

THE OREGON HATCHERY RESEARCH CENTER

ANNUAL REPORT

2024



**FEBRUARY
2025**

Prepared by

OHRC BOARD

Prepared for

**OREGON
LEGISLATURE**

ODFW DIRECTOR

ODFW COMMISSION



TABLE OF CONTENTS

		EXECUTIVE SUMMARY	1
		INTRODUCTION	3
		THE BOARD	5
		RESEARCH PROGRESS OHRC-FUNDED PROJECTS	6
		RESEARCH PROGRESS OHRC-AFFILIATED PROJECTS	15
		EDUCATION AND OUTREACH	20
FUNDING HIGHLIGHTS	22		
ACKNOWLEDGEMENTS	23		
CONTACT INFO	24		
APPENDIX A: PUBLICATIONS AND REPORTS	25		
APPENDIX B: PRESENTATIONS	27		

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EXECUTIVE SUMMARY

Fish hatcheries are an important tool in sustaining harvestable populations of salmon and trout in Oregon, but many face operational challenges and financial constraints. Research can play a vital role in guiding improvements to help hatcheries meet state fisheries goals, especially amid changing environmental conditions. **The Oregon Hatchery Research Center (OHRC) is at the forefront of this effort, dedicated to advancing hatchery management practices and addressing emerging challenges.** Through its innovative research, the OHRC continues to shape the future of hatchery science.

OHRC GOALS

- Understand mechanisms that may create differences between hatchery and wild fish
- Develop approaches to manage hatchery fish that conserve and protect native fish
- Educate and train students, fishery biologists, managers, and the public on the relationship between hatchery and wild fish, the connection between fish and watershed, estuarine and ocean systems, and the implications for fish management and stewardship



18

large-scale research projects since 2005

\$5M

of dedicated research funding since 2016
+ additional in-kind support

20

years of education and outreach to
youth and fisheries students

KEY ACCOMPLISHMENTS IN 2024

- Made progress on 4 large-scale research projects related to salmon imprinting & homing, timing of release, genetically informed mate pairing, and the perceptions of hatcheries across different fishing groups including Oregon's Tribal communities
- Fully transitioned lab operations to the Aquatic Animal Health Lab (AAHL) in Corvallis
- Launched 2 additional research projects with ODFW and the Coquille Indian Tribe
- Hosted a 40-person workshop on best practices for the use of hatchboxes
- Provided numerous education and outreach opportunities for undergraduate and graduate college students and the public



WHY IT MATTERS

Salmon are essential to the cultural heritage of Oregon. The science conducted and advised by the OHRC is directly tied to objectives for increasing the abundance and performance of hatchery fish to maintain harvestable levels for commercial, recreational, and Tribal fisheries. OHRC research works to inform hatchery management that better supports angler opportunity and wild fish conservation to sustain this resource into the future.

CONTACT



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🌐 fishbehaviorscapeslab.com/ohrc-about

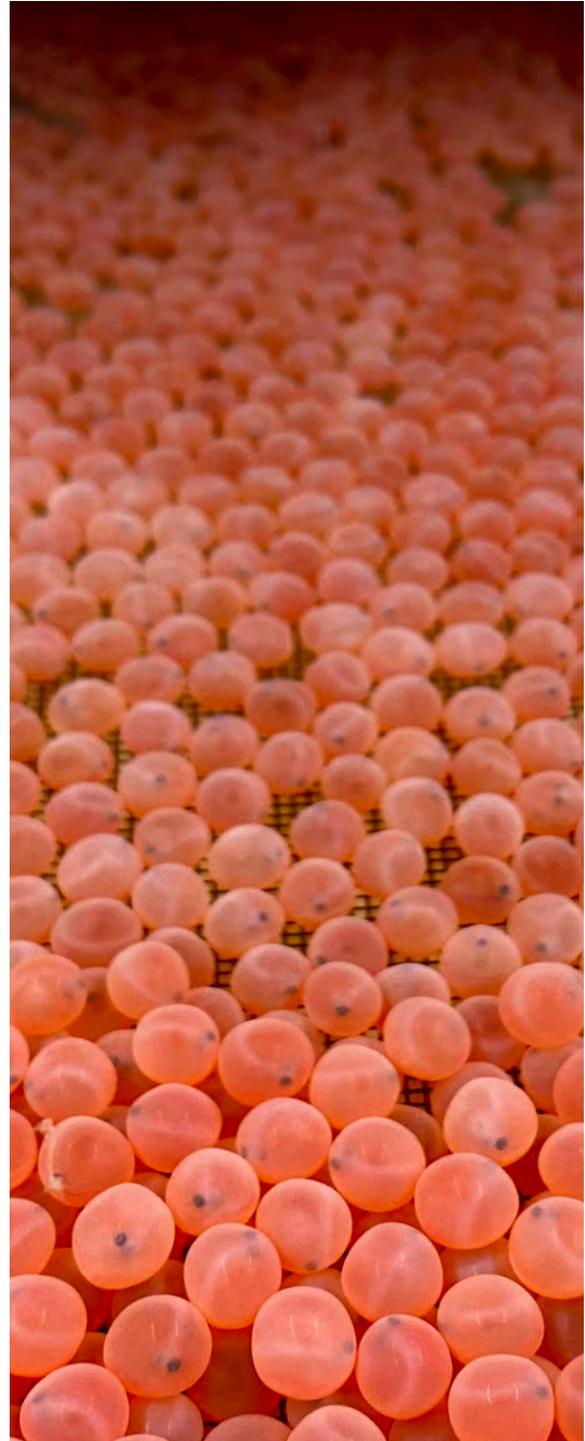


INTRODUCTION

PURPOSE

This report fulfills the Oregon Hatchery Research Center (OHRC) Board's requirement to report to the Legislative Assembly, the State Fish and Wildlife (ODFW) Director, and the State Fish and Wildlife Commission each calendar year on the findings of projects supported by the OHRC research fund, and any recommendations regarding current hatchery management practices based on OHRC research projects (ORS 498.827(6)).

We also detail the OHRC's involvement in supporting studies for collaborators on external projects that launched in 2024. Further, we elaborate on outreach efforts, including a workshop on best practices for the use of hatchboxes. Lastly we outline our funding allocations and provide a linked list of publications and presentations on research progress and findings from the last year.



ABOUT THE OHRC

The Oregon Hatchery Research Center (OHRC) is a collaboration between the Oregon Department of Fish and Wildlife (ODFW) and Oregon State University's Department of Fisheries, Wildlife, and Conservation Sciences. The purpose of the OHRC is to conduct research with the aim of improving hatchery operations through innovative science and to disperse knowledge to others through mentorship and outreach. The OHRC Board allocates research funds to projects with objectives that align with the OHRC Mission and Goals.



MISSION

To be an internationally recognized leader in fisheries science, conducting research to define the mechanisms that may create differences between hatchery and wild salmonids, recommending strategies to manage those differences, and educating Oregonians about the benefits, risks, roles, and performance of hatcheries in fisheries augmentation and conservation.

GOALS

- Understand mechanisms that may create differences between hatchery and wild fish.
- Develop approaches to manage hatchery fish that conserve and protect native fish.
- Educate and train students, fishery biologists, managers, and the public on the relationship between hatchery and wild fish, the connection between fish and watershed, estuarine and ocean systems, and the implications for fish management and stewardship.

OPERATIONS

The original site of the OHRC was at an experimental hatchery on Fall Creek near Alesia, OR. However, in 2020, a landslide occurred upstream of the hatchery causing human safety and water quality concerns. In late 2023, operations were transitioned to the Aquatic Animal Health Lab (AAHL) in Corvallis where researchers still have the capacity to rear fish in a laboratory setting, with the added benefit of high-quality well water and the ability to manipulate water temperature for experiments.

THE BOARD

The OHRC Board was established in 2013 in accordance with House Bill 3441. The Board consists of 15 members, including 12 voting members. The Board is charged with advising the OHRC Director on operational, budget and research priorities at the research center. Members are appointed by the ODFW Director.

All members of the Board must be residents of this state who are well informed on matters related to fish management policy and scientific research and who demonstrate an interest in research related to the propagation of fish in hatcheries.

Member	Position	Term Expiration
Seth White	Director	
Scott Starkey	Forestry, Board Chair	6/30/27
Dwight Collins	Oregon Salmon Commission	6/30/25
Derek Wall	Columbia River Gillnet	6/30/25
Tom Alkire	Wild Fish Advocacy	6/30/25
Yancy Lind	Wild Fish Advocacy	6/30/26
Anna Le	Sport Angling	6/30/27
Randall Brummett	Sport Angling	6/30/27
Ted Simon	Agriculture	6/30/24
Chuck Pavlik	Coastal Ports	6/30/24
Steve Jacobs	Independent Science	6/30/25
Peter Gruendike	Fish Habitat Restoration	6/30/25
Travis Mackie	Oregon Indian Tribes	6/30/25
*Lance Kruzic	Federal Agency	Indefinite
*Carl Schreck	OSU	Indefinite
*Tom Stahl	ODFW	Indefinite
*Non-voting		

RESEARCH PROGRESS

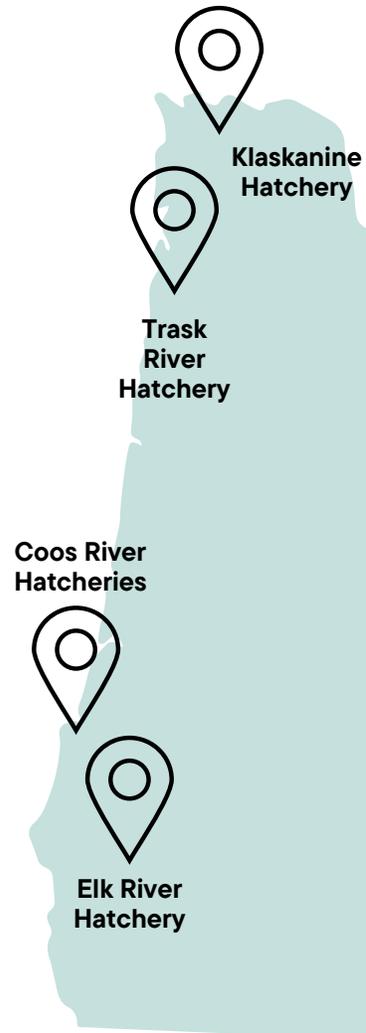
OHRC FUNDED PROJECTS

The following section details progress on the four projects that were funded through OHRC's dedicated Research Fund in 2024. The Board advises the Director on research areas of interest, a request for proposals is announced, and the Board, Director, and ODFW select projects based on feasibility, scientific merit, and how they meet the priority research concepts.

Timing of Release 2023 - present



- * Along the Oregon coast, seven ODFW hatcheries propagate fall-run Chinook Salmon to release into coastal rivers for harvest augmentation. Given increasing river temperatures, more variable flow regimes, and changing ocean conditions, existing release strategies based on historical ocean conditions may not optimize survival and fitness of migrating fish.
- * The goal of this study is to identify rearing and release strategies for juvenile hatchery Chinook Salmon that optimize the quality and abundance of returning adults under changing ocean conditions. To achieve this goal, researchers collaborate with ODFW to evaluate the performance of existing and novel release groups.



Dr. Jessica Miller
Project PI, OSU

Other contributors: Dr. Brian Beckman (OSU)
Dr. Marc Johnson (NOAA)

OHRC FUNDED PROJECTS - TIMING OF RELEASE

Progress in 2024

In 2024, two experimental releases of 2023 brood year fish were completed, which included new release groups in the Trask and Coos systems. Trask River releases occurred by June 2024, a bit earlier and larger than originally proposed, but nonetheless providing a comparison against the existing August in-river volitional release of much smaller fish. The Coos Bay releases proceeded as planned, with fish reared at Cole Rivers Hatchery and released at Morgan Creek in June.

Additionally, researchers conducted pre-release sampling of juvenile body size and condition. At least fifty individuals were weighed and imaged in May 2024 from the Morgan Creek STEP June release, Millicoma STEP mid-May release into Fourth Creek, and the later Morgan Creek STEP release group that was still in Bandon Hatchery. They also sampled the wild Coquille experimental release group that was reared at the Bandon Hatchery for comparison with the other release groups.



Photo credit: USFWS

Management Implications:

This research is expected to generate actionable recommendations for juvenile salmon rearing and release strategies by quantitatively comparing existing and new release groups. Given the duration of marine residence and the variable age-at-maturity for coastal Chinook Salmon populations, full analysis of survival data will take several years. Overall, the knowledge generated can inform hatchery practices and, potentially, also inform infrastructure needs that facilitate the development of more resilient hatchery rearing strategies considering projected future environmental variation.



Olfactory Imprinting 2014 - present

* The Olfactory Imprinting Project was designed to better understand the physiological processes that govern olfactory imprinting and homing in Pacific salmon, with the goal of managing the olfactory experience of hatchery salmon to reduce straying onto natural spawning grounds.

* The field experiment aimed at testing the use of amino acids as odorants to imprint and attract fall Chinook at the Elk River Hatchery continued in 2024 with plans to end in 2026.

* The lab component of the work progressed in 2024 with 2 experiments: one to develop a gene expression proxy for odor imprinting, and another to test positive controls for Y-maze behavioral trials.



Dr. Andy Dittman
Project PI, NOAA



Dr. Seth White
Project PI, OSU



Dr. Tom Quinn
Project PI, UW



Dr. Marc Johnson
Project PI, NOAA



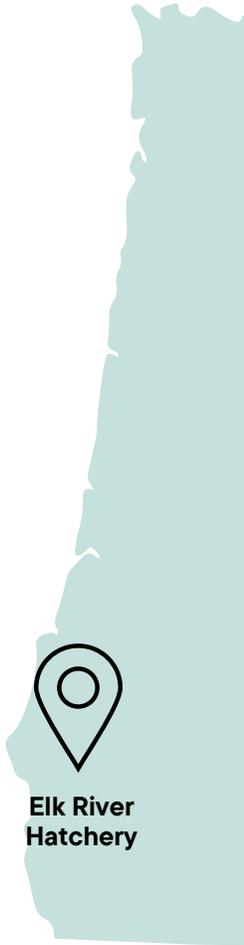
Ashley Sanders
Research Assistant
OSU



Darran May
Research Assistant
UW



Mimi Obley
PhD Student, OSU



Elk River Hatchery

Progress in 2024

The field experiment aimed at testing the use of amino acids as odorants to imprint and attract fall Chinook at the Elk River Hatchery continued in 2024. Juvenile fish were imprinted with odors at the hatchery for 3 brood years (2019-2021) and adult return detections started in 2022 and will continue through 2026 to capture all 3-5 yrs old adults.

During the 2023-2024 return year, 1,059 experimental salmon were recovered at the hatchery, 154 were recovered in the sport fishery, and 128 were recovered on spawning grounds. Recoveries from the 2024-2025 return year are currently being collected and coded wire tag data will be available later in 2025.

For the gene expression lab experiment, fish were exposed to odors at different developmental stages (embryo, early smolt, late smolt) alongside a unexposed control group. Olfactory rosettes were collected monthly to assess expression of genes associated with olfactory function. Gill tissue and blood were also collected from control fish to monitor smoltification (an important life history stage in regard to olfactory memory). A subset of fish remaining after the sampling will be reared at AAHL in conditions that promote early maturity in males (2 years old) to test if olfactory gene expression persists at a time when they would begin homing.

Another lab study using Elk River fry was developed to identify an appropriate positive control odor (a deterrent) for salmonid Y-



maze behavioral studies and explore differences in deterrent response between individual fish vs. a group of fish. Results showed that using fish skin extract as a positive control is laborious to prepare and requires sacrificing a live fish, which is not the case for a synthesized amino acid L-serine, however, the fish skin extract is a more reliable deterrent in future Y-maze work.



Management Implications:

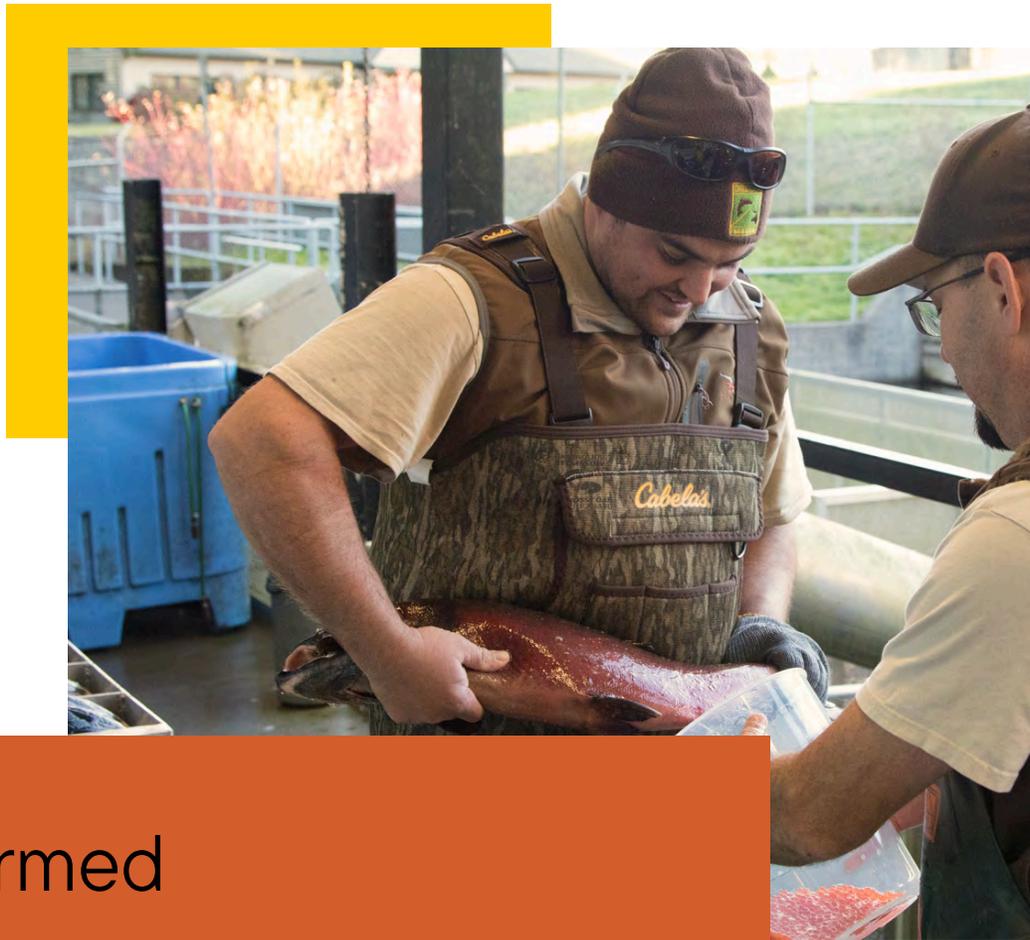
- A goal of the project is to improve homing fidelity of hatchery salmon by developing novel rearing strategies to improve imprinting. Researchers have tested and identified odorants that may be effective as salmon imprinting odors and they have initiated a multi-year hatchery-scale experiment to assess the efficacy of this strategy using added amino acids as homing cues. This study is still ongoing and no management recommendations can be made before analysis of the full dataset.
- A second goal was to understand the importance of exposure to river water during early development on homing success. Our study indicated that at the Elk River Hatchery, embryonic exposure to river water versus well water did not impact homing success. Embryo rearing

in well water is an effective strategy for disease control and regulation of development and at some hatcheries does not affect homing success. However, well water differs widely between hatcheries (Elk River Hatchery's well water chemistry is more similar to surface water because of its source) and each hatchery's well water should be examined for potential deleterious effects.

MARINE AND STRAY DISTRIBUTION PATTERNS

Research funds for the Olfactory Imprinting Project also supported work done by OSU PhD student Mimi Obley, who is taking a larger-scale approach to homing and straying by identifying if the marine distribution patterns of salmon bias where individuals stray, and what river conditions may attract hatchery strays. Despite salmon's innate ability to home to their natal stream, individuals stray away from their river of origin into other streams, rivers, or systems.

This analysis is expected to help predict where fish may stray under changing climate and ocean conditions. Marine and stray distribution patterns are currently being collected and categorized from the coded wire tags from the RMIS database to compare distributions. Stream data from the stray distributions are also being used to better understand the conditions that influence stray distributions.



Genetically Informed Mate Pairings

2014 - present

* Previous research has shown that fitness differences exist between offspring from naturally breeding parents and offspring from parents that were randomly paired at a hatchery, even when accounting for captive rearing in a hatchery.

* The primary goal of this research is to determine whether using genetic characteristics to inform Coho Salmon matings in the Sandy River Hatchery improves reproductive success, which is defined as the number of offspring produced by a spawning pair.



Dr. Kathleen O'Malley
Project PI
OSU/ODFW



Dr. Kevin Olsen
Post-doc Scholar
OSU



Sandy River Hatchery

Other contributors: Dr. Michael Banks (former PI, retired OSU), Dave Jacobson (COMES, HSMC), Heather Auld (COMES, HMSC), Drummond Wengrove (COE, HMSC iLAB), Spencer Tanenholtz (COE, HMSC iLAB), Rahul Kumar (COE, HMSC iLAB)



Progress in 2024

In 2019, 2020, and 2021, Coho Salmon mate pairs were identified and spawned based on their genetic characteristics while a second group of mate pairs were selected at random (i.e., the typical approach used in a hatchery setting). In years following (2021 – 2024), returning Coho Salmon identified as offspring were used to estimate the reproductive success of the genetics-based mating approach and random pairing of parents in the hatchery. The ~4,000 Coho Salmon returning in 2024 represent the last year of potential offspring associated with this study.

Drs. Kathleen O'Malley and Kevin Olsen of the State Fisheries Genomics Lab have taken over the project following Dr. Michael Banks' retirement. The 2024 samples are currently being processed in the lab and data analyses and report writing are scheduled to be completed in 2025.

Management Implications:

Results from this study are still being evaluated and no management recommendations can be made before analysis of the full dataset. However, if results are positive and convincing, then genetically informed breeding strategies could potentially increase hatchery contributions to marine and inland fisheries if logistical barriers can be overcome to make the practice feasible at a production scale.

Perceptions of Hatcheries 2023 - present

- * The focus of this research is on understanding public perceptions of salmonid hatcheries and identifying subgroups with similar beliefs about hatcheries. The study is premised on the idea that understanding where people are coming from – their existing beliefs and experiences – is critical for effective communication.
- * To study perceptions of hatcheries, this project focuses on two primary audiences: Tribal communities and non-Tribal fishing communities.



Dr. Kelly Biedenwieg
Project PI
OSU



Dr. Megan Jones
Project PI
OSU



Dr. Samantha Chisholm-Hatfield
Project PI
OSU



Dr. Brian Erickson
Post-doc Scholar
OSU

Progress in 2024

The study uses semi-structured interviews focusing on fisher perceptions and Traditional Ecological Knowledge. In 2024, the researchers completed interviews with non-tribal fishing communities and began interviews with Tribal members, which will conclude in March 2025.

Management Implications:

The results of this study will inform hatcheries outreach, education, and engagement about hatcheries in Oregon by supporting more tailored communication to different fisheries audiences and more effective facilitation of stakeholder consultations.



ODFW Flickr

RESEARCH PROGRESS

OHRC AFFILIATED PROJECTS

The following section details research projects that were associated with OHRC, but carried out by collaborators and **not** funded by the dedicated OHRC Research Fund. The OHRC has long-standing relationships with research entities at OSU such as the Wild Surrogate Salmonids Project and the Statewide Fisheries Genomics Lab, as well as new connections with the Coquille Indian Tribe, the ODFW office in Roseburg, and the Columbia River Inter-Tribal Fish Commission.

Coquille Indian Tribe Hatchbox Study



- * In 2024, OHRC staff began consulting on a research project led by the Coquille Indian Tribe (CIT) assessing the efficacy of using streamside incubators (“hatchboxes”) to utilize excess ODFW hatchery broodstock and enhance fall Chinook returns in the Coos River.
- * OHRC is providing study design recommendations to the CIT that will allow them to evaluate the survival rate of fish raised in hatchboxes, and if possible, to evaluate differences in survival between fish released volitionally from the incubators and those transported and released upstream.
- * Hatchboxes are drawing increasing interest from various stakeholder groups in Oregon. The CIT Hatchbox Study provides an opportunity to develop best practices, as well as evidence-based evaluations of their effectiveness.

The study was initiated on a small accessible Coos River tributary, the West Fork Millicoma River, that no longer experiences a strong run of natural-origin fish but has ample juvenile rearing habitat. The Millicoma Interpretive Center, located on this tributary, has the space to house CIT propagation equipment to eye and incubate eggs. Fin tissue clips from all adults were collected and will be genotyped to form a genetic library to which adult returns in 3-5 years will be matched to confirm hatchbox origin. Fertilized eggs from each spawning event have been divided into 2 groups: half to release volitionally from the boxes and the other half to be transported and released upstream. The field crew is refining protocols to use in the following years.



**Millicoma
Interpretive
Center**

North Umpqua Spring Chinook Telemetry Study

- * The OHRC is working with ODFW on a radiotelemetry study to better understand the spawning distributions of natural- and hatchery-origin spring Chinook Salmon and to estimate the percent of hatchery-origin adult spawners on natural spawning grounds (pHOS) in the North Umpqua River.
- * Other research questions aim to understand the influence of flow and temperature on fish movements, and compare the timing of spawning migrations between natural- and hatchery-origin fish.
- * Field work was completed in 2024 and data are being analyzed by OSU post-doc Zach Sherker.



From April to August 2024, ODFW captured and tagged 200 spring Chinook Salmon (100 wild, 100 hatchery-origin) at the Winchester Dam throughout the spawning run as fish entered the North Umpqua River. Fish were tracked throughout their spawning migration with mobile and stationary radiotelemetry receivers. Half of the tags were advanced radiotelemetry tags that collect temperature and accelerometry data for the fish every 5 minutes throughout their spawning migration. Over 30% of these advanced radiotelemetry tags were recovered from salmon on the spawning grounds and at the hatchery to provide high resolution data on the thermal conditions experienced by fish during the spawning run.



**Rock Creek
Hatchery**

Data analysis has begun and preliminary results suggest that most hatchery-origin fish returned to the Rock Creek Hatchery for spawning and the bulk of natural-origin spawning took place in the upper river. River flow and temperature seem to be key factors in determining the timing of upstream migration for spawning migrants, with high temperatures delaying upstream migrations and increasing the likelihood of fish holding in the system.

Further analyses will provide insights on the rate of migration through different sections of the river for wild and hatchery-origin spawners. The OHRC is mentoring an OSU undergraduate student to investigate the relationship between fish migration speed and temperature conditions from data captured by the advanced radiotelemetry tags to document the use of thermal refugia at different points in the spawning migration.



State Fisheries Genomics Lab



Dr. Kathleen O'Malley directs the [State Fisheries Genomics Lab](#) (SFGL) which conducts research to address the science and management needs of Oregon State University's [Coastal Oregon Marine Experiment Station](#) and the [Oregon Department of Fish and Wildlife](#). The SFGL has close ties to the operations and mission of OHRC. They provide leadership in the production of genetic data, the development of science-based tools from those data, and the formulation of science-based recommendations based on genetic information.

In 2024, the SFGL's salmonid research focused on Chinook Salmon, Chum Salmon, Coho Salmon, Steelhead, and Redband Trout. One research area focused on whether the lower reproductive success of hatchery-origin fish in the wild persists among their wild-born offspring. In the study of McKenzie River Chinook Salmon, researchers found that the low reproductive success did not persist in the offspring of wild spawning hatchery-origin salmon. Instead, the wild-born offspring produced almost twice as many adult offspring compared to hatchery-origin salmon, which continued to show lower reproductive success. These findings offer encouraging news for the use of hatchery salmon in support of conservation and recovery efforts. For more details, check out the [press release](#) and news report on [KLCC](#).

Another research area is focused on evaluating reintroduction programs for threatened spring Chinook Salmon in Fall Creek and the South Santiam River in Oregon. Results indicate that spring Chinook Salmon released above dams in these two systems are not replacing themselves, except for one year in Fall Creek. These findings were published in two U.S. Army Corps of Engineers [Technical Reports](#) and presented to fisheries managers at the annual [Willamette Fisheries Science Review](#).

Ongoing research includes:

- Analyzing genetic data to help inform NOAA Fisheries decision regarding the recent petitions to list Oregon Coast Chinook Salmon as endangered or threatened under the Endangered Species Act.
- Finalizing a genetic monitoring study of steelhead and Redband Trout in the Klamath Basin prior to removal of the four dams. This study will serve as an important baseline for future monitoring efforts.



Hatfield Marine Science Center

Wild Surrogate Salmonids Project



Migration patterns and survival of salmonids are related to their downstream movement through hydroelectric dams. Evaluation of passage improvement efforts has relied on hatchery-origin fish to accommodate the large sample sizes required for robust fish passage and migration studies. However, differences in morphology, behavior, and physiology between hatchery-origin and wild juveniles could confound estimations of dam passage efficiencies and survival. The main goal of the Wild Surrogate Salmonids Project is to provide wild fish surrogates for Upper Willamette Valley Project Research Monitoring & Evaluation migration and survival studies. This project has long-standing ties with OHRC as a previous recipient of research funds, shared/close proximity of facilities at Fall Creek and the AAHL, and ongoing collaborations.

In 2024 all fish were reared at the OSU Fish Performance and Genetics Laboratory (FPGL). The primary deliverables from the last year were for release studies on Foster, Green Peter, and Lookout Dams using Chinook Salmon and winter-run Steelhead. Researchers continue to rear deliverables for future Foster and Green Peter Dam tagging events.

In addition to the USACE deliverables, staff also reared 3,000 spring Chinook Salmon for two studies occurring at the FPGL. Half of the individuals were used for ongoing gut microbiome studies occurring at the AAHL, while the other half were allocated for a cyclical fasting study at the FPGL. Lastly, collaborating with the Columbia Intertribal Fish Commission (CRITFC) and the OHRC, staff are currently rearing 1,500 Umatilla Chinook Salmon for an upcoming epigenetics study to be conducted at the OHRC.

In 2024, the Surrogate Project continued studies on fasting Chinook Salmon during their growth phase. The BY23 fasting experiment was conducted at the FPGL to look at intermittent fasting in fish fed the low-lipid wild Chinook grower (Surrogate) diet versus Bio-Oregon commercial diet. Proximate analysis was used to determine energy allocation, and growth curves were evaluated for both brood years. Research will continue for this study to compare diets directly, assess stress, and test disease susceptibility.



EDUCATION AND OUTREACH



* HATCHBOX WORKSHOP

On November 14, the OHRC hosted an all-day Hatchbox Workshop to provide information and facilitate discussion on the use of alternative rearing strategies (streamside incubators, in-stream boxes, unfed fry releases, termed “hatchboxes”) with ~40 participants from a wide variety of fisheries backgrounds.

The event started out with an introduction to the topic and an overview of the information available in the literature, followed by a series of reintroduction case studies of their use in Oregon, Idaho, and California. The afternoon session was comprised of a technical session led by NOAA Fisheries scientists who spoke about the genetic and ecological risks of using hatchboxes for different purposes. The event was wrapped up with a small group discussion of the guiding questions and a large group discussion to summarize what was covered in the small groups. Feedback from the event was overwhelmingly positive and OHRC staff are compiling information to present at Oregon Chapter of the American Fisheries Society (ORAFS) Conference in February 2025 and to document best practices for the use of hatchboxes in Oregon.

* STAKEHOLDER OUTREACH

The OHRC Director and staff shared information about OHRC research at several Oregon Anglers Alliance monthly meetings in 2024 to stay connected to the angling community. The OHRC Director and staff also participated in ODFW’s Hatchery Resilience Review public meetings to interact with hatchery advocates, wild fish advocates, other members of the public, and ODFW staff.

* RADIO INTERVIEW

OHRC Director Seth White participated in a radio interview with hosts of [KWRO’s Hooked on Oregon Podcast](#) based out of Coos Bay. The conversation covered the OHRC collaboration with the Coquille Tribe on the Hatchbox Study as well as modern fisheries management practices as they relate to increasing fish performance and abundance.

* **UNDERGRADUATE MENTORSHIP**

OLFACTORY IMPRINTING PROJECT

In 2024, the Olfactory Imprinting Project provided mentoring to an undergraduate student, Kasey Ingram, who learned valuable skills in fish physiology sampling techniques and fundamental understanding of fish imprinting and homing. Kasey worked as a lab technician over the summer as a part of the Vanguarding an Inclusive Ecological Workforce (VIEW) Fellowship through the OSU Department of Fisheries, Wildlife, and Conservation Sciences. She learned aquaculture techniques at the AAHL and helped set up the Y-mazes that can be used in future studies on olfaction for this project and OSU course labs. She also completed the lab work for a fish pathogen project developed by OHRC staff and Microbiology collaborators at OSU. Kasey learned how to design and execute a lab study, follow samples from collection to analysis, and plan for the second stage in January 2025. She gave presentations to the VIEW program and to the OHRC Board at the fall meeting.

Graduate student Mimi Obley and Kasey also participated in an outreach event over the summer at AAHL where they assisted with fish pathology lessons to a visiting group of high school students.



NORTH UMPQUA TELEMTRY STUDY

Post-doc Zach Sherker, who is analyzing the data collected by ODFW, is mentoring an undergraduate student who is interested in using the advanced tag data to identify thermal refugia. He is gaining skills in developing research ideas, working with large datasets, and communicating his findings to fisheries professionals at ORAFS in February 2025.

FINANCIAL HIGHLIGHTS

Operations, Education, and Outreach Funding

ODFW's 2023-2025 operations budget for the OHRC is approximately \$800,000. Given the closure of the Fall Creek facility in November 2023, only about \$350,000 of these funds were spent at this site (for operations before closure and limited staffing to minimally maintain the site so it does not fall into disrepair prior to final disposition). Once OHRC activities were moved to the Aquatic Animal Health Lab (AAHL), which is part of OSU and located just outside of Corvallis, after the closure of the Fall Creek facility, approximately \$450,000 has been provided to OSU for the use and research associated with OHRC work at AAHL. Note that all of these facility funds are from ODFW's base License funding, and do not come from the dedicated account established for OHRC research.



Research Funding

A dedicated Oregon Hatchery Research Center Fund was established by the Legislature in 2015 (Oregon Laws 2015, Chapter 734). This funding began accruing on January 1, 2016 and comes from recreational and commercial fishing surcharges and ad valorem fees, respectively, that go to ODFW. ODFW expends these funds on research projects recommended by the OHRC Board, which are described in other sections of this report. Through December 2024, this fund has generated over \$5 million in revenue for research funding, which is approximately \$500,000 per year and \$1 million per biennium. The amount of research funding available each biennium is based on unspent revenue that has already been received, previously obligated contract amounts, and additional revenue projections through the end of the biennium that are done by ODFW's economists. For the 2023-25 biennium, it is expected that, consistent with previous biennia, approximately \$1 million will be available for OHRC Research.

All research budgets are formally approved through OSU-ODFW Intergovernmental Agreements and associated sub-awards. Research conducted at and through the OHRC is supported not only by the OHRC Dedicated Research Fund, but also by extramural funding. For example, the U.S. Army Corps of Engineers awarded Drs. Noakes & Schreck \$810,000 per year to carry out the Wild Surrogate Project through the OHRC, and that extramurally supported work is ongoing.

2023-25 Budgets (approximate)



Operations

\$800K



Research

\$1M

ACKNOWLEDGEMENTS

A draft of this report was prepared for the OHRC Board by Ashley Sanders and Dr. Seth White, with project specific contributions from researchers Michelle Scanlan, Darran May, and Mimi Obley, as well as Drs. Andrew Dittman, Tom Quinn, Marc Johnson, Kathleen O'Malley, Kevin Olsen, Kelly Biedenweg, Megan Jones, Brian Erickson, Samantha Chisholm-Hatfield, Jessica Miller, and Zachary Sherker. The photo on the cover page, as well as a few throughout the report, are credited to the ODFW Flickr.



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APPENDIX A

PUBLICATIONS AND REPORTS IN 2024

Dayan, D.I., Sard, N.M., Johnson, M.A., Fitzpatrick, C.K., Couture, R., O'Malley, K.G. (2024) A single generation in the wild increases fitness for descendants of hatchery-origin Chinook salmon. *Evolutionary Applications*, 17(4), [e13678](https://doi.org/10.1111/eva.13678). DOI:10.1111/eva.13678

Dittman, A.H., May, D., Johnson, M.A., Baldwin, D.H., Scholz, N.L., 2024. Odor exposure during imprinting periods increases odorant-specific sensitivity and receptor gene expression in coho salmon (*Oncorhynchus kisutch*). *Journal of Experimental Biology* 227, jeb247786. <https://doi.org/10.1242/jeb.247786>

Narum, S.R., Campbell, M., Coykendall, K., Meek, M., O'Malley, K.G., Wellenreuther, M. (2024) Advances in salmonid genetics - Insights from coastwide and beyond. *Evolutionary Applications*, 17(6), [e13732](https://doi.org/10.1111/eva.13732). DOI:10.1111/eva.13732

Olsen, K.C., Fitzpatrick, C.K., O'Malley, K.G. (2024) Evaluating genetic diversity between natural-origin and hatchery-origin Chinook salmon in the Coquille River. State Fisheries Genomics Lab, Hatfield Marine Science Center, Oregon State University. Newport, OR. [33pp.](#)

Olsen, K.C., Fitzpatrick, C.K., Smith, K.L., O'Malley, K.G. (2024) Oregon Chum salmon reintroduction: Genetic parentage and diversity analysis of the 2023 spring outmigrant fry and adult returns. State Fisheries Genomics Lab, Hatfield Marine Science Center, Oregon State University. Newport, OR. [28pp.](#)

O'Malley, K.G., Hereford, M.E., Olsen, K.C., Pearse, D.E., Tinniswood, W.R., Ramirez, B.S., Armstrong, J.B., Piotrowski, S. (In Prep) Characterizing the distribution of genetic diversity of *Oncorhynchus mykiss* in the Klamath Basin before dam removal.

O'Malley, K.G., Fitzpatrick, C.K., Olsen, K.C. (2024) Evaluating spring Chinook salmon releases above Fall Creek Dam, using genetic parentage analysis. [Report to the U.S. Army Corps of Engineers, Portland District, Portland, Oregon.](#)

O'Malley, K.G., Fitzpatrick, C.K., Olsen, K.C., Couture, R. (2024) Evaluating spring Chinook salmon releases above Foster Dam, on the South Santiam River, using genetic parentage analysis. [Report to the U.S. Army Corps of Engineers, Portland District, Portland, Oregon.](#)

PUBLICATIONS AND REPORTS IN 2024 (CONTINUED)

Pope, A.C., Kock, T.J., Perry, R.W., Cogliati, K.M., O'Malley, K.G., Murphy, C.A., Fielding, S.D. (2024) Using parentage-based tagging to estimate survival of Chinook salmon fry in a large reservoir. *Environmental Biology of Fishes*. DOI:[10.1007/s10641-024-01564-9](https://doi.org/10.1007/s10641-024-01564-9)

Rolland, J., Christensen, K.A., Assassa, Y., Booker, T., Devlin, R.H., Gabrielli, M., O'Malley, K.G., Nikolic, N., Withler, R.E., Koop, B.F., Schluter, D. (Submitted) Genomics of latitudinal adaptation in Chinook salmon. *Proceedings of the National Academy of Sciences*.

Ward, R.H., Quinn, T.P., Dittman, A.H., Yopak, K.E., 2024. The Effects of Rearing Environment on Organization of the Olfactory System and Brain of Juvenile Sockeye Salmon, *Oncorhynchus nerka*. *Integrative and Comparative Biology* 64, 92–106. <https://doi.org/10.1093/icb/icae002>

White, S.M., Dittman, A.H., Johnson, M.A., Quinn, T.P., 2024. Climate-driven straying dynamics in anadromous salmon and steelhead: Research agenda for conservation. *Ecology of Freshwater Fish* 33, e12797. <https://doi.org/10.1111/eff.12797>

APPENDIX B

PRESENTATIONS IN 2024

Biedenweg, K., Erickson, B.D., Chisholm Hatfield, S., & Jones, M. (2024) Understanding diverse perspectives of salmonid hatcheries in Oregon [Presentation]. Pathways Europe, Córdoba, Spain.

Couch C.E., Divilov K., Herron C.L., Wang B., Hakanson, O.M, Scanlan M.M., Whitman L., Davis M., Schreck C.B., Peterson J.T. Effects of Diet on Juvenile Chinook Salmon Microbiome and Gene Expression. Northwest Fish Culture Concepts Workshop. Seaside, OR. December 11th, 2024.

Dittman, A.H., Kamran, M., May, D., Johnson, M., Singer, G., Hinners, B., Gertken, R., Quinn, T., Noakes, D., and S. White. Developing methods to improve the homing fidelity of hatchery-reared salmon. WA/BC AFS meeting. Spokane, WA May 2024.

Dittman, A.H., Kamran, M., May, D., Johnson, M., Singer, G., Hinners, B., Gertken, R., Quinn, T., Noakes, D., and S. White. (Invited talk) Creating a unique odor bouquet to improve imprinting and homing of hatchery-reared salmon. International Congress on the Biology of Fish, Ann Arbor, MI. June 2024.

Dittman, A.H., May, D., Johnson, M. Hinners, B., Gertken, R., Quinn, T., Obley, M., Sanders, A., and White, S. (Invited talk) Developing methods to improve the homing fidelity of hatchery-reared salmon. Northwest Fish Culture Concepts meeting. Seaview, OR Dec. 2024.

Hakanson OM, Scanlan MM, Herron CL, Couch CE, Schreck CB, Peterson JT. Wild Fish Surrogate Project: Ongoing Development of a More Wild-like Fish Intended for Use in Dam Passage Studies Within the Willamette Basin. Northwest Fish Culture Concepts Workshop. Seaside, OR. December 11th, 2024.

Herron C.L., Scanlan M.M., Hakanson O.M., Couch C.E., Peterson J.T., Schreck C.B. Beginning to look at cyclical intermittent fasting to prepare juvenile Chinook salmon for release into streams. Oregon Chapter of the American Fisheries Society Annual Meeting. Bend, OR. February 29th, 2024.

Herron C.L., Couch C.E., Scanlan M.M., Hakanson O.M., White S.M., Couture, R.B., Schreck C.B., Peterson J.T. Reviewing the Wild Fishes Surrogate Project's Impact on Juvenile Salmonid Studies in the Willamette River Basin in 2023-2024. Willamette Fisheries Science Review. Corvallis, OR. April 3rd, 2024.

Herron CL, Couch CE, Scanlan MM, Hakanson OM, Chitwood R, Cornelius JA, White SM, Peterson JT, Schreck CB. Intermittent Fasting in Hatchery Reared Juvenile Chinook Salmon. Northwest Fish Culture Concepts Workshop. Seaside, OR. December 11th, 2024.

PRESENTATIONS IN 2024 (CONTINUED)

Lorenzen, K., Harrison, H., Loneragan, N., White, S., Arlinghaus, R., Blankenship, L., Camp, E., Erickson, B.D., Hazell, J., Leber, K., Lipscomb, T., McMillian, J., O'Neil, K., Perkin, L., Phang, S., Trushenski, J., Tien, T., Walker, A., Westley, P., Wu, Z. (2024). Aquaculture-aided fisheries enhancement, conservation, and restoration: Towards responsible development and effective reform [Roundtable panelist]. World Fisheries Congress, Seattle, WA.

Miller, J.A. Evaluating effects of smolt size, condition, and season of release on the quality and abundance of returning adult hatchery salmon. Oral presentation to Oregon Hatchery Research Center Board Meeting, December 2024.

White, S.M., Dittman, A.H., Johnson, M., & Quinn, T. Climate-driven straying dynamics in anadromous salmon and steelhead: Research agenda for conservation. Oral presentation to the Oregon Chapter American Fisheries Society Meeting, Bend, OR, February 2024.

White, S.M. & Sanders, A. M. (Invited talk) Advancing Hatchery Science: Enhancing Hatchery Fish Fitness, Minimizing Wild-Hatchery Interactions, and Exploring Alternative Techniques. Oral presentation to the 7th International Symposium on Stock Enhancement and Sea Ranching, Puerto Varas, Chile, November 2024.