recreational Shellfish Harvest

Proviso (52) directed the Department to monitor recreational shellfish harvest in the Puget Sound.

In 2023, the Department was directed by the Washington State Legislature—through a budget proviso in Engrossed Senate Bill 5187—to further this monitoring of recreational shellfish harvest, as well as address emerging environmental issues, maintain a new data management infrastructure, and develop a disease and pest management program to protect shellfish fisheries in Puget Sound. This proviso language is below.

(17) \$509,000 of the general fund—state appropriation for fiscal year 2024 and \$305,000 of the general fund—state appropriation for fiscal year 2025 are provided solely to monitor recreational shellfish harvests, monitor intertidal and crustacean fisheries, address emerging environmental issues, maintain a new data management infrastructure, and develop a disease and pest management program to protect shellfish fisheries in the Puget Sound.

## Budget Overview: Proviso (52)

The fully funded budget request to support this work was \$1.68 million per year. The Department requested funding to expand the Puget Sound Shellfish Program’s capacity to help address priority needs including risks to shellfish from climate change, record fisheries participation, and a rapidly growing human population in Puget Sound. Updating our program by adding a range of staff is necessary to address short and long-term needs, to adapt to evolving management conditions, to continue to meet tribal co-management obligations, and to continue to ensure the healthy shellfish populations for the citizens of Washington state. In FY 2023, we received \$1.04 million of the initial \$1.68 million request and in the 2024-25 biennium, we received \$814,000 of General Fund-State funding.

## Progress Update: Proviso (52)

In addition to the positions hired in FY’s 2022 and 2023, in FY 2024, we received \$509,000 in state general fund, a portion of our initial \$1.68 million request. These funds allowed us to add critical IT and data management capacity to our Puget Sound shellfish team. This capacity has allowed our team to begin to modernize antiquated internal and external data collection and storage processes including finalizing development of a new aquaculture data reporting software for industry. In addition to the IT efficiency gains, we utilized the remaining funds in FY 2024 to prioritize one-time critical fishery monitoring needs including developing and implementing a recreational squid creel in Puget Sound in winter 2023-24, conducting a phone/email survey of recreational crabbers in winter 2023-24 and spring 2024, and extending existing technician staff in the spring and fall to add additional capacity to recreational shrimp creeling in the spring and commercial shellfish fisheries monitoring.

Positions hired in FY 2024 include:

- IT Data Management – Journey (1 FTE) – Hired in April 2024



- Scientific Technician 3 (0.5 FTE) – Anticipated hiring date Dec. 2024 – Joint career-seasonal position with Forage Fish Unit dedicated to recreational crab creel sampling and commercial shellfish monitoring.

The staff hired with the funds from this proviso have allowed the Puget Sound shellfish team to expand our work in many key areas including intertidal bivalves and squid fisheries monitoring, Puget Sound Dungeness Crab Fisheries monitoring, shellfish and seaweed biosecurity, and Olympia oyster restoration.

## **Intertidal Bivalves and Squid Fisheries Monitoring**

The additional scientific technicians support by this funding contributed to our most productive creel season to date! The Intertidal Bivalve team performed 194 creel surveys between April 1 and October 15 (178 populated creels plus 16 creels where no effort was observed). Surveys resulted in 4,840 harvesters interviewed which broke our previous 2004 record for interviews by 23%. Relative to 2023, the total number of interviews increased by 30%. This increase over 2023, was primarily the result of our creelers being hired partially through 2023, so they couldn't contribute to a full field season.

With the additional funding received in 2023, we extended existing scientific seasonal technician staff into the fall and winter to perform a pilot creel study, developed to evaluate the recreational angling effort and harvest of market squid (*Doryteuthis opalescens*) in Puget Sound, only the second time this fishery has been assessed. A combination of creel (catch) and effort monitoring surveys were implemented on public fishing piers across Puget Sound from September 2023 through February 2024. 230 access point creel surveys were conducted (10% more than planned) in which 4,048 squid anglers were interviewed, 4.4 times more surveys than the last creel survey in 2016-17.

## **Puget Sound Dungeness Crab Fisheries Monitoring**

Utilizing the creel technicians funded through this proviso, the Puget Sound Shellfish Team conducted creel interviews of recreational crabbers in Puget Sound to monitor fishery compliance, effort, and catch rates, and promote education within the Puget Sound recreational Dungeness crab (*Metacarcinus magister*) and red rock crab (*Cancer productus*) fisheries. Boat ramps, marinas, and piers with a range of high to low use volume were monitored each open fishery day during the summer 2024 crab season (July 1 through September 2) and during a smaller number of open fishery days during the early part of the winter season.

During the summer 2024 crab season in Puget Sound, 318 individual creels were conducted across 38 different sites. A total of 12,786 recreational crabbers were contacted across 4,712 boats that were engaged in crabbing. Of the 36,011 Dungeness crabs observed in possession, 52% (n = 18,704) were sampled for biological and compliance data and 38% (n = 13,534) were weighed to further inform the average weight of an individual Dungeness crab. Of the 4,362 red rock crab retained, 39% (n = 1,719) were sampled for biological and compliance data and 24% (n = 1,056) were weighed to inform the average weight of an individual red rock crab. Additionally, 8,516 Catch Record Cards were checked from

individuals that caught and retained Dungeness crab to better understand the extent of undocumented catch.

## **Shellfish and Seaweed Biosecurity**

The two new staff members funded through this proviso (Fish and Wildlife Biologist 4 and Scientific Technician 2) were hired to the Shellfish and Seaweed Biosecurity team in FYs 2022 and 2023, and have expanded our capacity greatly. In 2024, these new staff contributed to processing 160 shellfish permits (133 Transfer and 27 Import permits) to date, including an expanded field presence which involved inspecting 10 Floating Upweller Systems (FLUPSY)/nursery systems, six shell piles, 19 wet storage/processing facilities, and eight aquarium/research facilities.

## **Olympia Oyster Restoration**

The new Fish and Wildlife Biologist 3 position was filled in July 2023. This additional capacity has allowed the program to begin updating the state's 10-year Olympia Oyster Restoration Plan, create an Olympia Oyster Restoration Catalog, win a grant to learn about native oyster genetics in the State, update hatchery protocols for native seed production, and produce the first draft of a Rapid Response Plan for climate-related shellfish mortalities. Other smaller projects include the creation of a reporting tool for shellfish mortality events, participation in working groups, committees, and grants, and an expanded presence at local and regional conferences.

## **Budget Overview: Proviso (17)**

The request to increase the spending authority for Puget Sound crab catch record card funds allowed the Puget Sound shellfish team to add needed capacity to adequately monitor recreational shellfisheries by updating historic harvest, effort, and compliance data that is crucial for sustainable fisheries management. To meet these needs, we initially requested to hire seven seasonal Scientific Technicians (2.7 FTE) dedicated to creel monitoring summer recreational Dungeness crab and recreational intertidal bivalve harvest. With the allocated funds, we were able to include an additional .25 FTE of a Scientific Technician 2, bringing the total staff to eight seasonal Scientific Technicians (2.9 FTE) dedicated to creel monitoring summer recreational Dungeness crab and recreational intertidal bivalve fisheries. These technician positions were filled again in FY 24.

## **Progress Update: Proviso (17)**

The eight scientific technicians dedicated to creel monitoring of recreational crab and intertidal bivalves were hired for the first time in spring 2023 and these positions were again filled in 2024. The contributions of these staff are summarized in the prior "Intertidal Bivalves and Squid Fisheries Monitoring" and "Puget Sound Dungeness Crab Fisheries Monitoring" sections.

# Dungeness Crab Harvest

Proviso (53) directed the Department to monitor recreational Dungeness crab harvest along the Washington coast.

## Budget Overview

Recreational catch in Washington's coastal Dungeness crab fishery has not been monitored historically, leading to uncertainty about harvest levels at popular access sites and within tribal usual and accustomed (U&A) fishing areas. To address this gap, the Coastal Recreational Crab Sampling Unit (CRCSU) was established to monitor recreational crabbing effort and produce area-specific catch estimates. The CRCSU is being implemented in three phases. Phase one was completed in fiscal year 2023 and focused on program development. Activities completed in phase one included hiring and training staff, purchasing necessary monitoring equipment, designing a comprehensive monitoring plan. The CRCSU team is currently comprised of six staff members (see Figure 9):

- Fish and Wildlife Biologist 3 (1 FTE) – Lead crab biologist – hired November 2022
- Fish and Wildlife Biologist 2 (1 FTE) – crab biologist – hired April 2023
- Scientific Technician 2 (1 FTE) – crab creel sampler – hired July 2023
- Scientific Technician 2 (0.5 FTE) – crab creel sampler – hired April 2023

Phase two of CRCSU implementation was completed in fiscal year 2024. Phase two activities included implementing the monitoring plan developed in phase one by conducting systematic sampling along Washington's coast, gathering data on recreational Dungeness crab catch, including catch volume and effort. Phase three will focus on refining the sampling methodology to enhance accuracy and efficiency, using insights and data generated in phase two to develop a catch estimate methodology. Catch estimates generated by the CRCSU will provide WDFW fishery managers with information necessary to estimate recreational harvest of coastal Dungeness crab needed to effectively manage the coastal Dungeness crab resource.

## Progress Update

The CRCSU completed its first complete year of sampling within fiscal year 2024, with creeling activities implemented in full force from September 15, 2023 to September 16, 2024. The primary focus of activities within phase two was to test the efficacy of the monitoring plan developed in phase one. Specific goals included the following at each site:

- Monitor crabbing effort and catch;
- Determine the gear types used by participants;
- Determine if crabbing effort differed between weekdays and weekends;
- Define how crabbing effort is affected by seasonality, holidays, and public participation in other fisheries;

- Define how land-based and boat-based crabbing effort differs; and
- Define the impact of inclement weather, bar restrictions, and small craft advisories on crabbing effort.

In fiscal year 2024, CRCSU creel staff conducted surveys at 25 coastal access sites within Grays Harbor and Pacific County, completing 13,676 interviews and sampling 13,115 Dungeness crabs for biological data from 24,819 crabbers. Key take aways included the identification of:

- Sites with consistently high effort (e.g., Westport Marina, Ilwaco Landing, etc.);
- Federal and non-federal holidays that significantly impact participation within the fishery;
- Fisheries openers (e.g., salmon, razor clam) and other coastal activities (e.g., festivals) that impact effort;
- Gear types used at each location; and
- Seasonal trends in effort and catch per unit effort (CPUE) across sites and gear types.

In addition to conducting effort counts and surveying crab catch, the CRCSU also met with groups within and outside of the agency to solicit feedback on the teams' monitoring plan and to seek assistance with the development of a methodology for catch estimation. In fiscal year 2024, the CRCSU met with the:

- WDFW Ocean Sampling Program (OSP);
- WDFW Puget Sound Dungeness crab creel team;
- WDFW Freshwater Creel Team; and
- Fishery managers from the Quinault Indian Nation

Internal agency discussions resulted in incremental improvements to the monitoring plan and the questionnaire used during creel surveys. The monitoring plan received positive feedback and strong support from Quinault fishery managers; co-managers expressed that they look forward to continued meetings to stay informed about the activities of the CRCSU and would like to be routinely updated with regard to the status of development of catch estimates for coastal access sites and beaches in and around Grays Harbor.

## Challenges

During the summer months, recreational crabbing activity poses unique challenges for the CRCSU, as crabbing occurs across diverse sites such as beaches, mudflats, docks, and boat launches, demanding extensive coverage. Sampling is especially difficult due to crabbing's sporadic distribution over a broad area, with many crabbers adding crabbing to their salmon or bottom fish trips, further stretching resources. Staffing drops to three technicians in the summer, often requiring one sampler to cover both a beach and a major port in a single day. With limited support from other creeling programs, samplers must cover multiple locations, reducing the frequency of interviews. Adding two additional technicians—one for the Columbia River and one for Grays Harbor/Pacific County—would help address these coverage gaps, enabling more consistent data collection.

## Next Steps

Building on the progress made in phase two, the CRCSU will enter the third phase of implementation in fiscal year 2025. The focus of the CRCSU in phase three includes the completion of the following specific goals:

- Continued refinement of the harvest monitoring plan to account for site variability, seasonal influences, and other factors that impact fishing effort;
- Construction of a database and data analysis pipeline; and
- Development of a catch estimation methodology capable of producing site-specific estimates along with their associated uncertainty.

To ensure the CRCSU meets these goals, the lead biologist plans to hold a series of technical meetings with Research Scientists within the WDFW Freshwater Creel Team. The CRCSU is also exploring whether the use of electronic catch record cards (eCRC) could address coverage gaps in creel surveys, particularly at coastal beaches where effort is sporadic and widely distributed.



Coastal Recreational Crab Sampling Unit staff. Photo by WDFW.