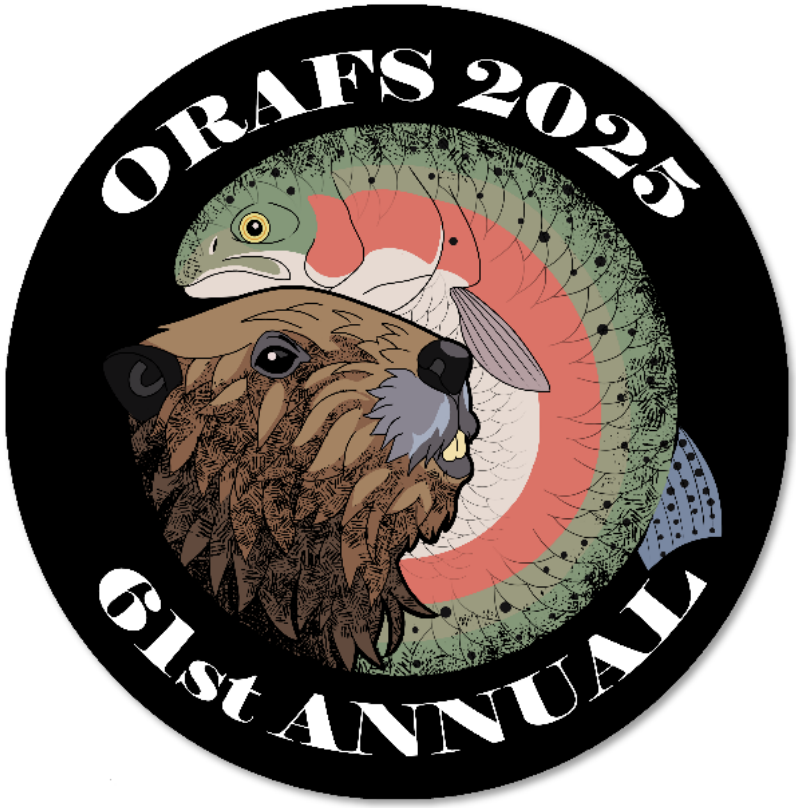

Connecting Communities

Feb 25 - Feb 28 Bend, Oregon

Clamoring for consensus: engaging resource users to manage and monitor sustainable bay clam fisheries

Eric Anderson

Oregon's bay clam fisheries include recreational and commercial harvesters and focus upon a diverse group of species that differ in habitat requirements, life-histories, and accessibility to clam diggers. Recreational clamming is a relatively low cost, easy, and productive sport fishery with participation by thousands of experienced and novice clammers. In contrast, relatively few clammers are licensed to participate in the commercial bay clam fisheries where they take hundreds of thousands of pounds of clams annually from Oregon's bays for both human consumption and bait for the commercial Dungeness crab fishery. Management of the recreational and commercial fisheries is a challenging task, particularly within the broad framework of maintaining sustainable bay clam populations for the benefit of current and future generations. The commercial fisheries utilize a combination of limited entry permits, open access licenses, and annual quotas informed by fishery independent surveys, while recreational clammers must purchase an annual license and stay within daily bag limits. In 2019, the Oregon state legislature directed the Oregon Department of Fish and Wildlife to form the Tillamook Bay Clam Advisory Committee with a broad mandate to work together to address conflict and other issues. This talk will explore how community engagement was utilized to provide recommendations on how to manage and balance the commercial and recreational bay clam fisheries. We will also provide an update of commercial and recreational clam data that will be used in the upcoming Fishery Management Plan for Bay Clams in Oregon.

Oral Presentation
Marine

Swimming upriver: developing a coordinated approach to monitoring Oregon's thermal-scape and better supporting native fish species in a warming climate

Kara Anlauf-Dunn

Water temperature influences a wide range of biological responses from species phenology (e.g., emergence, migration) and growth, to community composition. Measuring water temperature has become increasingly relevant as a changing climate is already displacing native species and disrupting their ecology and survival in Oregon. The Oregon Department of Fish and Wildlife (ODFW) currently lacks sufficient data to describe water temperature over time and space, and this compromises our ability to quantify the associated threats to Oregon's native fish species now and into the future. We developed a plan that outlines an approach to water temperature research and monitoring that we hope will better inform fish, wildlife, and habitat management decisions and better support our native species. The plan includes four strategies: (1) continuous monitoring of the Oregon thermal-scape which includes broad and fine scale monitoring and the identification of cold water sources and patches, (2) the identification of

species thermal tolerance thresholds, (3) forecasting future water temperatures, and (4) improving the integration of temperature and flow into models and decision frameworks. This work will be implemented best within a collaborative environment, using multiple tools, approaches, and funding. Our goal is to take a coordinated and thoughtful approach to water temperature monitoring to reduce costs, leverage additional value from individual efforts, ensure complementary, not duplicative efforts, and avoid inappropriate inference where it affects management actions.

Oral Presentation
Native Fish

Upper Klamath Adfluvial Redband Trout Population Dynamics: Spawning Phenology, Abundance, and Portfolio Effects in a Primarily Spring-fed Basin

Gabriel Askew

Biocomplexity is an integrative term used to describe how populations respond to temporal and spatial variability in environmental and habitat conditions. Importantly, biocomplexity in a system produces stability across populations. This concept has been demonstrated extensively in Bristol Bay sockeye salmon populations but is not well documented in inland fish species. Here attributes of Upper Klamath Lake Redband trout population were explored to characterize population stability in a primarily groundwater fed system. Variability in spawning phenology and trends in population abundance were assessed from fish and redd counts. A coefficient of variation portfolio effect (CVPE) was calculated to assess population stability. We found that Upper Klamath Redband exhibited highly protracted spawning seasons with some variability in spawn timing due to location (72%) and year effects (28%). Significant positive trends of abundance were experienced in Spring Creek and Fort Creek. Also, the metapopulation was twice as stable as component populations with a CVPE of 1.98. High negative correlations of population abundance across different sub-basins demonstrated population asynchrony. This study characterized previously undocumented patterns of variability in a migratory stock-complex that provides insights into biocomplexity and the portfolio effect.

Poster

Lahontan Cutthroat Trout in Oregon: The Good, The Bad and The Ugly

Dave Banks

An update of efforts to manage and recover Lahontan Cutthroat Trout (Oncorhynchus clarki henshawi, LCT) populations within Oregon from 2005 to 2024 by Oregon Department of Fish and Wildlife and other state and federal partners. Lahontan Cutthroat Trout are a desert-adapted cutthroat occurring in the Alvord, Coyote Lake and Quinn River watersheds in southeast Oregon. LCT are an original ESA listed salmonid with efforts to recover populations occurring in Oregon, Nevada and California. Some populations have

long-term population monitoring and are doing well, others have challenges competing with non-native salmonids for resources or face genetic threats and others face new threats from climate change and resource utilization.

Oral Presentation
Native Fish

Spatial variation in life history traits of black rockfish (Sebastes melanops) in the California Current and Gulf of Alaska

Madison Bargas

The growth and maturity of marine fishes are critical biological parameters that drive fisheries assessment models. These models aid in estimating sustainable harvest limits and assessing the status of fish populations. Groundfish populations along the U.S. West Coast are often managed over broad spatial scales (i.e., coastwide by state), yet biological data used in assessment models are usually taken from smaller spatial studies and seasonal sampling efforts. To ensure sustainable management, refined estimates of biological parameters are necessary for the sustainable management of fisheries. In absence of region-specific biological data, stock assessors must use data from other regions to fill gaps in model parameters. This disparity highlights a gap in our understanding, with implications for management and conservation strategies. Recent stock assessments for black rockfish (Sebastes melanops) have lacked key biological data (e.g. northern California model) and suggest that relative spawning output is at or just below the management target in the California Current. This project aims to provide a baseline of life history data across the natural range of black rockfish that can be used to inform fisheries management. To reach these goals, we are sampling across an extremely broad range from California to Alaska, spanning several biogeographic regions including Point Conception, Point Arena, Cape Blanco, Columbia River, Cape Flattery, and the Gulf of Alaska. We are using histological methods to assess maturity and the break and burn method to estimate age. This project takes a comprehensive and transdisciplinary approach to ensure that fishery stakeholders are engaged in the scientific process and that varied areas of expertise are represented to strengthen the quality and utility of research products. The deliverables of this project will inform future stock assessments and management decisions for black rockfish.

Student Presentation
Marine

Designing and Installing Beaver Coexistence Flow Devices While Meeting the State of Oregon's Fish Passage Rules and Regulations

Mac Barr

Beaver dams play a crucial role in supporting fish populations and their habitats. They can provide cooler, deeper water for rearing fish and create hydrologically complex ecosystems that promote healthy aquatic and riparian areas. However, beaver dams may also adversely impact human infrastructure through unintended flooding. Beaver coexistence flow devices, such as pond levelers and culvert exclusion fencing, can ameliorate flooding impacts, but also risk injuring native migratory fish or impeding their movements. These devices help control water levels and protect infrastructure while allowing beavers to maintain natural activities. Beaver dams are not considered barriers to fish migration, however beaver coexistence flow devices are distinct human-made obstructions which present unique challenges and require special considerations for fish passage. Discover how these devices can be employed to address flooding impacts while preserving the ecological needs of beaver and meeting the state's criteria for fish passage. I will discuss design considerations, novel strategies, and the nexus to the state's rules and regulations as well as new procedures for obtaining fish passage approval from the Oregon Department of Fish and Wildlife for the use of these tools.

Oral Presentation
Fish Passage

Leveraging disparate datasets to model the distribution of Oregon's native freshwater mussels

Shelby Bauer

Across the Pacific Northwest, managers are concerned about the status of native freshwater mussels. This is particularly true in developed watersheds like the Willamette River Basin where the hydrology and geomorphology that shapes freshwater mussel habitat is heavily modified and often regulated. Over the last 15 years, state, federal, and non-profit agencies have collected presence data on two culturally and ecologically significant species of concern, the Western Pearlshell Mussel Margaritifera falcata and the Western Ridged Mussel Gonidea angulata. Collectively these datasets have the potential to robustly inform species distribution models, but because of the disparate field and laboratory methodologies used to collect each dataset they have yet to be fully leveraged. To address this, we are developing a broadly transferable, hierarchical approach to modeling aquatic species distributions in a Bayesian framework that will integrate mussel presence data collected using visual surveys and three different eDNA workflows including qPCR and metabarcoding. The hierarchical structure of our model will allow us to account for the imperfect detection of eDNA and we will utilize a suite of modeled hydrogeomorphic variables to inform the model's estimation of occupancy so that our results may be readily placed within the context of riverine management and regulation. The results of our analyses may be used to inform more efficient species

status assessments, develop proactive conservation measures, and link species distributions to hydrogeomorphic processes.

Poster

Independent Testing of PIT Tags for Fisheries Research: A Framework for Standardization and Performance Evaluation

Brian Beckley

Passive Integrated Transponder (PIT) tags are critical tools for monitoring animal movements and survival in fisheries research. This study presents a framework for rigorous, independent evaluation of PIT tag performance, focusing on the Voda IQ HQ12, HQ10, HQ9, and HQ8 tags. Key tests included dimensional and weight assessments, electrical parameter evaluations, read range and noise resistance, proximity performance, and durability under challenging environmental conditions.

Results showed that HQ10 and HQ9 tags met all regional standards, demonstrating reliable detection, minimal tag burden, and robustness under high noise and pressure conditions. The HQ12 tag excelled in detection efficiency but marginally exceeded the allowable weight threshold by 0.0022g, with negligible biological impact. The HQ8, designed for smaller species, exhibited limited read range but proved suitable for low-burden applications.

This research underscores the importance of standardized testing protocols to validate new biotelemetry technologies, ensuring consistency and reliability in diverse environmental scenarios. The methods outlined serve as a model for global fisheries monitoring, enabling stakeholders to adopt innovations confidently. Rigorous independent testing not only verifies performance but also advances the efficacy of conservation efforts, particularly for threatened and endangered species.

Oral Presentation
Monitoring

Reconnecting Large Wood Transportation After Dam Construction and Flooding

Micah Bennett

Historically, large woody debris (LWD) originating from the Metolius, Crooked, and upper Deschutes Rivers located in Central Oregon moved downstream unhindered, until Pelton Dam was constructed in 1958. Dam construction blocked LWD transport from the forested upper reaches to the high desert influenced lower reaches. A high flow event in 1996 removed LWD present in the lower Deschutes River from the reregulation dam to the Columbia, resulting in an 85% decrease in LWD between the Reregulating Dam and Trout Creek, and without LWD transport from blocked upstream sources this section became starved of LWD. In 2007 Portland General Electric (PGE) and the Confederated Tribes of Warm Springs Reservation of Oregon (CTWS) implemented a Large Wood Management Plan, reconnecting LWD transport between the upper and lower basins. Wood is removed form Lake Billy

Chinook and placed in the lower Deschutes between the Reregulating Dam and the Highway 26 bridge crossing resulting in placement of 353 pieces of LWD from 2007 to 2024. Snorkel monitoring of placed LWD has shown fish prefer placed LWD over habitat without LWD. Tracking of LWD in the lower Deschutes River has shown LWD has long residence time creating a lasting effect on habitat, but it also shows LWD can periodically move downstream and has been seen as far downstream as Sherar's Falls. Reconnecting LWD transport in the Deschutes Basin over a long period of time has resulted in improved habitat locally and further downstream.

Oral Presentation
Freshwater habitat

Generating annotated reference genomes to identify the underpinnings of local adaptation in two of Oregon's endemic fishes

Andrew Black

Oregon's high desert harbors several iconic fishes found nowhere else, including Foskett Spring Speckled Dace (Rhinichthys klamathensis goyatoka) and Borax Lake Chub (Siphateles boraxobius). Though both fishes were recently delisted from the federal list of threatened and endangered species, the circumstances allowing their persistence in tiny spring-fed ecosystems within an arid landscape still prompt inquiry. Borax Lake Chub in particular demonstrates an uncanny ability to thrive in chemical-laden water flowing from a hot thermal spring and may already exist near the limits of its thermal tolerance. Understanding how these fishes adapted their genotype, phenotype and physiology to these unusual conditions can reveal the extent to which a warming earth may threaten them in the future. However, the absence of a reference genome for either taxon significantly hinders that understanding. To help fill those gaps, we have constructed a draft annotated genome for Foskett Dace (length=1.1Gb, N50=2.9Mb, 23k protein coding genes) and characterized its anatomical adaptations using 2D and 3D morphometrics; assembly and annotation of the Borax Lake Chub genome is still in process. This presentation will detail our progress and explain how we can use these resources to identify candidate genes behind the adaptive potential of these remarkable fishes, ultimately illuminating the mechanism of their persistence in unusual environments and their adaptive potential in a warmer future.

Oral Presentation
DNA and Genetics

Engaging Local Students in Field Research: Experiences from Thirtymile Creek

Lizz Blackburn

Engaging students in scientific fieldwork presents challenges but yields considerable educational benefits through hands-on experiences. In 2022, we began involving local middle and high school students in

active research within their home watershed, Thirtymile Creek, a key steelhead rearing tributary in the Lower Mainstem John Day River. This initiative was supported by a collaborative network including project partners, educators, and parents, fostering a community-based approach to scientific education. Over the past two years, participating students have engaged in hands-on hook-and-line sampling, successfully capturing and collecting data on hundreds of smallmouth bass (Micropterus dolomieu). This data collection is part of an ongoing study that focuses on the predator-prey dynamics within Thirtymile Creek between smallmouth bass and wild summer steelhead (Oncorhynchus mykiss). Our presentation will detail our approach, the implementation process, and the educational outcomes. We aim to highlight the key successes and valuable lessons learned, demonstrating the impactful role of community-engaged science in fostering scientific curiosity among young students.

Oral Presentation
Thirtymile Creek Steelhead Recovery

Do bass exploit fine-scale thermal heterogeneity to increase consumption of juvenile steelhead? Evidence from temperature sensing tags in Thirtymile Creek, John Day Basin.

Lizz Blackburn

Heterogeneous riverscapes harbor fishes with contrasting thermal physiologies, which likely have interactions governed by water temperature. For example, species such as introduced smallmouth bass (Micropterus dolomieu), which prefer warmer waters, can coexist with salmonids (Oncorhynchus spp.), which thrive in cooler conditions. A key challenge is to understand how spatial and temporal heterogeneity in water temperature mediates species interactions such as predation. Here we explore how seasonality and fine-scale spatial heterogeneity mediate bass predation on steelhead. Thirtymile Creek, a spring-fed tributary of the Lower Mainstem John Day River, constitutes a cold patch of habitat adjacent to the warm mainstem. Smallmouth bass move into Thirtymile from March to August, coinciding with the emergence of steelhead fry (Oncorhynchus mykiss) and a critical growth period for age-0 steelhead. Despite Thirtymile Creek's average daily temperature mean of 15°C, which lies outside the optimal range for smallmouth bass growth and consumption, evidence suggests that smallmouth bass consume steelhead throughout their residence in the stream, across temperatures ranging from 10 - 19. We hypothesize that smallmouth bass exploit warmer microhabitats, such as sunlit off-channel areas, for thermoregulation, extending the period of time that the stream is energetically profitable. To examine this, we surgically implanted temperature-sensing radio tags in 30 smallmouth bass in 2023 to monitor their temperature use over time. We anticipate variation in behavioral thermoregulation due temporal variation in foraging opportunity and ambient temperature. The ongoing in-channel habitat restoration in Thirtymile Creek is likely to affect the thermal profile of the creek. Our findings, combined with complementary bioenergetics and population modeling, aim to provide critical insights into smallmouth bass dynamics, fostering a comprehensive conservation strategy for protecting wild summer steelhead.

Oral Presentation/Thirtymile Creek Steelhead Recovery

Evaluating the recovery of functional fish and invertebrate habitat in restored eelgrass beds

Olivia Boisen

Native eelgrass (Zostera marina) beds provide a wealth of ecosystem services, including key nursery and essential fish habitat for ecologically and economically important species. Globally, eelgrasses and the ecosystem services they provide are threatened by development within estuaries and climate change impacts. In Oregon, both compensatory mitigation following construction (i.e., bridge placement) and active restorations in response to losses in eelgrass coverage have occurred. However, post-restoration monitoring often focuses solely on bed extent and shoot density, overlooking the critical ecosystem service of fish habitat which must be assessed to fully evaluate restoration success. Therefore, we aim to revisit Oregon restoration sites (Valino Island 2020, Siuslaw Bridge 2007–2008, Pony Slough 2010, and OTH Airport 1989) to assess the return of functional fish and invertebrate communities. Sampling is conducted using box minnow traps, modified shrimp pots, and sediment cores comparing restored beds to several nearby natural beds. By analyzing metrics such as feeding guilds and sex ratios of crabs with a mixed model approach, we evaluate whether restored sites provide habitat comparable to natural eelgrass beds. We anticipate a non-linear recovery trajectory, with communities at recently restored sites initially less diverse, followed by significant improvement after a critical threshold is reached. Preliminary findings indicate that restored eelgrass beds support diverse fish and invertebrate communities, though fish abundance, richness, and their similarity to natural sites vary by location. We will continue sampling seasonally over two years, allowing us to both determine how well restored habitat is providing for important fishery species and define expectations and timelines for the recovery of essential fish habitat. Ultimately, this work will promote eelgrass conservation by using the recovery of ecological functions as a guiding framework for making informed restoration decisions.

Student Presentation
Marine

Examining the diet and habitat use of Salmon sharks (Lamna ditropis) through eDNA and fatty acid analysis

Reilly Boyt

Determining the diet of predators in marine systems is critical to understanding their impact on ecosystem function. Salmon sharks (Lamna ditropis) are an endothermic apex predator in the Northeast Pacific that undertake extensive migrations from subpolar to subtropical waters. They are thought to exert a significant influence on fisheries of both commercial and ecological importance. However, their exact role within Northeast Pacific communities, and how it shifts with ontogeny and sex, remains unclear. In this study, we use two recently developed techniques, eDNA and fatty acid analysis, to study the diet of salmon sharks. We analyzed eDNA from the stomach to more precisely identify prey species than has been achievable previously, while extracting fatty acids to determine influences of habitat on recent shifts in

diet. Preliminary results reveal dietary and habitat-use differences across size classes, suggesting that salmon sharks' ecological roles evolve throughout their ontogeny. Additionally, we found differences in the foraging ecology between males and females, further highlighting the complexity of their ecological interactions. Here, we present our early findings using these novel biochemical approaches, to enhance our understanding of salmon sharks and their ecological role within their ecosystems.

Student Presentation
Marine

Dude, where's my river? Combining acoustic and PIT tagging methods to quantify John Day summer steelhead migration and overshoot

Logan Breshears

The concept of homing for anadromous salmonids is often thought of as a linear process, wherein fish enter freshwater, then migrate directly to their natal streams to spawn. However, this is typically not the case for John Day River summer steelhead (Oncorhynchus mykiss). A large proportion of returning John Day adults delay their migration in some fashion before permanently entering the John Day River, often taking several months before continuing their upstream journey. Peak temperatures in the mainstem Columbia River and the John Day arm of the reservoir are believed to be a seasonal barrier for migrating adults, and we address that idea here in this study. 156 wild A-run summer steelhead were equipped with both acoustic tags and PIT tags at the Bonneville Dam Adult Fish Facility between July and September of 2022. To capture movements, a dense array of acoustic receivers was deployed between John Day Dam and McNary Dam, with additional acoustic receiver arrays deployed in Drano Lake and the Deschutes River, which were identified as key holdover locations for John Day steelhead in 2020. This study builds upon the acoustic monitoring done in 2020 by utilizing an improved acoustic array between the John Day and McNary dams, and incorporating VPS technology to build pathways that can be analyzed using network analysis techniques. Logistic regression will be implemented to create a model for overshoot and to identify the environmental and anthropogenic factors impacting this phenomenon. Furthermore, residence times will be calculated to better identify space-use of the reservoir for the John Day fish that overshoot. Results from this study will provide managers with valuable insights for developing solutions to the overshoot problem in order improve conversion rates and escapement of John Day summer steelhead back to their natal reaches of the John Day River Basin.

Student Presentation
Thirtymile Creek Steelhead Recovery

Catchability of Hatchery and Wild Salmon and Steelhead in Recreational Fisheries

Benjamin Briscoe

Mark-selective recreational fisheries are a management tool intended to provide harvest opportunity by allowing anglers to retain hatchery-origin salmon and steelhead while requiring release of natural-origin fish. Impact rates of these fisheries on natural-origin fish are typically calculated using a post-release mortality rate applied to an estimate of hatchery fish encountered. However, if catchability of hatchery and natural-origin fish is not equal, impact rates would be biased. To investigate this issue, we summarized data from a catch-and-release metadatabase representing multiple hatchery and natural-origin salmon and steelhead populations. Angling was conducted or monitored by research biologists. We found that differences in catchability varied across populations and depended on hatchery practices.

Oral Presentation
Native Fish

Reel them in: engaging the public in marine recreational fisheries management

Melanie Bukovec

Effective fisheries management depends not only on scientific research but also on the active participation of the communities directly affected by these decisions. This presentation highlights various methods for engaging with fishing communities, from participation in creel surveys to encouraging public comment or testimony during Pacific Fishery Management Council meetings. I will also explore the importance of holding public meetings to foster transparent discussions and creating a platform for anglers to voice their concerns. Additionally, the role of outreach materials, such as handouts, online resources, community events, and even games, will be discussed as key tools for raising awareness. By creating opportunities for stakeholder engagement, we can strengthen collaboration, build trust, and ultimately ensure more effective and inclusive fisheries management strategies.

Oral Presentation
Marine

Migrating between rivers and oceans: a global phylogenetic analysis of diadromy

Mike Burns

Diadromy, a specialized form of fish migration, entails moving between marine and freshwater habitats during various life stages to maximize feeding or reproduction. Here, we explore the evolutionary origins of diadromy through two competing hypotheses: the safe-site hypothesis, which suggests that anadromy evolved from marine ancestors to reduce predation risks in freshwater, and the productivity hypothesis,

which posits that differing productivity levels between environments drive the evolution of anadromous and catadromous species. While empirical evidence supports both hypotheses, a global phylogenetic context for diadromous evolution remains unexamined. Our research employs a time-calibrated phylogeny and habitat ecology to analyze the evolutionary relationships of diadromous species across all ray-finned fishes. We find that the evolution of diadromy is complex, and there is no single hypothesis supporting the evolution of diadromy across fishes. Instead, diadromy has evolved in response to a mosaic of selective pressures dependent on geographic location, phylogenetic history, and community structure. By assessing patterns of diadromy within an evolutionary framework, we clarify the ancestral origins and adaptive strategies linked to diadromy, ultimately providing deeper insights into the evolutionary pressures shaping these migratory life histories in fishes.

Oral Presentation
Marine

Fish Assemblages in the Great Basin: Disentangling Environmental Effects on Community Structure

Katherine Carey

Arid ecosystems are often undervalued for their ecological contributions, yet they frequently harbor endemic fish species critical for regional biodiversity and ecological functions. This study examines how environmental gradients shape fish community structure in the Goose Lake Basin, an endorheic valley in the Great Basin characterized by dynamic hydrology and susceptibility to human-induced environmental changes. Despite its designation as a "Conservation Opportunity Area," fish populations in the basin continue to face significant threats from habitat degradation, water diversions, and climate-mediated disturbances. We analyzed the relationship between fish communities and environmental variables using Canonical Correspondence Analysis (CCA) on data collected from 34 sites between 2022 and 2024. The fish and environmental data encompassed species counts, spatial information, and habitat variables at both landscape and reach scales, including elevation, slope, temperature, canopy cover, substrate type, and macrohabitat composition. The final model explained 56.8% of the variance in fish community composition (adjusted r2=0.479) and identified significant environmental gradients, with stratum, woody debris, and macrohabitat composition emerging as key drivers of species distribution. Monte Carlo permutation tests confirmed the significance of the first two CCA axes, which explained 49.5% of the variation. Redband trout, speckled dace, and larval lamprey were well represented, with the first three constrained axes explaining 81%, 70%, and 66% of their variation, respectively. In contrast, juvenile lamprey (29%) and pit roach (31%) showed weaker model fits. These findings address critical data gaps in an understudied region and underscore the need to promote habitat heterogeneity to support fish community resilience in this and other Great Basin systems.

Student Presentation
Native Fish

Tracking Change with the Klamath River Renewal Project

Daniel Chase

The Klamath River Renewal Project restored volitional fish passage to hundreds of miles of the Klamath River, once the third largest producer of salmon on the West Coast, and is leading to landscape level change seldom seen in a single project. RES was selected by the Klamath River Renewal Corporation to lead restoration for this ambitious effort, as well as accept liability associated with ensuring restoration meets ecological and biological performance standards and long-term goals/objectives. Preparation for, and implementation of, the restoration of over 2,200 acres of formerly inundated lands has encompassed years of planning, preparation, and on the ground action. This presentation will look at the restoration components of the project, how change in the aquatic and terrestrial habitats are being monitored and informing actions taken on the ground, and a look at the work ahead. Information on the projects fisheries and aquatics monitoring and reporting efforts will be included.

Oral Presentation
Klamath Basin Monitoring

Known knowns and known unknowns for upstream passage for lampreys in Oregon

Benjamin Clemens

Lampreys are an ancient group of fishes that have persisted through four global mass extinctions over their 360-550 million year history. However, they now experience multiple human-caused threats and limiting factors that are associated with declines in many species. One key limiting factor, artificial obstructions to upstream passage, blocks lampreys from accessing their spawning and rearing habitats. Here, I talk about what we know is necessary to provide upstream passage for native lampreys in Oregon (i.e., the "known knowns") and what requires more research (the "known unknowns"). Lamprey passage requires thinking differently because Lampreys have different passage needs from other fishes. These passage needs vary significantly across lamprey species and also within species. One of the known knowns is that body size is a key determinant of upstream passage abilities. Oregon's lampreys differ significantly in body size, from pencil-sized lampreys with tiny oral discs (i.e., several species) to yardstick-sized lamprey with a large oral disk used for burst-and-attach swimming and climbing in some situations (i.e., Pacific Lamprey). Considerations for the upstream passage of Oregon's lampreys will require broad, critical, and creative thinking, in addition to funding, research, and adaptive management to realize conservation benefits. We humans are inherently creative and ingenious, having engineered rivers to generate power, irrigate deserts to grow crops, created lakes for recreation and to contain floods. Surely we can find a way to pass the oft-overlooked lampreys?

Oral Presentation
Fish Passage

Bull Trout Status and Tend Monitoring in the Middle Fork and North Fork John Day River Subbasins

Alex Coburn

Bull Trout (BLT) populations in the John Day Basin have suffered declines for a multitude of reasons. Despite their conservation status, and increasing restoration efforts in the basin, there have been historically few or infrequent efforts to collect baseline or long-term monitoring data regarding their abundance, distribution, production and population trends. The Confederated Tribes of Warm Springs Reservation of Oregon (CTWSRO) in collaboration with Oregon Department of Fish and Wildlife (ODFW) have been working together to sample known BLT populations in the Middle Fork and North Fork John Day River basin utilizing eDNA, and electro fishing techniques to address aforementioned data gaps. Electrofishing in phase one was primarily aimed at informing an occupancy model created by ODFW. In phase two we modified our protocol to include the ability to calculate abundance estimates for these populations. In phase one electro fishing found 50 BLT (4/47 sites) and 253 brook trout (BKT, 7/47) sites sampled in the middle and north fork. This phase highlighted electrofishing as the necessary technique for detecting bull trout in these remote populations. In phase two, we focused sampling in eight USFWS sub populations. 163 BLT, 277 BKT, and six-teen possible BLT/BKT hybrids were captured at 34/130, 16/130, 4/130 sites sampled in the middle and north fork. These data are currently being incorporated into the ODFW BLT Occupancy model. We are currently calculating abundance and density estimates from phase two; however, due to low fish numbers in these areas, uncertainty of these estimates was high. Phase one showed that sampling was successful at informing occupancy models. Phase two highlighted that low fish densities will make calculating abundance estimates difficult while densities remain low. Continued monitoring throughout the known BLT extent, with occasional sampling in habitat with colonization potential, will be necessary for monitoring BLT stats in the future.

Oral Presentation
Bull Trout

Hook, Line, and Thinker: Does Hook-and-Line Sampling Hook the Hungrier Bass?

Cort Colby

Effective management of fish populations often relies on understanding predator-prey dynamics and evaluating sampling methodologies. In Thirtymile Creek, a tributary of the Lower Mainstem John Day River, smallmouth bass (Micropterus dolomieu) migrate seasonally from the mainstem of the John Day River and can be present from March to August. Traditional capture methods, such as electrofishing, are often challenging due to high water levels and flow rates throughout the spring. However, hook-and-line sampling (HLS), when targeting alcoves and areas of soft water, has proven to be an effective method for capturing smallmouth bass. Combining these methods could increase sample sizes for bass-steelhead studies, but a key challenge is to identify whether variables of interest are potentially confounded by

sampling types. This study aims to evaluate whether HLS captures hungrier individuals (i.e. individuals with fewer prey items or lack of prey items) compared to electrofishing. We captured and collected diet samples from smallmouth bass using both HLS and electrofishing. Diet samples were analyzed to compare the stomach contents and prey item quantity from both capture methods. We expect to see no difference in diet composition or prey quantity upon hypothesis testing between diets of smallmouth bass captured by HLS versus electrofishing. These findings provide evidence that HLS does not only target hungry smallmouth bass, suggesting its broader applicability for capturing smallmouth bass for research purposes. Our results provide a framework for further research that's essential to comprehensively assess potential biases with HLS, such as size, species, seasonality, and environmental conditions.

Poster

Habitat use, migration timing, and growth of juvenile salmonids in Willamette Valley reservoirs

Kristin Connelly

Cramer Fish Sciences was contracted by the U.S. Army Corps of Engineers to sample juvenile salmonids in Lookout Point and Green Peter Reservoirs during 2023 and 2024. The purpose of the project was to assess juvenile Chinook salmon (Oncorhynchus tshawytscha) and steelhead (O. mykiss) reservoir habitat use, longitudinal distribution, migration timing and growth in relation to water management strategies implemented as part of the interim injunction measures. Sampling in 2023 was conducted between June and December and from February through November during 2024. Late winter and spring sampling was conducted biweekly in the nearshore environment of each reservoir using small Oneida Lake traps and box minnow traps. A stratified random sampling design was used to select daily trap placement locations within each reservoir zone (Lower, Middle and Upper). Captured Chinook salmon were enumerated, examined for marks (adipose fin clips and tags), measured for length and weight, given a body condition examination, and if untagged, were given a visual implant elastomer (VIE) or passive integrated transponder (PIT) tag. During summer and fall, biweekly fish sampling was conducted in the offshore environment using small mesh suspended gill nets set at six fixed sites spread along the longitudinal axis of each reservoir. Limnological sampling (vertical profiles of temperature, dissolved oxygen and turbidity) were taken coincident with fish sampling events. Final results from 2023 sampling and preliminary results from 2024 sampling will be presented. Catch rates and distributional patterns will be compared to results of past investigations and interpreted in relation to implemented interim injunction measures.

Oral Presentation
Fish Passage

Do you see what I see? Quantifying uncertainty of snorkel survey counts of salmonids in Oregon coastal streams.

Ron Constable

The Oregon Department of Fish and Wildlife uses snorkel surveys to monitor juvenile salmonids in Western Oregon streams. The bias of Snorkel surveys is driven by two primary factors: variable fish detection probabilities and the relative abundance of fish in habitat types below the recommended minimum depth for snorkeling. We examined these factors across three salmonid species (Oncorhynchus spp.), 4 years, and 113 location-years in Oregon coastal streams. We calibrated snorkel counts to mark-recapture estimates and developed mathematically explicit expressions that convert a new snorkel count into a probability density of abundance for streams containing mixed habitat types that were and were not snorkeled. Snorkelers detected 63%, 47%, and 39% of juvenile coho salmon (O. kitsutch), steelhead trout (O. mykiss), and cutthroat trout (O. clarkii clarkia) estimated by mark-recapture, respectively, but uncertainty within and among sampling units was high. Further, analytics developed here can be used to infer abundance and uncertainty for habitat types that were not snorkeled. Our quantification of uncertainty arising from using snorkel counts as a proxy for abundance will help managers balance biological risks with available resources.

Oral Presentation
Native Fish

Macroinvertebrates of Lower Thirtymile Creek

Joseph Corsini

Thirtymile Creek, a tributary of the lower John Day River, supports a population of Mid-Columbia wild steelhead. However, a century of agricultural activity including overgrazing and creek side farming, has seriously damaged the riparian zone and instream habitat, adversely affecting steelhead spawning success and parr survival. To address these challenges, Gilliam County Soil and Water Conservation District, in partnership with local landowners and the Oregon Department of Fish and Wildlife, has launched a two-pronged effort to: 1) better understand steelhead population dynamics and 2) restore spawning and rearing habitat. As part of these efforts, macroinvertebrate monitoring was conducted at three locations, the first at the mouth, the second approximately five miles upstream of the mouth, and the third on private land approximately 10 miles upstream from the mouth. Both benthic and drift samples were collected at all locations. The benthic samples were collected with a kick-net (80 meter reach, eight 1 square foot subsamples collected every ten meters and then composited). Drift samples were collected over an 18-24 hour period with a 500um mesh net. Samples were collected in November of 2022, April of 2023, August of 2023, and November of 2023. Taxonomic identification, to the lowest taxonomic level, and biomass estimation via length correlation was conducted by Rhithron Associates. The analysis of sensitive and tolerant taxa suggests overall low to moderate stream health and significant spatial and seasonal variation

in tolerance and sensitivity indicators (EPT Richness, Pollution Supertolerance, Hydropsychidae/Total Trichoptera). The ODEQ PREDATOR model also suggests that all sites are significantly degraded. Analysis of biomass indicates that the biomass fluctuates from site to site and between seasons in both drift and benthic samples. In addition, the organisms that dominate the biomass also vary between sites and seasons. Finally, we discovered one ephemeral reach that supports a surprising diversity of macroinvertebrates.

Poster

Revealing Hidden Sculpin Diversity: Resolving Phylogenetic and Morphological Structure in Cottopsis

Alvaro Cortes

Freshwater sculpins (genus Cottus) are a diverse group of bottom-dwelling fishes across northern Holarctic drainages. Despite over a century of study, many sculpin species remain difficult to identify due to overlapping traits and unclear geographic boundaries, leading to frequent misidentifications and inconsistent results in scientific research. This issue is particularly pronounced in the Cottopsis clade of the Pacific Northwest, where species like Cottus asper (Prickly Sculpin), C. perplexus (Reticulate Sculpin), and C. gulosus (Riffle Sculpin) have unresolved species boundaries and uncertainty over whether they represent a single species or multiple distinct species. To address these challenges, this study combines modern molecular tools and advanced imaging techniques to clarify relationships within the Cottopsis clade. Using a large panel of single nucleotide polymorphisms (SNPs), we constructed a phylogeny and began to integrate it with computed tomography (CT) scans of museum specimens. Preliminary results reveal clear genetic and geographic boundaries between C. asper, C. perplexus, and C. gulosus and uncover previously unrecognized species-level diversity within the clade. These findings resolve decades of taxonomic uncertainty and set the stage for formal species descriptions in future work. By disentangling complex relationships within the Cottopsis clade, this research provides a clearer framework for understanding freshwater sculpin diversity in the Pacific Northwest.

Oral Presentation
Native Fish

Klamath River after Dam Removal: Collaboration to monitor fish returns

Alex Corum

The Removal of four dams from the Klamath River will present challenges to existing monitoring of fisheries. Previous to this year, efforts to monitor Klamath River fisheries were designed to look at a river that ended at Iron Gate Dam. New ways of observing fish numbers are being explored to effectively enumerate fish to provide fisheries managers accurate counts with the dams gone. I will discuss previous

and existing monitoring efforts as well as new projects implemented as fish move into formerly inaccessible areas. I will highlight a new collaborative project to deploy a sonar camera at the former site of Iron Gate Dam and a radio telemetry project associated with the fish capture efforts to validate the sonar. I will also present preliminary data from the first season of this project.

Oral Presentation
Klamath Basin Monitoring

The Importance of Hatcheries to Salmon and Steelhead Recovery

Ian Courter

Studies comparing hatchery and wild salmon and steelhead have identified various mechanisms through which negative genetic and ecological interactions might occur. However, there are also many examples of hatcheries providing significant conservation benefits, with nearly all modern salmon and steelhead hatcheries explicitly managed to support conservation goals. Despite this, the scientific literature often emphasizes the potential negative impacts of hatcheries, leading to policies that presume hatchery fish are detrimental. Some researchers even suggest that hatcheries are a key factor in the decline of salmon populations.
In this presentation, I will examine the role of salmon and steelhead hatcheries in the Pacific Northwest and evaluate their contributions to conservation. Hatcheries are actively restoring extirpated populations, bolstering depleted salmon runs, and supporting both tribal and non-tribal fisheries. Contrary to concerns about negative impacts, there is little evidence that hatcheries impair wild fish returns. Instead, they appear to provide critical demographic support to wild fish populations, playing a vital role in recovery efforts while sustaining fisheries.

Oral Presentation
Hatcheries

Surveillance of the surf zone: early warning system for HABs in Oregon

Rebecca Crawford

Harmful Algae Blooms (HABs) along the Oregon Coast have historically been associated with detrimental impacts to human health, marine life and coastal economies. Domoic acid produced by the diatom Pseudo-nitzschia spp. and saxitoxins produced by the dinoflagellate Alexandrium spp. accumulate in shellfish tissue and can cause Amnesiac Shellfish Poisoning and Paralytic Shellfish Poising, respectively, if consumed. Large blooms of these phytoplankton have been responsible for the closure of commercial and recreational shellfish harvesting, resulting in significant losses from these fisheries. Given the serious risk these harmful algae pose, the Oregon Department of Fish and Wildlife (ODFW) established Monitoring Oregon Coastal Harmful Algae (MOCHA) in 2007. MOCHA has been funded through the National

Oceanic and Atmospheric Administration (NOAA), Monitoring and Response to Harmful Algae (MERHAB), and Northwest Association of Networked Ocean Observing Systems (NANOOS) grant programs. Through weekly enumeration and identification of phytoplankton in water samples collected from North, Central, and Southern Oregon Coast sites, MOCHA has been able to provide timely information about the status of harmful algal blooms and the potential need for harvest closures prior to regularly scheduled shellfish tissue testing. Further collaboration with the Washington Department of Fish and Wildlife (WDFW) and the Olympic Regional Harmful Algal Blooms program (ORHAB) has allowed for effective monitoring of HABs from California to the Canadian Border. These programs inform the Pacific Northwest HAB Bulletin, which synthesizes Pseudo nitzschia counts, toxin levels, and oceanographic metadata to identify the overall HAB risk and provide an early warning to coastal managers. Here, we present data spanning from 2006-2024 detailing the prevalence of harmful algae along the Oregon Coast. We show how HAB monitoring can successfully alert for increases of toxin accumulation in shellfish and how these data help to inform effective decision making for fisheries managers.

Oral Presentation
Marine

Invasive Crayfish are Here - How are they Impacting our Aquatic Ecosystems?

Denise Dammann

The only native crayfish in Oregon is Pacifastacus leniusculus (signal crayfish). Non-native Faxonius neglectus (ringed crayfish) have been introduced into the Umpqua Basin from the Rogue. Observations found that in a decade after F. neglectus were discovered at sites historically abundant with native crayfish, F. neglectus were well-established and native crayfish were not detected. A global meta-analysis of the ecological effects of non-native crayfish consistently found negative effects on the ecosystem; they prey on native aquatic species, spread diseases, compete for food, and are better adapted to avoid predation (Twardocheleb, et al., 2013). F. neglectus have previously been detected in the lower North Umpqua River and two adjacent drainages connected by roadways with potential for human transfer. Procambarus clarkii (red swamp crayfish) have been detected in the basin as well. The lack of data on invasive crayfish and the concern for impacts to the North Umpqua Subbasin's aquatic ecosystems, prompted a surveying effort.

From 2022-2023, preliminary presence/absence surveys were conducted, expanding in 2024, with funding from the North Umpqua Foundation (TNUF) and the Steamboaters with grants from the Umpqua National Forest and Bureau of Land Management through TNUF. Objectives were to find the leading edge of invasive crayfish populations or isolated populations and survey adjacent drainages connected by roadways. Site selection was based on historically-known locations, and survey results informed future site selection. At each site, a combination of both baited trapping and baiting, observing, and netting was used.

Survey results found both F. neglectus and P. clarkii expanded their range from historically-known locations. Also, at one site, where previously there had been both native crayfish and F. neglectus, only F. neglectus were present. More research is being proposed for the future. Early detection is the first step to understanding the potential impact of invasive crayfish on stream ecosystems.

Poster

NOVEL DETECTION OF PROLIFERATIVE KIDNEY DISEASE IN CHINOOK SALMON OF THE UPPER ROGUE RIVER

Nilanjana Das

Proliferative Kidney Disease (PKD), caused by the myxozoan parasite Tetracapsuloides bryosalmonae (T. bryo), is an emerging concern for salmon and trout populations across western North America. Though clinical PKD can affect a wide range of species, it is highly temperature dependent and manifests as severe kidney inflammation, discoloration and anemia once fish hosts experience 15˚C for at least 30 days. Although the parasite is native to Oregon, prior to 2020, only four occurrences of T. bryo infections were recorded in the state's fish hatcheries (all between 1994 and 2001). However, from 2020 to 2024, PKD outbreaks caused unexpected, severe mortality of juvenile Chinook salmon (Oncorhynchus tshawytscha) at Leaburg Hatchery on the McKenzie River and in 2021 at Dexter Hatchery on the Willamette River. Given its sudden reemergence and unknown regional distribution, we conducted surveillance in September 2023 for T. bryo at 9 different salmonid hatcheries across Oregon, spanning 8 watersheds. Kidney tissue was sampled from 10 mortalities per fish stock at each location, then screened with PCR targeting the 18S and ITS1 regions of malacosporean and T. bryo rRNA, respectively. We detected novel infections of T. bryo at Cole Rivers Hatchery (CR) on the Rogue River, in rainbow and steelhead trout (Oncorhynchus mykiss) and Chinook salmon. Opportunistic sampling of CR Chinook for additional molecular screening in September 2024 confirmed that infections not only reoccurred there the following year, but also progressed to clinical PKD. A genetic analysis of the ITS1 region of the SSU rDNA revealed watershed-specific genotypes of T. bryo in the McKenzie and Rogue rivers. Continued efforts to characterize the epidemiology of this emerging parasite across Oregon will be critical for informing hatchery management, specifically the timing of fish transfers to and from PKD-endemic sites to mitigate losses from this temperature-dependent disease.

Student Presentation
Chinook

Community resilience is reflective of environmental stability in a drought-sensitive aquatic ecosystem

Melanie Davis

Ecological resilience, the capacity of biological communities to absorb disturbances while maintaining their functional integrity, is a crucial concept in conservation science. This is particularly vital for arid land aquatic ecosystems, where water scarcity poses significant challenges. As part of a broader monitoring effort, our study investigated resilience within the Goose Lake Basin, a drought-sensitive system in Oregon's Great Basin, by examining the stability of native fish communities over short (2022–2024) and long-term (2007–present day) timescales. We hypothesized that native fish communities would exhibit higher stability over short-term intervals compared to long-term intervals, and that variability would be influenced by local hydrologic stability. To test this, we used data from electrofishing surveys at a suite of stratified sites and associated hydrologic measurements from continuous water loggers. We used multivariate analytical methods, including Bray-Curtis dissimilarity calculations to quantify stability, ordination techniques for visualizing community changes, and statistical models to assess relationships between community stability and environmental factors (habitat type, probability of dewatering, and elevation). Model output supported our hypotheses and showed a clear relationship between hydrologic stability and ecological resilience. Our findings offer insights into the mechanisms of ecological resilience in drought-sensitive systems and their implications for effective conservation and management.

Oral Presentation
Native Fish

Klamath Basin Fisheries Collaborative

Monica Diaz

The Klamath Basin Fisheries Collaborative PIT tag monitoring and database project is a Klamath Basin fish tracking infrastructure and associated fisheries monitoring collaboration with more than 30 entities. The PIT tag project supports an ambitious effort by many partners to monitor and evaluate Klamath River restoration opportunities in the face of an ecological system in crisis and several imperiled fish species requiring Endangered Species Act (ESA) protections.
Several years of PIT tag research—led by multiple entities across the Basin—catalyzed the formation of KBFC and informed many of the goals and strategies now driving collaboration, data sharing and database development work. Key collaborators include Tribes, federal and state agencies, non-governmental organizations and the Pacific States Marine Fisheries Commission. These data collected focuses on native Klamath fish data that will be shared through the KBFC PIT tag database and will be used to inform fisheries management and ecosystem restoration in the Basin.

Oral Presentation/Klamath Basin Monitoring

Picture pore-fect: a novel method to map shark electroreceptor pores with photograph-based 3D models

Natalie Donato

Sharks can detect weak electric fields in their environment via their Ampullae of Lorenzini, which sit at the base of individual gel filled canals terminating in visible pores across the head. The unique pore patterns and quantities vary greatly depending on their phylogeny, biology, and potentially life history stage, providing insights into species-specific behaviors and movements. However, the volume of data needed to uncover broad trends is difficult to achieve due to the constraints of current methods, where the skin is removed from the specimen's head and illuminated from behind to view and map the pores on a flat plane. The dissections provide essential information such as positioning and density of the pores but are tedious, time consuming, and destructive. Photographs can also be used to view the pores, but the 2D images of the round heads result in distorted mapping and density calculations. To bridge the gap between the essential data from traditional methods and non-destructive photographic methods, we developed a novel method using photograph-based 3D modeling (3D photogrammetry) to generate a "digital skin", a flattened 360-degree view of the head. We compared the accuracy of our methods to traditional methods using Salmon shark (Lamna ditropis) heads. Our methods can greatly reduce the time to map the pores and provide a means to map the pores non-destructively.

Student Presentation
Marine

Below the Bering: Song Type Diversity of Bering-Chukchi-Beaufort Bowhead Whales

Nikita Dulan

Bowhead whales (Balaena mysticetus) are distinctive in the complexity of their songs, thought to be produced by males as a mating behavior. While previous studies on the Spitsbergen bowhead whale population revealed a high frequency of short-lived song types, it is unclear whether this characteristic is shared across populations. This study aimed to quantify the diversity of songs produced by the Bering-Chukchi-Beaufort (BCB) bowhead whale population. Passive acoustic recordings were obtained from AURAL-M2 hydrophones deployed on a mooring in the southern Chukchi Sea, north of the Bering Strait. The hydrophones recorded 10-25 minutes every hour at sampling rates of 8,192 or 16,384 Hz, depending on the year. We analyzed data from December, a peak singing month, across four years (2011, 2014, 2017, 2020). Data was visualized as spectrograms in Raven Pro version 1.6 to annotate song boundaries (2,048-point FFT, 50% overlap, Hann window) and extract key features (e.g. duration, frequency). Visibly distinguishable songs were manually categorized into types, after which temporal dynamics and overall diversity were compared within months and across years. Results show over 25 distinct song types identified across the four Decembers, with no song recurring in multiple years and song lifespans ranging from days to weeks. Our results align with previous studies on the Spitsbergen bowhead whale population,

which suggests that the rapid turnover of complex songs is a defining feature of bowhead whales rather than a population-specific trait. This research improves our understanding of bowhead whale song dynamics and lays the groundwork for future comparisons across populations.

Student Poster

Adapting Resist-Accept-Direct to bull trout recovery in the face of rapid ecological transformation

Jason Dunham

Bull trout is a threatened species of charr that persists only in the cleanest, coldest, and most connected freshwaters in the Pacific Northwest. Warming temperatures, rising climate variance, and extreme events like heatwaves, wildfires, and different forms of drought are rapidly changing freshwaters in the region. These physical changes and their influences on bull trout are often compounded by the growing effects of introduced species, and other threats. Given these changes, many historically feasible alternatives for recovery of bull trout may no longer be as effective or practical as they once were. This reality is acknowledged by bull trout recovery documents, which invite managers to consider a broader decision space. To this end, the Resist-Accept-Direct (RAD) concept is specifically designed to assist managers in exploring novel decision alternatives, and to respond more effectively to ecological transformation. In this presentation we provide hypothetical and real examples of how RAD can be adapted to bull trout recovery. Lessons learned from these examples can be more broadly applied to many species and ecosystems.

Oral Presentation
Bull Trout

Low-tech process-based restoration in the Upper Klamath Basin: restoring resiliency and monitoring riverscape transformation

Charles Erdman

Like elsewhere in the West, riverscape restoration strategies used in the Upper Klamath Basin have evolved over the last decade. Today, restoration practitioners are more focused on implementing process-based restoration techniques that blend a more fluid understanding of fluvial systems, attempt to restore wood accumulation, beaver activity, and dynamism to riverscapes, harness natural energy to achieve project goals, and minimize post-fire impacts. We provide an overview of process-based restoration, mainly of the low-tech variety, implemented in the Upper Klamath Basin over the last six years by Trout Unlimited in partnership with private landowners, the U.S. Fish and Wildlife Service, the U.S. Forest Service, the Catena Foundation, Anabranch Solutions, and Swift Water Design. We also discuss ongoing monitoring activities that will provide important insights into how this type of work transforms riverscapes and the fish and wildlife that use these habitats. Hopefully, as capacity for this type of work continues to

grow and evolve, so too does our collective understanding of restoring process to fluvial systems and our ability to adapt to these evolutions in ideas and practices. Process-based restoration strategies, albeit relatively new in the Upper Klamath Basin, can offer creative and often cost-efficient means to achieve riverscape restoration benefits, assist in successful anadromous salmonid reestablishment of the Upper Klamath Basin, and restore a healthy system for all the basin's inhabitants.

Oral Presentation
Freshwater habitat

Understanding Fishing Community Perceptions of Salmonid Hatcheries Using Qualitative Audience Segmentation

Brian Erickson

Effective communication is vital for salmon and steelhead conservation, particularly when engaging diverse fishing communities with varied perspectives on hatchery practices. Despite the cultural and ecological importance of hatcheries in Oregon, little research has explored how fishing community members perceive hatcheries as a tool for salmonid management. Understanding these perceptions is essential for designing communication strategies that resonate with specific audiences and foster constructive dialogue.

This study uses audience segmentation, a method widely employed in marketing but underutilized in conservation, to identify subgroups within Oregon's fishing community based on shared perceptions of hatcheries. Through 16 semi-structured interviews with non-tribal recreational anglers, commercial fishers, hatchery employees, and representatives of conservation and fishing organizations, we identified at least five distinct audience segments. These segments reveal nuanced perspectives that challenge the simplistic binary of "pro-hatchery" or "anti-hatchery" stances often assumed in public discourse.

We will present the characteristics and key themes defining each segment, illustrating how they perceive the benefits, harms, and science associated with hatcheries as well as the myths they believe others hold. Our findings highlight the potential of audience segmentation to enhance conservation communication by tailoring messages to the perceptions of specific groups. This approach offers actionable insights for biologists, managers, and communicators seeking to engage fishing communities in more inclusive and effective ways.

Oral Presentation
Education and Outreach

Adult Hatchery Origin Steelhead (Oncorhynchus mykiss) Straying in the Imana River Basin

Neal Espinosa

Generally, straying is defined as hatchery fish recovered in spawning populations outside their release stream. In this study, we investigated the straying and distribution of hatchery fish that failed to return to a hatchery trap and entered natural spawning areas within the Imnaha River basin. The Little Sheep Creek hatchery program releases hatchery steelhead for harvest mitigation under the Lower Snake River Compensation Project. The proportion of hatchery steelhead entering natural spawning areas will estimate hatchery impacts at basin-wide and tributary scales. The Nez Perce Tribe estimates the abundance and population demographics of Snake River Basin natural-origin steelhead (Oncorhynchus mykiss) and Chinook Salmon (Oncorhynchus tshawytscha) populations tagged with passive integrated transponder (PIT) tags at Lower Granite Dam. To calculate those estimates, we apply the Lower Granite Dam adult branch occupancy model (DABOM) to PIT tag interrogations at in-stream passive integrated transponder tag detection systems (IPTDS). However, adult hatchery-origin steelhead are not PIT-tagged Lower Granite Dam, omitting those stocks from the DABOM analysis. To address this data gap in the Imnaha River basin, we developed a method that utilizes returning adult hatchery steelhead PIT-tagged as juveniles and weir-based abundance estimates for hatchery-origin fish to calculate fish-per-tag. We applied that to PIT tag detections throughout the basin to better understand the abundance and proportion of hatchery-origin spawners. Our findings revealed low levels of hatchery-origin straying in the upper basin and a majority of individual tributaries, with much of the hatchery fish returning to the hatchery subbasin in Little Sheep Creek.

Oral Presentation
Hatcheries

A Multi-species Investigation of Predation by Piscivorous Colonial Waterbirds on Suckers and Chinook Salmon in the Upper Klamath Basin during 2001-2023

Allen Evans

Previously published research indicated that predation by piscivorous colonial waterbirds in the Upper Klamath Basin (UKB) was a substantial source of mortality for Lost River suckers and Shortnose suckers, including mortality of both juvenile and adult suckers. Avian predation on Chinook Salmon in the UKB had not previously been investigated but could now be a factor limiting the survival of fish following dam removals and the subsequent reintroduction of Chinook to the UKB. To provide fisheries managers with the most up-to-date information, we estimated avian predation rates (percentage of available fish consumed) on passive integrated transponder tagged suckers and Chinook Salmon by colonies of American White Pelicans, Double-crested Cormorants, Caspian Terns, California Gulls, Ring-billed Gulls, Great Blue Herons, and Great Egrets during 2021–2023. Predation rate estimates were highly variable (ranging from less 1% to greater than 50%) depending on the fish species, age-class, waterbody

(Upper Klamath Lake, Clear Lake Reservoir, Sheepy Lake), and year. Avian predation rates were often the highest on adult suckers in Clear Lake Reservoir and on juvenile suckers in both Clear Lake and Upper Klamath Lake. Predation on juvenile hatchery suckers released as part of Sucker Assisted Rearing Program were the highest on fish released in the spring/summer, with estimates as high as 59% of available fish observed. Predation estimates on juvenile hatchery Chinook Salmon ranged from 3% to 40%, with the highest estimate observed on fish released in the spring/summer. Predation also varied significantly by predator species and the location and size of bird colonies in the UKB. Future research will focus on identifying biotic and abiotic factors associated with sucker susceptibility to avian predation and determining to what degree avian predation limits the recovery of suckers and Chinook Salmon in the UKB.

Oral Presentation
Klamath Basin Monitoring

Using environmental DNA to assess a thermal passage barrier for migrating coho

Hannah Ferguson

The Tualatin River is a tributary to the Willamette River and meanders roughly 80 miles through relatively flat sediment heavy terrain. With the installment of a fish ladder over Willamette Falls in 1885 and hatchery stocking programs from the 1950's to 1996, previously inaccessible river habitat on the Tualatin River became spawning grounds for Coho salmon. Clean Water Services (CWS), a special-use district, helps jointly manage and maintain flow and water quality in the Tualatin River in part through discharges into the Tualatin River from four water resource and recovery facilities (WRRFs). These WRRFs are regulated for water quality standards including temperature under a watershed-based NPDES permit. Treated water is warm in nature leading to on-going questions about whether warm water from the four WRRFs create passage barriers for migrating Coho. To address this, we designed a multiyear environmental DNA study with the goals of better understanding Coho migration timing, environmental cues, and the potential for thermal discharge to prevent upstream migration. First, a time series was constructed from water samples collected at regular intervals from July 2023 - June 2024. We found Coho DNA concentration was low year-round, increasing from September – January, which correlates with timing of migration and spawning activity. Additionally, we found increases in DNA concentration lagged Willamette Falls fish counts by roughly a week, and positive DNA detections began only after river temperature fell below 20°C. Using this information, two sites were sampled concurrently from August 2024 - February 2025 to determine whether DNA concentration differed upstream versus downstream of thermal inputs. Initial results show similar DNA concentrations at both sites and confirm the lag time between fish counts and presence of Coho in the Tualatin River. This study provides novel insight into Coho migration in the Tualatin River, helping better plan for future climate scenarios.

Oral Presentation
DNA and Genetics

Surveying Oregon's marine reserves: Exploring early trends in fish abundance and setting expectations of future change

Ryan Fields

Oregon's five marine reserves span from Cape Falcon in the north to Redfish Rocks in the south. Three primary goals of the reserves are the conservation of marine habitats and biodiversity, serving as scientific reference sites, and minimizing significant negative impacts on ocean users and coastal communities. The Oregon Department of Fish and Wildlife's (ODFW) Marine Reserves Program is responsible for the ecological monitoring of these areas, and conducts multiple long-term surveys, including biennial hook-and-line fishing surveys. that were first carried out in 2011. The five marine reserves vary in size, habitat, oceanography, historical fishing pressures, and time since implementation, leading to nuanced expectations of ecological change. While Oregon's marine reserves were not explicitly designed for fisheries enhancement, larger reserves with higher historical fishing rates have greater potential for change. This presentation examines results from four reserves—Cape Falcon, Cascade Head, Cape Perpetua, and Redfish Rocks—and their comparison areas still open to fishing, focusing on nearshore groundfish species including Black, Copper, and Quillback Rockfish. Fish catch and size trends at the four reserves varied substantially between reserves, species, and over time. Cape Falcon which experienced low historical fishing pressure is also the youngest reserve. Average catch per unit effort (CPUE) for rockfish species at Cape Falcon remained consistent through time. At Cape Perpetua, we observed early signs of increasing average CPUE of four rockfish species within the reserve, including Brown and Quillback Rockfish. Cascade Head and Redfish Rocks had higher historical fishing pressure compared to Cape Falcon and Cape Perpetua. The average CPUE of Copper and Quillback Rockfish increased in recent years at Cascade Head, and we observed a similar pattern of Quillback and China Rockfish at Redfish Rocks. Further data and analyses are needed to disentangle reserve effects from environmental variability (e.g., temperature, oxygen).

Oral Presentation
Marine

Fishing for Science: Communities and Captains Play an Essential Role in Tracking Groundfish Trends in Oregon's Marine Reserves

Stephanie Fields

Monitoring the ecology of Oregon's five marine reserves was assigned to the Oregon Department of Fish and Wildlife's (ODFW) Marine Reserves Program when the reserve system was implemented in 2010. In addition, ODFW was also mandated to conduct outreach and public engagement and to utilize fishing vessels as research platforms. The Marine Reserves Program's hook-and-line surveys address all these goals. The catch-and-release fishing surveys collect data to track changes in groundfish communities over time and are conducted on local fishing vessels. They also foster public engagement in ecological research

by creating volunteer opportunities. The survey engages and relies on volunteer anglers with ocean fishing experience to catch the fish and volunteer biological assistants to aide ODFW staff with data recording. Finally, the program reaches back out to the community by producing an annual newsletter as that summarizes the year's findings. Since data collection began in 2011, the hook-and-line volunteer program has steadily evolved, with valuable lessons learned and successes in building a dedicated volunteer base. Broad public calls for volunteers proved challenging to manage, whereas relying on community members and charter offices to recruit additional anglers was far more effective. Today, the program involves over 80 different volunteers annually, who collectively contribute more than 1,000 hours of their time. The program is currently reflecting on the future of the volunteer program and how to become more inclusive, informed by insights from a recent DEI scholarship pilot project. Additionally, the program has secured 30 different contracts with local fishing boats out of four different home ports to both serve as research platforms for the surveys and incorporate the local fishing knowledge of their captains. While ecological monitoring and public engagement are mandated, the success of the hook-and-line surveys depends on the interest and support from the communities using these natural resources.

Oral Presentation
Marine

Collaborative monitoring of spring-run Chinook Salmon (ishyâat) across the mid-Klamath River

Amy Fingerle

Spring-run Chinook Salmon (Oncorhynchus tshawytscha) were historically the most abundant salmonid in the Klamath Basin but are now on the brink of extinction. In 2023, UC Berkeley, the Karuk Tribe, Salmon River Restoration Council, UC Davis, and Wild Salmon Center began a multiyear study in mid-Klamath River tributaries to improve understanding of run-type distribution and the degree to which interbreeding among spring-run and fall-run Chinook is occurring, which will help inform management decisions for Chinook Salmon in the Klamath Basin. In the Salmon River, which hosts the largest remaining wild population of spring-run Chinook in the Klamath Basin, we collected fin clips from juvenile Chinook captured in three rotary screw traps and via seine net sampling throughout the watershed. We also collected fin clips from adult Chinook carcasses encountered during spawning surveys. Additionally, fin clips were collected through partnership with the California Department of Fish and Wildlife at rotary screw traps in the Scott and Shasta rivers, where the spring-run phenotype has not been observed in decades. We genotyped each Chinook salmon at the GREB1L genomic region, which is diagnostic for run timing (spring-run or fall-run). Results from our first two years indicate that in the Salmon River, relative abundance of spring-run Chinook varies among subbasins, fall-run Chinook spawn upstream of dynamited seasonal-hydrologic migration barriers that historically maintained a degree of reproductive isolation between runs, and heterozygous Chinook are a major component of the run-type composition of Salmon River Chinook Salmon. We also found that heterozygous Chinook are present at very low abundance in other mid-Klamath River tributaries where spring-run Chinook have been extirpated. We discuss plans for 2025 and beyond, opportunities for future collaboration, and implications

of this work in the context of Klamath dam removals and spring-run Chinook Salmon recovery and reintroduction.

Student Presentation
Klamath Basin Monitoring

PIT Tagging Juvenile Chinook Salmon in the Willamette Valley: Insights from Larg-Scale Marking Efforts

Ryan Flaherty

Cramer Fish Sciences was contracted by the U.S. Army Corps of Engineers to bulk mark juvenile Chinook salmon with Passive Integrate Transponder tags (PIT) in 2023 and 2024. The purpose of the project was to contribute to the understanding of downstream passage of juvenile Chinook salmon (Oncorhynchus tshawytscha) in the Willamette Valley Project while meeting the objectives of the Interim Measures Research, Monitoring, and Evaluation plan. To date, over 350,000 Juvenile Chinook salmon have been PIT tagged and released across the South Fork McKenzie, Middle Fork Willamette, South Santiam, and North Santiam subbasins. Recapture rates for release groups varied widely, from less than 0.1% to 6%, with most falling between 0.6% and 2%. Travel times ranged from days to months, influenced by release location, dam operations, and seasonal factors. The study revealed complex interactions between fish movement, dam operations, and environmental conditions. Higher recapture rates were generally observed for fish released closer to dams and during periods of increased flow. The Cougar Dam project area stood out with notably higher recapture rates. These findings provide valuable insights into juvenile Chinook salmon migration patterns in the Willamette Valley system, though further analysis is needed to fully understand the factors influencing fish survival and passage through the dams.

Oral Presentation
Fish Passage

Aquatic ecosystem responses to riparian alternative buffer configurations

Alex Foote

Riparian buffers were established to conserve aquatic ecosystems by providing stream shade, reducing solute delivery, and providing opportunities for large wood recruitment. Conventional buffers are generally “fixed width” with an exclusion area a set distance from the stream channel. While these riparian buffers are effective in providing shade, maximum shade may not reflect historic light regimes in these systems. Light availability beneath young forests can be lower than natural light conditions beneath old growth riparian stands. Therefore, in highly effective conventional buffers, streams in young regenerating forests may be light-limited with lower primary production at the base of stream food webs. In this study we evaluate alternative buffer configurations designed to replicate conditions found in old growth stands

where natural disturbances create patches of higher light conditions along streams, or which allow for wider buffers in areas of groundwater discharge but narrower buffers in other locations along the stream. In six replicate blocks within the Oregon coast range we implemented a total of four different buffer treatments (standard practice, fixed width, variable retention, and canopy gaps) plus one uncut reference on small and medium fish bearing streams on private timberlands. Using a replicated before-after control-impact design (BACI) we measured aquatic ecosystem responses for two years pre- and two years post-treatment. Post-treatment conditions saw reductions in effective shade up to >30% with the greatest degree of variation in variable retention treatments. We found no significant differences in the degree of temperature increase post-treatment among the different buffer treatments. Macroinvertebrates, as a biological indicator of changes in water quality, suggest variable retention treatments may have experienced the greatest disturbance as more chironomids, more tolerant, and less intolerant species occurred in this treatment. Buffer configuration did not appear to explain vertebrate biomass responses, but total vertebrate biomass increased with reductions in shade.

Oral Presentation
Freshwater habitat

Does Origin Matter? Hatchery Influence on the survival of Interior Columbia River Spring Chinook salmon

Rebecca Forney

Interior Columbia River (ICR) spring Chinook salmon (Oncorhynchus tshawytscha) are included in three Evolutionarily Significant Units, two of which are listed under the Endangered Species Act (ESA). Despite significant hatchery investments to mitigate population declines, ICR spring Chinook salmon consistently fail to meet the Northwest Power and Conservation Council's target smolt-to-adult return ratio (SAR) of a 2-6%. Additionally, between 2015 and 2021, >80% of out-migrating juveniles were of hatchery origin, with intra-annual variation in SARs across hatcheries being as variable as interannual variation. To better understand the factors driving survival variation, we investigated how ICR Chinook salmon from different origins respond to the same ocean. Using parentage-based tagging (PBT), we tracked ICR Chinook salmon collected by NOAA's Juvenile Salmon and Ocean Ecosystem Survey (JSOES) to their hatchery of origin. We applied a linear mixed model to determine how well size, condition at capture, and hatchery origin, with year as a random factor, explained inter- and intra-annual variation in SARs from 2015 to 2021. A model with a three-way interaction among size, condition, and origin accounted for 66% of SAR variation, with hatchery origin explaining nearly 30% of the total. In 2021, a year with the highest catch across hatcheries, we further analyzed intra-annual variation in migration patterns across hatcheries. We conducted otolith structural and chemical analyses to assess timing of ocean entry, marine growth, and size at ocean entry. Timing of ocean entry varied, with fish from hatcheries in the Mid-Columbia basin entering first, Upper-Columbia second, and Snake last. Notably, origin explained 30% of the variation in condition at capture, suggesting hatchery carryover effects are evident in the ocean months after release. These findings highlight the importance of fine-scale examination of hatchery-specific survival variation

to inform the optimization of hatchery practices, ultimately supporting the recovery of this ESA-listed species.

Oral Presentation
Hatcheries

Advanced radio tag data reveal migration patterns and realized riverscape thermal regimes of returning Chinook Salmon in the North Umpqua River

Luca Fretwell

Thermal refugia plays a crucial role in the success of salmon spawning. As a result of a rapidly changing climate, river dynamics are changing with warming temperatures and changes in stream flow regimes. These changing conditions put salmon spawning migrations at an increased risk. Although much is known about salmon, the utilization of thermal refugia by adult salmon during river migrations is not completely understood. Salmon behavior during migration is responsive to flow events and patches of thermal refugia, and this may create realized thermal conditions for a salmon that are different from the mean river conditions captured in surface water measurements. Further, the patterns of use by returning salmon may vary by origin – wild vs. hatchery. This study uses thermal and accelerometry data recorded in radiometry tags inserted into returning adult spring Chinook Salmon in the North Umpqua River mainstem and then recovered from the hatchery and upstream spawning grounds. These tags provide high resolution (every 5 minutes) measures of temperature and movement and allow us to explore the relationships between holding patterns and river conditions. These data provide the ability to determine whether the fish experience cooler water when holding or when migrating upstream. In addition, we can evaluate the frequency and duration of salmon holding in these thermal refugia while making their migration upstream. Such data will provide insights on the importance of thermal refugia in relation to the success of a spawning spring Chinook Salmon upstream migration.

Student Poster

Intermittent streams and steelhead (Oncorhynchus mykiss) food availability

Jesse Fritz

More than half of global stream networks are intermittent, experiencing periodic drying, with such events projected to increase due to climate change and human activities. By studying trophic interactions in intermittent streams, we can better understand how these systems function and inform management strategies for their conservation in both altered and unaltered contexts. Recent research highlights the use of intermittent streams by terrestrial and aquatic organisms, including spawning habitat by endangered steelhead (Oncorhynchus mykiss) of the Pacific Northwest. Whether these fish are simply surviving in these systems or benefiting from unknown advantages remains unclear. Our goal is to determine if

differences in prey availability in perennial and intermittent habitats influence steelhead use of intermittent streams. We collected diet samples of wild juvenile steelhead (n=100 individuals) and benthic invertebrate communities (n=24 samples) from both perennial and intermittent sections of Thirtymile Creek, a high desert stream in Oregon, USA, from May through July 2022. We compared the biomass, abundance, and diversity of the steelheads' diets and the benthic invertebrate communities between the two habitats. Steelhead diets did not significantly differ between habitats. Analyses using nonmetric multidimensional scaling (NMDS) will allow us to explore how different environmental variables in the two habitats influence steelhead diet and macroinvertebrate communities. Our findings can inform conservation practices for steelhead in different stream habitats by exploring the dynamics of habitat-specific dietary patterns. Understanding how organisms subsist in intermittent systems can help protect endangered species such as salmonids and preserve unique biodiversity in changing environments.

Student Presentation
Thirtymile Creek Steelhead Recovery

Mobile DNA sequencing laboratory for real-time assessment of Columbia River basin fisheries: genotyping in a van down by the river

Lanie Galland

Estimating the migration timing, stock-specific abundance, and ancestry proportions of native salmonids is essential for effective conservation and management in the Columbia River basin. Here, we present an innovative monitoring program intended to provide real-time genetic stock assessment of salmonids from priority fisheries during critical migration, spawning, and harvest periods. We have worked to develop a mobile genetics laboratory where receipt of tissues, completed genotypes, and final parentage-based tagging (PBT) and genetic stock identification (GSI) analyses are intended to be completed within a 24-hour period, providing the most up-to-date genetic assignments for monitoring trends across stocks in the Columbia River and its tributaries. We aim to assess individuals from key migration and spawning sites by utilizing a mobile genetics laboratory. Designed in a custom trailer, the mobile lab will be fully equipped to process DNA samples from tissue collection through genotype, and distribute results to conservation managers. Further, the lab will have the potential to run entirely off grid, providing capacity at remote sites where energy, power, and network settings may be otherwise prohibitive. With the advent of the mobile genetics laboratory, this may facilitate real-time conservation and management of priority fisheries.

Oral Presentation
DNA and Genetics

A snapshot of Oregon's Bull Trout through the lens of the Species Status Assessment

Stephanie Gunckel

The US Fish and Wildlife Service recently published the Species Status Assessment (SSA) and 5-year Review for the Coterminous US Bull Trout DPS. Based on the conservation principles of resiliency, redundancy, and representation, the SSA evaluates the current viability of Bull Trout core areas and projects their future condition under 5 scenarios varying by climatic and conservation factors. Current condition varies markedly throughout Oregon depending on local basin-scale habitat and demographic factors. Core areas with the greatest resiliency are those with an absence of nonnative trout, intact aquatic habitats, and hydrologic connectivity between multiple local populations and to adequate foraging, migratory and overwintering habitats. Poorly resilient core areas are typically those with single or isolated populations, abundant nonnative trout populations, and small population size. Analyses of future projections show Bull Trout resiliency does not improve under any of the climate scenarios and an increase in conservation actions is necessary to ensure future persistence throughout Oregon. To that end, the Oregon Bull Trout Strategy is a framework that assists working groups and state managers with identification of recovery actions and prioritization of resources in a transparent manner to continue to focus and promote Bull Trout recovery statewide.

Oral Presentation
Bull Trout

Passive Integrated Transponder tagging smolts to estimate the marine survival rate of wild Coho Salmon from Mill Creek

Kevin Hall

Long-term monitoring of imperiled salmonid populations is critical for progressing their recovery. However, many populations lack this long-term data, especially that which is site-specific and most useful for adaptive management. Here, we show how over 20 years of monitoring data on Mill Creek (Yaquina River basin) revealed a unique migration behavior that ultimately showed higher marine survival estimates of threatened Coastal Coho Salmon. The Oregon Department of Fish and Wildlife Life Cycle Monitoring Project has operated a trap on Mill Creek (Yaquina River basin) since 1997 to estimate the total number of smolts heading to the ocean each year. Since there is good rearing habitat both above and below the trap, it is possible that some individuals rear in the estuary below may return to our adult trap as adults and inflate the marine survival rate. To test this, we inserted Passive Integrated Transponder (PIT) tags in 1,000 out-migrating Coho Salmon smolts each spring from year to year. Each fall from year to year, we scanned returning adults for PIT tags before passing them upstream. Preliminary results suggest that our estimation of marine survival has been lower than the traditional smolt to adult methodology. This could be due to a portion of fish shedding the PIT tag from their bodies, or some fish finding suitable spawning habitat below the adult trap. Installing a second PIT antenna in a lower portion of Mill Creek, or scanning

carcasses recovered by spawning ground surveyors below the trap could help make future estimates of marine survival more accurate.

Poster

Movement of Tournament Caught Bass in Owyhee Reservoir

Kirk Handley

Frequent bass tournaments are held on Owyhee Reservoir in southeastern Oregon during the spring summer and fall. We implemented angler tag reporting program to evaluate movement of Largemouth Bass, and Smallmouth Bass from reservoir release reach back to reservoir capture reach. In the spring of 2022, 412 bass were marked at tournament weigh ins and released using regular tournament procedures. In the spring and early summer of 2023, 134 bass were caught, marked and released at their capture location to compare regular movement patterns of bass released at their capture location to movement patterns of bass marked at tournament weigh ins. In 2023, 21 of the bass were marked with $50.00 reward tags and 111 were marked with non-reward tags to estimate angler tag reporting rates. All bass were marked with uniquely numbered non-reward T-bar anchor tags and could be reported on the Oregon dept. of Fish and Wildlife Website or telephone hotline. We divided the reservoir into 10 reaches and provided the map to anglers so they could report the reservoir reach where they captured each reported bass. We estimated movement, harvest, and reporting rates from recaptured bass reported by anglers. Half of the recaptured bass that were moved more than 15 kilometers down reservoir by anglers during bass tournaments did not leave the Forebay reach where they were released. Only one of the 14 recaptured bass that were displaced from the upper reservoir to the Forebay reach was recaptured farther than 15 kilometers up reservoir. Bass movement rates were greatest for bass released in the Forebay, the lowest reservoir reach. The lack of long-distance dispersal of bass back to their capture location after tournament releases in Owyhee Reservoir suggests current tournament release practices will concentrate bass in the lower portion of Owyhee Reservoir.

Oral Presentation
Native Fish

Examining the Vertical Distribution of Pacific Halibut as They Encounter a Groundfish Bottom Trawl and its Application in Bycatch Reduction

Dylan Heppell

The West Coast groundfish bottom trawl fishery is a major economic driver for Oregon coastal communities, bringing in $49 million in ex-vessel value in 2022. While the fishery can target sablefish, rockfishes, lingcod, and several flatfish species, trawlers are prohibited from retaining Pacific halibut (hereinafter referred to as halibut). Recent regulation changes in the bottom trawl fishery now allow high-rise trawls (e.g. nets that open 12 to 15 feet above the seafloor) in areas where previously only low-rise trawls (e.g. nets that open 3 to 5 feet above the seafloor) were permitted. To determine if this regulation

change could have an impact on halibut catches, we constructed a two-tiered trawl to vertically separate halibut into two groups; those that would be caught only in a low-rise trawl versus additional halibut that would be caught in a high-rise trawl. Both tiers had their own cod-end to keep the two catches separate. We also attached LED light clusters to the wing tips and upper bridles of the trawl for approximately half the tows to determine if artificial illumination could have an impact on halibut catches. Our study found that for both illuminated and non-illuminated tows, the bottom tier (low-rise) portion of the net caught significantly more halibut than the upper tier portion of the net. We also found that, although not statistically significant, the illuminated tows caught 48% fewer halibut by numbers than the non-illuminated tows. These results indicate that the regulation change is unlikely to significantly increase halibut bycatch in the fishery.

Poster

Decadal change and the abundance of fishes and invertebrates in Yaquina Bay.

Scott Heppell

Natural environmental change, anthropogenic development, and inter-annual variability can affect the diversity and abundance of estuarine fish and invertebrates. Yaquina Bay, Oregon has undergone substantial change in the last sixty-plus years, including widespread development, deep-draft dredging, shoreline hardening, and infill of former tide flats. In 1967, prior to much of the modern rearrangement of the estuary, the United States Environmental Protection Agency conducted a 21-month survey of Yaquina Bay to characterize the demersal fishes and epibenthic crustaceans that occupy the bay. From 2003 to 2005, we replicated that work to provide a comparative snapshot across a 35-year time interval. We found a 90+ percent decline in CPUE between surveys, as well as a decline in overall biodiversity. Furthermore, by the time of our sampling the estuary had shifted from a fish-dominated system to one dominated by epibenthic crustaceans. While we can't establish causal relationships between these changes and human or natural events, we do document substantial changes in both the diversity and total abundance of animals in the Yaquina benthic community over three-plus decades. The Yaquina estuary continues to change, and twenty years on from our work, a repeat study is now due.

Oral Presentation
Marine

Efforts to Reduce Rockfish and Pacific Spiny Dogfish Bycatch in a Pacific Halibut Longline Fishery

Dylan Heppell

The West Coast groundfish bottom trawl fishery is a major economic driver for Oregon coastal communities, bringing in $49 million in ex-vessel value in 2022. While the fishery can target sablefish,

rockfishes, lingcod, and several flatfish species, trawlers are prohibited from retaining Pacific halibut (hereinafter referred to as halibut). Recent regulation changes in the bottom trawl fishery now allow high-rise trawls (e.g. nets that open 12 to 15 feet above the seafloor) in areas where previously only low-rise trawls (e.g. nets that open 3 to 5 feet above the seafloor) were permitted. To determine if this regulation change could have an impact on halibut catches, we constructed a two-tiered trawl to vertically separate halibut into two groups; those that would be caught only in a low-rise trawl versus additional halibut that would be caught in a high-rise trawl. Both tiers had their own cod-end to keep the two catches separate. We also attached LED light clusters to the wing tips and upper bridles of the trawl for approximately half the tows to determine if artificial illumination could have an impact on halibut catches. Our study found that for both illuminated and non-illuminated tows, the bottom tier (low-rise) portion of the net caught significantly more halibut than the upper tier portion of the net. We also found that, although not statistically significant, the illuminated tows caught 48% fewer halibut by numbers than the non-illuminated tows. These results indicate that the regulation change is unlikely to significantly increase halibut bycatch in the fishery.

Student Presentation
Marine

The Return of Salmon into the Upper Klamath Basin

Mark Hereford

The four Klamath River hydroelectric dams were removed in early fall of 2024 allowing migration of adult anadromous fishes into habitat in California and Oregon that had been blocked for over one-hundred years. Immediately following the removal of the dams California Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, The Klamath Tribes, and Karuk Tribe began monitoring the mainstem Klamath River and its tributaries above the former dam sites to document the potential volitional return of Chinook and Coho Salmon. Monitoring consisted of boots-on-the ground surveys in tributaries, float-based surveys on the river, and video weirs on tributaries. Within weeks after the final section of the lower-most dam was removed the first Klamath River Fall Chinook were observed in tributaries immediately above the former dams in California and Oregon, making their way up the mouths of tributaries that in only a few months prior had been under reservoirs and blocked by four dams. In the following weeks hundreds of fall Chinook would be observed in both tributary and mainstem habitat, greatly exceeding initial expectations immediately following dam removal. This presentation will summarize the initial findings of the Chinook Coho Salmon monitoring effort that took place following the largest dam removal project to ever occur. This presentation will also feature the still images of returning salmon documented by Klamath and Modoc Tribe member, Paul Wilson, as he follows the return of C'iyals [Salmon in Maqlaqsyals language] above the reaches of the previous reservoirs just weeks after the removal.

Oral Presentation
Klamath Basin Monitoring

Steelhead Trout Stress Response When Reared With and Without In-Tank Structure at High and Low Density

Crystal Herron

In previous studies, the Wild Fishes Surrogate Project has provided evidence that rearing juvenile Chinook Salmon (Oncorhynchus tshawytscha) with in-tank structure at low density results in a propensity to produce a reduced stress response when presented with a transportation-like stressor. For this presentation, we will show the stress response of juvenile Steelhead Trout (O. mykiss) from two different brood years (BY). Juveniles from BY 2021 were reared with 600 individuals per 6 ft diameter tank with or without in-tank structure. BY 2022 fish were reared at high (n=900) or low (n=300) density, with or without in-tank structure, in 6ft diameter tanks. Treatments were performed in duplicate. As parr we subjected them to a stress challenge. To simulate transportation stress, fish were moved from their outdoor rearing tank to an indoor tank and held for 3 hours, after which fish were moved again to a novel outdoor rearing tank. Plasma was collected from fish throughout the stressor to monitor the stress response and recovery. Fish stress response was assessed by measuring cortisol in a radioimmunoassay. We found that rearing Steelhead Trout with in-tank structure resulted in a mitigation of the stress response, similar to what was found in juvenile Chinook Salmon.

Oral Presentation
Fish Passage

Streambed geology explains patterns of flow and water temperature in perennial vs. intermittent reaches of Thirtymile Creek

Skuyler Herzog

Thirtymile Creek is a critical spawning tributary for Mid-Columbia River steelhead and an informative case study of the link between hydrogeology and fish ecology. Like many tributaries of the John Day and other inland NW rivers, many reaches of Thirtymile Creek dry up during summer, and even perennial reaches experience very low flows. Intermittent flow may threaten the survival of rearing juvenile steelhead, block fish migration, and limit the extent and abundance of riparian vegetation. However, prior to this study it was unclear why certain reaches were intermittent vs. perennial and how much more flow would be required to maintain continuous surface flow. The rationale for this study is that streamflow only occurs when the streambed and valley sediments have first filled with water and additional water moving down-valley can then overflow into the stream channel. We estimated the so-called subsurface flow capacity, Q_sub (i.e., the amount of water needed to fill the subsurface), by two independent methods. First, a high-tech forward model used topographic data to calculate valley widths and slopes, soil maps to estimate sediment permeability (hydraulic conductivity), and geophysical measurements (active seismic refraction) to estimate streambed depth to bedrock. Second, a low-tech inverse model used walking

surveys and temperature loggers on the streambed to map the locations and timing of stream drying for comparison to nearby stream gauges. We found that both independent methods of estimating Q_sub had strong agreement, and that Q_sub explained the observed patterns of intermittency (i.e., intermittent reaches had greater Q_sub than perennial reaches). Intermittent reaches also exhibited a cooling effect on downstream perennial reaches due to reduced solar radiation and subsurface thermal buffering. We place our results in the context of collaborative restoration efforts intended to promote steelhead recovery and restore natural stream processes.

Oral Presentation
Thirtymile Creek Steelhead Recovery

Homeward Bound: Monitoring the return of Fall Chinook salmon to the Upper Klamath Basin after a century of extirpation

Mallory Hoffbeck

Once the third most productive river for salmon in the lower 48, the Klamath River had been drastically changed by the construction of four hydroelectric dams, built between 1912–1964, which blocked fish migration into upstream habitats. Since the removal of the dams in 2024, salmon and other anadromous fish species can once again access these habitats for spawning. ODFW's objective is to track and monitor the abundance and distribution of fall Chinook salmon and other anadromous species as they return to the Upper Klamath Basin. In Fall 2024, our team conducted spawning ground surveys to count live Chinook and spawning redds, as well as sample all observed carcasses. Carcass samples include scales, tissue, and heads (containing otoliths). These samples provide data on age, genetics, and origin of salmon from the lower basin. It was expected that the return of salmon and steelhead to the Upper Basin could take several years, but after only 14 days since the removal of the final coffer dam, the first Chinook was observed in Spencer Creek, a tributary of the Klamath River in Oregon. After another 14 days, the peak live count in Spencer was an astonishing 182 Chinook salmon. As of December 2024, our team has collected samples from more than 250 Chinook carcasses sampled here in Oregon.

Poster

An Engineering Perspective of Culvert Repairs at Fish Crossings

Wade Holaday

The Culvert Repair Programmatic Agreement between the Oregon Department of Transportation and the Oregon Department of Fish and Wildlife has facilitated significant advancements in culvert repair and fish passage improvements at culvert crossings on fish-bearing streams. This presentation encompasses an engineering perspective on various structural culvert repair methods and fish passage solutions implemented under the agreement. Learn about different repair techniques and fish passage improvements

both inside and outside of the barrel. Over the past nine years, valuable lessons have emerged regarding the optimization of repair techniques and fish passage enhancements. The findings highlight the need for a balanced approach in culvert repairs to critical state infrastructure needs and fish passage designs to ensure effective solutions for aquatic species.

Oral Presentation
Fish Passage

Elevations relatively, assessing and prioritizing a larger portfolio of floodplain habitats in upland riverscapes.

Edward Hughes

Off-channel rearing habitats are widely recognized to be the primary limiting factor for coastal populations of salmon and steelhead. Channelization in higher stream orders is a leading cause of tidal and floodplain disconnection in coastal riverscapes. These habitats are among the most favorable for Coho growth and associated survival. Using GIS spatial analysis with methods presented in workshop, we developed a Relative Elevation Model (REM) of the lower reaches of the East and North Fork Coquille River that delineates the area and volume of main stem off-channel floodplain habitat that is available for fish at seasonal river stages. The model was verified at a 'pasture pond' site where Coho were sampled and PIT tagged in early 2024. We observed a threshold of connectivity to the pond for Coho based on river stage and mark recapture sampling. These Coho were similar in size and growth rate to their contemporaries in the tidal zone. With seasonal connectivity these off channel habitats, downstream of the most productive spawning grounds in the Coquille Basin, support a more complete portfolio of juvenile rearing life histories, promoting resiliency across temporal and spatial variability. Without connectivity, they are ecological traps. Fish passage projects prioritizing fish egress could restore these working lands to realize mutual benefits.

Poster

Overview of the recent unprecedented PSP event and recommendations for the future in the context of increasing frequency of marine toxin events

Matthew Hunter

Biotoxin closures to shellfish fisheries from domoic acid or paralytic shellfish poisoning along the west coast of the United States have become more frequent, more intense and increased in duration. State natural resource and health agencies have programs, procedures and policies in place to protect consumers and harvesters from consuming contaminated product. These programs have been effective in ensuring public safety for years and have provided consumers the confidence that the shellfish they harvest and/or consume are safe.

On Memorial Day weekend of 2024, an unprecedented paralytic shellfish poisoning event occurred that resulted in several hospitalizations, numerous presumptive illnesses, and widespread closures of shellfish harvesting along the Oregon coast. While biotoxin accumulation in shellfish resulting in closures has occurred for many decades, this recent event had a rapid accumulation intensity not documented before. It impacted numerous harvested species of shellfish both marine and estuarine with levels that exceeded previous recorded thresholds. The rapid accumulation, large geographic area affected, and the quantity of species impacted strained state agency's ability to effectively provide public safety.
Through adaptive coordination, natural resource and health managers were able to effectively manage the situation, provide detailed information to constituents, and keep the public safe. This event only lasted several weeks but it revealed that state managers need to rethink program priorities, build more effective testing capabilities, establish better channels for dialogue and continue to coordinate polices and procedures to ensure shellfish consumption is safe to the harvesters and public.

Oral Presentation
Marine

Assessing eDNA as a Non-invasive Sampling Technique for Pathogen Detection in Salmonid Fish

Kasey Ingram

Increasing water temperatures brought by climate change and modifications to freshwater environments have increased fish vulnerability to infection by pathogens. Pathogen detection used to monitor the health of fish is usually invasive and often requires fish to be euthanized for necropsy. Invasive sampling can be labor intensive and not ideal when working with small populations of threatened or endangered species. Our goal is to develop a non-invasive environmental-DNA (eDNA) sampling technique to accurately determine if and to what degree fish are infected. In this study, we used steelhead trout (Oncorhynchus mykiss) and the myxosporean parasite Ceratonova shasta, a common host-parasite of concern in the Klamath basin. We exposed 3 groups of treatment fish to C. shasta and kept one group as the control. Each week, we incubated 1 fish from each group in a bucket of water and filtered a subsample of the water through filters that were then used to determine total C. shasta spore count with qPCR. Results from infected and control fish were compared while fish necropsies served as a point of reference for infection. We found that C. shasta was hardly detected before 4 weeks post-exposure, at which point fish also showed clear physical signs of infection and tested positive in necropsies. Additionally, we found that the quantity of spores between subsample replicates and tank replicates varied widely, which we think is caused by spores clumping in the incubation water. Non-invasive sampling was not effective at detecting C. shasta throughout the disease cycle, which aligns with the dispersal pattern of the pathogen. Our next experiment will add replication to infected fish at week 4 and more rigorously assess if subsampling is feasible given the non-uniform dispersal of spores in incubation water.

Student Poster

Klamath Falls National Fish Hatchery 2024 Year in Review

Michelle Jackson

The staff from Klamath Falls National Fish Hatchery (KFNFH) will be presenting updates and achievements in 2024, in addition to future plans as the facility continues to develop. KFNFH has been collecting larval Lost River suckers (C'waam) and shortnose suckers (Koptu) since 2016 and stocking them back into natal waters since 2018. Updates will include larval collection efforts and numbers collected, broodstock updates, spawning achievements, rearing efforts from larval to juvenile stage, Gerber Reservoir net pen operations, numbers on station, and numbers stocked out to Upper Klamath Lake and its tributaries. With the future increase of production numbers as the facility continues to be developed, we aim to continue refining methods of larval collection and rearing, spawning of wild and captive adults, and implementation of a genetic management plan for broodstock. We will review studies completed in 2024 at the hatchery and field monitoring for Sucker Assisted Rearing Program (SARP) fish, in addition to future studies and priorities for the hatchery and SARP in 2025. An update about the ongoing construction for the future hatchery will conclude the presentation.

Oral Presentation
Klamath Basin Monitoring

A molecular specimen bank for contemporary and future study captures landscape-scale fish biodiversity baseline before Klamath River dam-removal (In review)

Dylan Keel

(In review) Global restoration and conservation of freshwater biodiversity are represented in practice by works such as the Klamath River Renewal Project (KRRP), the largest dam removal and river restoration in the United States, which has restored connectivity to 640 river kilometers. With dam removals, most biological outcomes remain unstudied due to a lack of pre-impact data and complex ecosystem recovery timeframes. In anticipation, we created the KRRP molecular library, an environmental specimen bank, for long-term curation of environmental nucleic acids collected from the restoration project. We used these initial samples, environmental DNA (eDNA) metabarcoding, and generalized linear mixed-effects models to evaluate patterns of pre-dam removal fish richness and diversity. Demonstrating the suitability to resolve biological differences, the baseline shows that tributary and mainstem streams had greater native fish diversity and 2.3 – 7.9 times greater native fish species richness than reservoirs. These and future sampling efforts should, at a minimum, allow tracking of fish community response to ecosystem restoration. Anticipating the acceleration of omics innovation, we preserved samples for long-term storage and identified requisite phases for sustained function and adaptation of the molecular library: securing a physical storage facility for genetic material, establishing a governance structure, and confirming support for archive management. (In review)

Oral Presentation/DNA and Genetics

Dispersal patterns of juvenile spring Chinook Salmon in relation to riverscape conditions and restoration in Catherine Creek, NE Oregon

Kayla Kelley

Salmon populations are declining throughout the Columbia River basin and its tributaries due to numerous anthropogenic impacts including climate change and habitat degradation. Chinook Salmon are among the species at risk of extinction, despite significant recovery efforts. Catherine Creek, in the Grande Ronde sub-basin, harbors a distinct population of spring Chinook Salmon and has been affected by habitat degradation, warming temperatures, and channelization. Although several large-scale river restoration efforts have been conducted on Catherine Creek, successful management requires further knowledge on progeny dispersal patterns from redds to summer rearing locations and their preferential selection of habitat conditions. To address this need, we have used parentage-based tagging tools (PBT) to investigate juvenile dispersal patterns in relation to parent origin, riverscape condition, and restoration. During the fall of 2023, we conducted surveys to determine spawning locations (n = 158) and parental origin (hatchery vs. natural-origin) of individual adults. In the summer of 2024, we conducted extensive parr sampling (n = 5000) throughout Catherine Creek. We determined dispersal patterns in relation to spawner origin and restoration using a two-level hierarchical model that predicts the probability of individual parr dispersing to specific rearing sites while accounting for sampling probability. Understanding the spatial arrangement of juvenile rearing and adult spawning can provide guidance for successful restoration actions that consider habitat complementation and connectivity in the future.

Student Presentation
Chinook

ʔImtwaha Fish Hatchery: Spring Chinook in the Walla Walla Basin

Jen Krajcik

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) Fisheries program develops, operates, and co-manages artificial fish production facilities that release fish throughout the traditional use areas (specifically the Umatilla River, Grande Ronde River, and Walla Walla River Basins) to replace extirpated populations and supplement depressed populations. The newest facility working towards these goals is the ʔImtwaha Fish Hatchery, in Milton-Freewater, Oregon which was completed in 2022. This hatchery produces 500,000 spring Chinook each year for release into the Walla Walla River and its tributaries. Spring Chinook in the Walla Walla River were extirpated in the early 1900s. Work to replace this population started in the 1990s, but existing habitat, flow, and passage barriers needed resolution before implementing hatchery supplementation. Over the last 30 years enough progress has been made on these issues that construction of a full fish hatchery was warranted. As fish begin returning to the Walla Walla Basin, co-managers are working together to ensure that the program goals are successful. Broodstock needs are currently supplemented by the Umatilla Hatchery Satellite Facilities project and/or

US Fish and Wildlife Service until the returns support taking the full brood locally. Co-managers are working to develop guidelines to balance broodstock collection, harvest opportunities, and spawning escapement. CTUIR habitat staff are working to ensure that there is habitat for passed adults to utilize. CTUIR monitoring and evaluation staff are conducting surveys to see if the adults are spawning successfully after being passed, and running screw traps to quantify the production of smolts from these fish. Oregon and Washington have passed legislature to protect the water in the river so the fish are able to return to the tributaries each spring. Co-manager engagement is key to the success of the ʔImtwaha Fish Hatchery into the future.

Oral Presentation
Hatcheries

Status and trends of adult Lost River and shortnose sucker populations in the Upper Klamath Basin

Jacob Krause

It has now been 37 years since Lost River (LRS; Deltistes luxatus) and shortnose suckers (SNS; Chasmistes brevirostris) were federally listed as endangered. The populations still have not recovered and tracking the population dynamics of these endemic suckers are important for recovery strategies. We used a time-series of mark-recapture data from the years 1999-2024 to estimate annual survival through a Cormack-Jolly-Seber model (CJS), estimates of recruitment of new individuals into the spawning populations through a reverse-time analog of the CJS model, and estimated abundance using CJS detection probabilities and recaptures for Upper Klamath Lake populations. Adult populations have not experienced a significant recruitment since the early 1990's and are reaching critically low levels. The populations in spring 2023 were estimated to be ~16,000 for LRS river spawners, ~2,400 for LRS lake spawners, and ~5,000 SNS. A large reduction in the LRS populations is expected as detections halved in 2024 for these fish. The current LRS populations may be experiencing senescence as evidence by a downward trend in survival and most individuals now being 12 years past their average life expectancy. Shortnose suckers have had some recruitment, but never enough to offset annual mortality losses leading to a 90% population reduction since 2001. There are no positive indicators from juvenile monitoring programs to suggest that existing juvenile cohorts of wild or hatchery-reared in Upper Klamath Lake should be expected to make it to adulthood in numbers that will reverse the current population trajectories. Time is limited to recovery suckers in Upper Klamath Lake. Sucker populations in Clear Lake have limited recruitment, but the highly dynamic system dictates variable adult survival and inconsistent spawning that leaves these populations vulnerable to stochastic events. Long-term monitoring suggests the persistence of suckers in the Klamath Basin is bleak.

Oral Presentation
Klamath Basin Monitoring

Seeing the bigger picture of restoration in the Whidbey Basin through a large-scale literature review

Pryclynn Kubatka-Campbell

Restoration monitoring is a relatively new concept for restoration in the delta/nearshore, yet it is vital to guide future restoration actions and maximizing the impact of that restoration. The Whidbey Basin Cumulative Effects Evaluation (Whidbey CEE) project is an ongoing effort to evaluate and synthesize data from restoration projects in the nearshore and deltas across the Whidbey Basin by utilizing existing restoration projects and their associated monitoring data. This approach utilizes a large-scale literature review and a casual analysis framework to evaluate hypotheses from previous monitoring efforts to evaluate effectiveness of that restoration in benefitting juvenile Chinook salmon in their nearshore and estuarine habitats. This large-scale literature review is a vital component of the project in which over 75 restoration projects and over 350 sources across the Skagit, Snohomish, Stillaguamish, and Whidbey basins (Whidbey CEE project area) have been identified. Although there is a wealth of information available, many of these sources lack critical monitoring data and consistent data collection and reporting methods that can used in aiding and informing salmon recovery efforts. This project aims to provide spatial data of available data to identify gaps in reporting and highlight ways in which future data collection monitoring efforts can be more useful in the future. This literature review and evaluation of available data can help to inform those involved in restoration monitoring on ways in which a more focused study design and intentional reporting can help with future analyses.

Poster

Saving Fish Demands Diversity – Start Local – an Example from Parkrose High School

Denny Lassuy

If we want to conserve healthy aquatic ecosystems for the next generation(s), we must improve the ethnic and racial diversity of our profession. Plain and simple, we are all in the fisheries/aquatic conservation profession because it's relevant to us; we care about fish and their habitats. Also plain and simple, the demographic picture of the U.S. population will be dramatically different in the coming decades than when we began our schooling and careers. So – we must stay relevant; we must work now to ensure an engaged, informed, diverse cast of future members in our profession. Representation matters! ORAFS, its DEI Committee, and its E/O Committee are doing important work but we, all of us, each of us, can act locally to move forward in this direction. This talk reviews a recent set of field trips jointly enabled through ORAFS and private funding to involve BIPOC students in learning about fish, conservation and job opportunities. Field trips were preceded by classroom presentations of background information and then visited marine facilities and environments in Newport, as well as college classroom and fish production facilities at Mount Hood Community College and Bonneville Hatchery.

Oral Presentation/Education and Outreach

Nutrient and DOC response to watershed conditions and riparian buffer types in streams of Western Oregon

Anika Lechner Armitage

Riparian buffers are important tools to help protect stream biota and stream ecosystem processes in disturbed landscapes. At the watershed scale, a common response to disturbance is an increase in nutrient availability. The availability of macronutrients (nitrogen (N), phosphorus (P)) can regulate primary production and rates of stream organic matter processing. Because stream autotrophs are the base of stream food webs, the factors which influence macronutrient availability can be important for stream communities and ecosystem processes. Similarly stream dissolved organic carbon (DOC) availability, an important energy source, can also change in streams following upland disturbance, with implications for stream heterotrophs. In this study, we quantify changes in nutrient and DOC concentrations across 30 headwater streams following varying degrees of upland forest management disturbance. We evaluate how background watershed conditions affect initial nutrient and DOC availability and are related to nutrient and DOC responses to forest management. We also explored whether different riparian buffer configurations influenced nutrient and DOC concentrations. To answer our study questions, we designed an experiment with six replicate stream "blocks" in the Oregon Coast range. Each block consisted of an unharvested reference stream plus one stream in each of four buffer design configurations: current practice, fixed width, variable retention, and gaps. We quantified nitrate, ammonium, total N, phosphate, total P and DOC concentrations in filtered (0.7 µm GF/F) water samples collected during baseflow from each stream two years before and one year after treatment. We found that overall landscape features were linked to nutrient and DOC concentrations with more variable responses to buffer configurations. These preliminary results illustrate the connections between landscape conditions, forest management, and the processes which drive aquatic ecosystems.

Student Poster

'Pelicanundrum' - potential effects of pelican-assisted PIT tag migrations on salmonid outmigrant estimation in the Snake River Basin

Joseph Lemanski

The effects of avian predation on juvenile salmon and steelhead throughout the mainstem Columbia River are well documented. Much of our knowledge on its effects are based on the detection of PIT tags at known avian colonies throughout the mainstem Columbia River and estuary. Some managers rely on these detections to incorporate into estimating juvenile outmigrant abundance and survival to certain points along their migration route (e.g. Lower Granite Dam). As part of a new study focusing on the impacts of tributary-level avian predation on juvenile salmonid survival and outmigrant abundance, we encountered two potential biases in survival estimation and outmigrant abundance calculations that may be relevant for managers who utilize detections at avian rookeries. The first bias consideration involves the potential

impact of imperfect detection probabilities at avian rookeries and detection of tags at rookeries years after estimates are generated. The second bias consideration is the potential for pelicans (or other long-distance foraging avian predators) to deposit PIT tags a long distance from the location where the tagged fish were captured and consumed. It is generally assumed that recovery of a PIT tag at a mainstem avian colony site such as Badger Island indicates that the fish successfully migrated past an upstream detection point in order to be consumed as prey near the avian colony. We examine an alternative possibility that some tags arrive at avian colonies "artificially" when fish are consumed during long-distance foraging bouts and deposited at rookeries.

Poster

Effects of Avian Predation in the Grande Ronde Valley on Recovery of Snake River Spring Chinook Salmon and Summer Steelhead

Joseph Lemanski

Impacts of avian predation on juvenile salmonids have been well documented, with much attention focused on avian colonies throughout the mainstem Columbia River and estuary. Less attention has been given to evaluating the impacts of tributary-level avian predation on juvenile salmonid survival and outmigrant abundance. Here we document a mixed-species avian colony, dominated in recent decades by double-crested cormorants, located along Catherine Creek in the Grande Ronde Valley, NE Oregon. Although this colony is small relative to avian colonies in the mainstem Columbia, the level of impact on local salmonid populations appears to be substantially hindering recovery efforts of two populations of Snake River Spring Chinook Salmon. PIT tag recoveries at the colony site indicate minimum predation rates exceeding 15-10% on natural origin outmigrating juvenile salmon and steelhead each year, including 2-4%on on hatchery-produced smolt released upstream of the avian colony. Incorporating standard-procedure expansion factors, such as deposition rate and detection probability, suggest 20% or more of the outmigrating natural origin salmonids from these two populations can be consumed during the spring-time breeding period when these colonial waterbirds are present at the colony. While millions of dollars of habitat restoration efforts are being performed annually throughout the Grande Ronde Basin, the predation rates demonstrated by this colony of avian predators may drown out any signal of progress towards recovery as a result of those efforts and further contribute to declining populations of salmonids.

Oral Presentation
Chinook

If you build it, will they come? The importance of pre-restoration data collection for effectiveness monitoring

Joseph Lemanski

Innovation in floodplain restoration is the landmark of practice in the Pacific Northwest. In recent years, valley reset and stage 0/8 (S0) restoration approaches have gained attention. These restoration approaches propose to reset valley-scale processes (hydrologic, geomorphic and biological) to improve the resiliency and sustainability of ecosystem services. But how effective are they? Preliminary signs of ecological uplift have been documented at sites where S0 restoration has recently occurred, however, these restoration approaches have not been investigated thoroughly. In particular, fish response to these efforts has largely gone un-monitored due to lack of robust pre-treatment information. In the Grande Ronde Basin, the Wallowa-Whitman National Forest, and local Federal, State, Tribal, and NGO partners, have embarked on implementation and monitoring of watershed-scale valley reset/S0 restoration on 20+ miles of fish bearing streams throughout the Meadow Creek watershed. Watershed-scale restoration that incorporates valley reset restoration tools offers an opportunity to learn more about the biological and geophysical effects of process-based restoration. As part of the restoration planning, scientists and practitioners are co-developing the timeline for work to facilitate pre- and post-restoration data collection. In particular, this long-term monitoring project seeks to understand and interpret the effects of these restoration efforts on several fish response metrics at the watershed level, with a particular emphasis on Oncorhynchus Mykiss (resident rainbow trout and anadromous steelhead). A pilot year data collection effort took place in June and September of 2024 consisting of watershed-wide electrofishing sampling to establish a baseline assessment of watershed-scale fish community composition, relative abundance, and distribution as well as the initial collection of juvenile salmonid growth and movement metrics via PIT tagging. Throughout 117 sampling events across 66 total sites, a total of 9 species were observed with a mean of 3.6 species present at a given sampling site. Additionally, 1,205 O. mykiss were captured and PIT tagged, 142 of which were recaptured during a subsequent sampling effort.

Poster

Utility of Parentage Based Tagging for Research, Monitoring, and Evaluation of Hatchery Programs within the Columbia River Basin

Devayne Lewis

Salmon and steelhead hatchery programs in the Columbia River Basin (CRB) play a critical role in supporting healthy population abundances and mitigating the effects of hydrosystems. Hatchery managers require effective ways to conduct research monitoring and evaluation (RME) of the programs and stocks that they manage. Parentage-based Tagging (PBT) is a modern genetic tool that has several advantages over conventional tagging methods (e.g., coded wire tags, physical marks, and Passive Integrated Transponders) for RME applications including being relatively inexpensive, attaining nearly 100% tag

rates, no tag-shedding, and non-lethal tag recovery from any life stage. PBT Baselines for Chinook Salmon and Steelhead were initiated in 2008 within the Snake River basin and expanded by 2012 to attain high expected tag rates for all hatcheries above Bonneville Dam. Combining RME information collected via PBT from adult returns to hatchery programs with other RME efforts that utilize PBT could provide a means for hatchery managers to track abundances, run timing, and harvest utilization of the stocks that they manage in a comprehensive manner throughout the CRB. Our objective for this study was to demonstrate the utility of PBT for comprehensive RME by testing whether a set of recently genotyped broodstock collections (i.e., adults spawned in 2022) showed that observed estimates of percent PBT-assigned, age and stock composition, and abundances of stocks passing Bonneville Dam were similar to the expected values for these metrics. Expected percent PBT-assigned of 52 Chinook Salmon collections (N=57,095) averaged 85.2% (53.5 – 100%) and 15 Steelhead collections (N=5,951) averaged 93.6% (66.9 – 100%), which largely agreed with observed percent PBT-assigned except for rare cases including intentional integration of natural origin fish in broodstocks. Similarly, we explain rare deviations from expectations of age and stock composition and Bonneville Dam stock-specific abundances, which if routinely monitored could be helpful to hatchery managers.

Poster

Bull Trout Passage at the Crooked River's Opal Springs Dam

Peter Lickwar

The Deschutes Valley Water District's (DVWD) Opal Springs Hydropower Project Dam (Opal Project) on the Crooked River has blocked upstream fish passage into the lower Crooked River since the dam's height was increased in 1986. USFWS staff first suggested installing upstream fish passage at the dam in 2000 to help facilitate steelhead and spring chinook reintroduction, as well as passage for bull trout and other native fish species. In 2016 the DVWD agreed to install upstream passage at the dam in November of 2019 and the project's fish ladder began operation. It provides access to about 120 miles of historic anadromous species habitat as well as bull trout foraging, migratory, and overwintering habitat in the lower Crooked River upstream to Bowman Dam, Mckay Creek, and Ochoco Creek. These stream reaches do provide spawning habitat for bull trout. The first bull trout was observed passing upstream through the fish ladder on December 19, 2019 and by the end of the ladder's first year of operation a total of 711 bull trout had been detected using the ladder. Of these 479 passed upstream while 232 moved downstream. As of October, 2024 a total of 2,059 bull trout had passed through the fish ladder. About 1,450 of these moved upstream while 609 moved downstream. The Opal Project's Federal Energy Regulatory Commission license expires in 2032. As part of the Project's relicensing process federal, state, and tribal agencies will re-assess the Project and its effects on fish and wildlife resources in the Crooked River.

Oral Presentation
Bull Trout

Experimental evaluation of the virulence of trematode parasites in juvenile Lost River suckers from Upper Klamath Lake

Jan Lovy

Trematode parasites are abundant in fish from Upper Klamath Lake, with some species believed to contribute to juvenile mortality of endangered Lost River and shortnose suckers, Deltistes luxatus and Chasmistes brevirostris, respectively. These parasites have a three-host life cycle that includes snails and fish as intermediate hosts and birds as definitive hosts. To better understand the diversity and prevalence of trematodes, lymnaeid and planorbid snails were collected from Upper Klamath Lake between July and October 2024 and screened for trematode cercariae. In total, about 2,600 snails were collected, representing at least three snail species, Lymnaea stagnalis, Radix auricularia, and Planorbid spp. After setting up and holding snails overnight in tanks, screening for trematodes was done by microscopic detection of parasite cercariae from water samples. Cercariae were identified by morphology and genetic sequencing of the ITS region of the rRNA gene and the mitochondrial cytochrome oxidase I gene (COI). Here we summarize our findings and identify primary snail hosts for respective trematode species, with a focus on fish pathogenic species, including Diplostomum spp., Tylodelphys spp., and Bolbophorus spp.
We determined the virulence of Diplostomum pseudospathaceum and Bolbophorus sp. trematodes experimentally in young-of-the-year captive reared Lost River suckers. Fish (TL ≈ 30.9 mm) were exposed to four doses of Diplostomum pseudospathaceum (ranging between 100 to 1,000 cercariae). Cercarial doses as low as 250 cercariae were acutely lethal to suckers, whereas they better tolerated the lowest dose of 100 cercariae during a 3-hour exposure. Lethal cercarial doses increased as body size of suckers increased, with suckers (TL ≈ 45.4 mm) tolerating medium cercarial doses (500 cercariae). Experimental infection with Bolbophorus sp. showed that doses of 1,000 cercariae/fish were acutely lethal to juvenile suckers, while doses of 500 cercariae/fish and lower were acutely tolerated. Despite this, Bolbophorus sp. was lethal in fish between 9- and 14-days post-exposure at the lowest doses tested (250 cercariae/fish). The pathology of acute disease related to D. pseudospathaceum and the chronic impacts of Bolbophorus sp. will be further discussed.

Oral Presentation
Klamath Basin Monitoring

Decision analysis to inform management decision-making for long-lived, difficult-to-monitor species with high uncertainty.

Erin Lunda

Making decisions for at-risk species is difficult because stakes are high and complexities arise due to limited information availability. Uncertainty is inevitable when studying long-lived, difficult-to-monitor species, making it essential for conservation strategies to account for and measure that uncertainty. Stakeholder engagement from a variety of different backgrounds helps to solve complex problems through

the development of competing hypotheses of how the system works. In 2013, the Central Valley Project Improvement Act (CVPIA) Anadromous Fisheries Program took steps towards developing an adaptive resource management framework which utilizes structured decision-making for recovery of several species including green sturgeon (Acipenser medirostris) and white sturgeon (Acipenser transmontanus). Initial sturgeon models contained significant knowledge gaps and were developed based solely on expert elicitation, or "best guess", with no empirical data. In this presentation, we will describe the new and improved decision support tools for sturgeon in California's Central Valley, United States of America. We showcase the collaborative efforts of multiple agencies and organizations across the Central Valley and their efforts to determine specific and quantifiable objectives. We discuss types of uncertainty expressed throughout the decision-making process and approaches to reduce uncertainty and ultimately improve decision-making. Results include best restoration strategies determined by the group as well key uncertainties that were identified during the process and can be used to guide future research and monitoring efforts. Using this adaptive management framework is critical to reducing uncertainties within the context of management actions and decisions, especially for threatened and endangered species. Although we use Central Valley sturgeon as case study for this analysis, we believe the techniques demonstrated will be useful to others conducting research to inform management for difficult to study species.

Student Presentation
Marine

Postfire Changes to Aquatic Habitat Metrics in Fish Creek

Regina Maag-Klobas

Fish Creek, a tributary of the Clackamas River, supports populations of coho salmon (Oncorhynchus kisutch), summer and winter steelhead (O. mykiss), chinook salmon (O. tshawytscha), and other native freshwater species such as sculpin (Cottidae) and dace (Rhinichthys spp.). In 2020, the Riverside Fire burned approximately 112,000 acres, including a substantial portion of the Fish Creek watershed. A Level II stream inventory survey had been conducted in 2019 prior to the fire, and this was repeated in 2022 to evaluate the effects of the wildfire on stream conditions.

Comparative analysis of pre- and postfire surveys revealed discernible changes in stream habitat metrics. As anticipated, solar radiation and average daily water temperatures increased, while stream discharge declined. Notably, the survey documented a marked increase in large woody material (LWM) within the bankfull channel, coupled with a higher proportion of finer substrate materials such as cobbles and gravels. The extent of side channel habitat doubled within the surveyed reach as well, suggesting enhanced rearing habitat availability.

A presence/absence snorkel survey performed in 2022 revealed robust populations of juvenile coho salmon and steelhead fry, indicating resilience and potential for recovery in Fish Creek.

These findings highlight the complex effects of wildfire on aquatic habitats and the importance of post disturbance monitoring to inform conservation and management strategies for fish populations in fire-affected watersheds.

Poster

Longevity of Large Wood Restoration Success to Improve Coho Salmon Habitat: A 2D Modeling Approach

Madelyn Maffia

Coho salmon abundance in Coastal Oregon watersheds has significantly declined from predevelopment conditions, largely due to the creation of unfavorable stream habitat for juvenile fish during high-flow events. Large wood (LW) additions have been a heavily practiced restoration technique used to improve native fish habitats. However, we lack information regarding LW's long-term benefits. We used a field-calibrated hydraulic model, Nays2DH, to evaluate hydraulic conditions relevant to acceptable fish habitat 2 to 6 years post LW restoration in three alluvial fish-bearing tributaries of the Siletz River in Coastal Oregon, USA. Acceptable salmon habitat was assumed when flow velocity was slower than the critical swim speed of the juvenile coho fish (vcrit = 0.5 m/s) and stream bed refuge was stable, represented by the likelihood of entrainment of the median size sediment particles on the stream bed. We observed that the maintenance of the initial benefits of the restoration effort estimated in an increase in the acceptable fish habitat of around 30% appears to depend on the original orientation of the LW pieces and the size of the stream relative to the size of the logs below the bankfull flow. Preliminary modeling results indicate that as a result of increased floodplain connectivity from the LW introductions, reductions in water velocity primarily occur near the banks of each reach, and maintained or increased velocity occurs near the thalweg. Downstream log jams also appeared to experience the largest change, relative to the upstream log jams in each reach. Maintenance of acceptable coho salmon habitat 7 years after the LW introductions indicates that LW has the potential to continually improve or maintain created fish habitat over numerous years, specific to the reach scale characteristics. The findings from this research are ecologically important for identifying locations of restoration for species that require longer time frames of maintained acceptable habitat for population recovery or for land managers that strive to improve sustained instream hydraulic complexity.

Student Poster

Active & Passive Community Engagement for Healthy Watersheds

Danielle Maillard

Tillamook Estuaries Partnership (TEP) is one of 28 National Estuary Programs (NEP) and is dedicated to the conservation and restoration of Tillamook County's watersheds through active stewardship, scientific

inquiry, community engagement, and education. By utilizing both active and passive methods of community engagement, TEP is able to reach a diverse audience and connect with rural communities that would otherwise be left out of programming. The organization's active engagement opportunities include participating in free 'Explore Nature' stewardship events, monitoring water quality across the county, becoming a STEAM volunteer for fieldtrips and school-based events, and supporting the operations of TEP's Native Plant Nursery. Passive engagement opportunities include opting-in to TEP's free Backyard Planting Program, participating in TEP's septic system repair pilot, and supporting the nursery by purchasing plants for restoration projects. Each of these opportunities impacts successful fish passage and ecosystem health and provides avenues for varied levels of engagement. Whether TEP's Community Outreach Team is partnering with the local library and Oregon Department of Fish and Wildlife (ODFW) to host a Spring Chinook release and teach youth about salmon lifecycles, or the Habitat Restoration Team is on private land removing invasive vegetation and planting native trees and shrubs along salmon-bearing waterways as part of TEP's Backyard Planting Program, the organization finds new and exciting ways to engage stakeholders for the purpose of enhancing waterways and ecosystem health. This presentation will highlight how TEP's active and passive methods of engagement support successful fish passage and thriving waterways, and how the organization is working to expand opportunities to Tillamook County residents and visitors who are under-represented in current community engagement programming.

Oral Presentation
Education and Outreach

Upper Klamath Basin juvenile spring-run Chinook release study: Using PIT tags to inform outmigration

Carolyn Malecha

The construction of four hydroelectric dams on the Klamath River near the California-Oregon border blocked upstream passage of anadromous fishes in 1912 resulting in the extirpation of fall and spring-run Chinook Salmon, Coho Salmon, steelhead trout, and Pacific Lamprey in the Upper Klamath River watershed. An effort to restore anadromous fish populations throughout the watershed by removing the four hydroelectric dams was initiated decades ago when the license to renew operation of the dams expired. Deconstruction of the dams began in the winter of 2024 with near-simultaneous drawdown of the reservoirs, followed in the summer with the deconstruction of dam facilities. Within weeks following the completion of dam removal fall-run Chinook Salmon were observed spawning in the Klamath River and its tributaries both in California and Oregon in numbers and spatial-extent beyond what was anticipated. However, the expectation for spring-run Chinook Salmon to naturally repopulate newly available habitat is not as promising due to the limited locations of current populations in the lower basin and the location of suitable habitat in tributaries at the headwaters of the Upper Klamath River Basin. ODFW and its partners have been developing a strategy for repopulating habitat with spring-run Chinook Salmon using transplanted, hatchery-reared juveniles. Studies have and continue to occur to investigate this transplanting strategy and to determine if released juveniles can successfully out-migrate through the

upper watershed considering that the landscape has dramatically changed since spring-run Chinook last occupied this habitat. This presentation will summarize ODFW Chinook smolt releases with respect to timing of release events, location, and number of fish released, it will also provide a summary of detections on PIT arrays and discuss proposed future monitoring and reintroduction efforts.

Oral Presentation
Klamath Basin Monitoring

Age structure, reproductive age, and growth of sucker populations in Upper Klamath Lake, OR and Clear Lake Reservoir, CA

Barbara Martin

Both Lost River and shortnose suckers are endangered throughout their ranges, while Klamath largescale suckers are a species of concern. Understanding age structure, when suckers become sexually mature, and sucker growth rates provide important insights into the current populations, juvenile cohort formation, and the timelines for recovery of the Lost River and shortnose suckers. Fin rays were collected and aged from Lost River, shortnose, and Klamath largescale suckers in Upper Klamath Lake, Oregon, and Clear Lake Reservoir, California. In Upper Klamath Lake, adult Lost River suckers from the spring spawning population were compromised of fish spawned in the early 1990's and a few individuals from 2006. The age structure of shortnose and Klamath largescale suckers were more variable and had adults that were spawned within the last 10 years. In Clear Lake Reservoir, Lost River adult sucker populations were mainly from the 2016 and 2017 cohorts, shortnose suckers were mainly from the 2017-2019 cohorts, and Klamath largescale were mainly from the 2016-2020 cohorts. Average age of spawning based on fin ray structures, differed according to sex and population for Lost River suckers, but appeared uniform for shortnose and Klamath largescale suckers. In Upper Klamath Lake, Lost River sucker spring spawners appeared to spawn later (average age for males=age-7 and females=age-9) than Clear Lake Reservoir Lost River suckers (average age for males=age-6 and females=age-7), while the average spawning age for shortnose and Klamath largescale suckers was age-5. Growth of the suckers appeared to plateau at the average age of spawning with Lost River suckers growing quicker than shortnose and Klamath Largescale suckers. Our findings highlight the diversity in life-history among sucker species and across their range that need to be considered when developing sucker recovery plans.

Oral Presentation
Klamath Basin Monitoring

Relative abundance, distribution, and occupancy-based ecological niche of char in northeastern Oregon

Mike Meeuwig

The status of Bull Trout Salvelinus confluentus in many areas in northeastern Oregon is generally unknown due to limited or sporadic monitoring in recent years. For Bull Trout in northeastern Oregon, the U.S. Fish and Wildlife Service, regional Bull Trout working groups, and other stakeholders commonly identify a need to assess the status of Bull Trout, assess the presence of nonnative Brook Trout S. fontinalis and Bull Trout x Brook Trout hybrids, develop a long-term monitoring strategy for Bull Trout, and assess the population genetic structure of Bull Trout. We used backpack electrofishing gear and a spatially replicated survey design to survey 330 sample sites among the Middle Fork John Day, North Fork John Day, Upper John Day, Upper Grande Ronde, and Wallowa subbasins in northeastern Oregon. We documented the relative abundance of Bull Trout, Brook Trout, and putative Bull Trout x Brook Trout hybrids among subwatersheds and evaluated the influence of abiotic and biotic variables on detection probability and occupancy probability of Bull Trout. Additionally, we used occupancy model parameter estimates to develop a preliminary ecological niche model for Bull Trout in selected portions of northeastern Oregon. These data provide insight into the current status of Bull Trout in portions of northeastern Oregon. Although the aim of this study was not to develop a long-term monitoring strategy for Bull Trout, data generated during this work may form the basis for an occupancy-based monitoring framework. Additionally, tissue samples collected during this work may be used for documenting the current population genetic structure of Bull Trout among putative populations.

Oral Presentation
Bull Trout

Measuring and Monitoring Streamflow Response to Beaver Strongholds in Thirtymile Creek, Oregon

Reese Mercer

How might both the quantity and quality of beaver activities within the Thirtymile Creek, Condon basin affect stream surface flows (volume and permanence) over time? And how might an increase in “beaver strongholds” prioritized, and then supported, through a “BeaverHOODs” habitat connectivity approach positively increase “Q Valley” surface flows (permanence and volume) at intermittent stream reaches? This presentation will examine these research questions above, grounded from a “beaver googles” based (ie. more of a ‘pond up view’ vs. top down) framework to qualify, measure, and monitor beaver occupancy over time within the Thirtymile Creek, Oregon basin. Through a multi-disciplinary team approach of both restoration practitioners and researchers, we can then examine how fluctuations in “beaver strongholds” might impact hydrology of this intermittent system supporting Steelhead.
The talk will examine:

• Ways to evaluate and qualify existing beaver occupancy and strongholds;
• Assessing existing beaver habitat within the basin using the "BeaverHOODs" conceptual model as a 'screen';
• Building a beaver habitat connectivity plan to support (and then advance) beaver strongholds utilizing a "habitat stepping stones" approach;
• Opportunities for annual monitoring and measurement of beaver activities in the basin through the American Beaver Activity Survey (Vanessa Petro); and
• Evaluating beaver activity responses to anthroprogenic activities and inputs (ie. what activities yield the most favorable beaver and stream flow responses).

Oral Presentation
Thirtymile Creek Steelhead Recovery

Ecological and Sociological Risks of a Proposed Container Port on Coos Bay

Christine Moffitt

The Pacific Coast Intramodal Project (PCIP) proposed by the Port of Coos Bay poses more extensive alterations to the Coos estuary, the cultural and environmental surroundings than did the Jordan Cove Pipeline and Port project that was finally abandoned in 2021. We present an overview of the PCIP project including designs for the container and rail yard on the North Spit, details of the plans for dredging and enlarging of the estuary to accommodate the draft and length of container ships, and review the challenges of modifying a 100-year-old rail line to carry 12 trains a day (6 outbound and 6 inbound) with double stacked containers to and from the rail connections in Eugene. We review some of the implications of all phases of the proposed development on existing fish and wildlife populations and their essential habitat, risks to Indigenous cultural resources, and impacts on recreational opportunities. Operations of container ports and the transport by rail will bring significant risks to the wellbeing of all surrounding communities from noise and light pollution, potential spills, fires, and cargo releases and derailments.

Oral Presentation
Marine

Spatial and temporal dynamics of Oregon's kelp forests with an emphasis on rockfishes

Wave Moretto

One of the most highly productive ecosystems on earth, kelp forests are prime examples of imperiled habitats that are critical to countless marine species. Kelp forests within the California Current (CC) are no exception, where they provide vital habitat to many nearshore fishes, including commercially valuable rockfishes (genus Sebastes). Multiple stressors including marine heatwaves, storms, and loss of keystone species have led to major recent declines of kelp forest habitat in the CC. Despite robust monitoring efforts,

subtidal surveys in Oregon mainly target invertebrates and algae, whereas fish surveys are rare. This is alarming considering Oregon has lost more than two-thirds of its kelp canopy (primarily composed of bull kelp, Nereocystis leutkeana) since 2010. There is an urgent need to continue to monitor canopy kelp persistence in Oregon, and to enhance our tracking of changes in fish communities in response to both overall declines and seasonal fluctuations in kelp canopy cover. To address this, we are comparing temporal changes in fish communities using novel kelp forest community composition data collected through three distinct in-situ diver survey methods (visual, environmental DNA, and stereo-video) at three nearshore sites on the Oregon coast. We predict that fish communities within kelp forests will be more diverse than in rocky reef habitats and that there will be greater numbers of fish in kelp forest habitats. Our preliminary findings support our prediction that fish diversity is greater within kelp forests, however fish abundance is more variable and may be influenced by site specific factors. Overall, this study will offer critical insights into the role of kelp forests in sustaining important fish species in Oregon.

Student Presentation
Marine

Ex(span)ding Fish Passage Projects – Thinking outside the channel

Alex Morton

Fish passage projects in Oregon have traditionally focused on developing a static, single-threaded channel to meet specific hydraulic conditions conducive to aquatic species migration. The crossings' conditions are often void of in-stream habitat, unable to pass/transport small or large organic debris, restrict natural processes, and generally degrade overtime. As an example, Oregon updated its fish passage policy requirements in 2023 (OAR 635-412), and the stream simulation (channel-centered design approach) was cited as the "preferred design alternative" as opposed to barrier removal or floodplain-based crossings options. Modern fish passage projects are looking beyond the channel to not only restore larger scale watershed processes but better engage the community members who manage and are connected to our natural resources. This presentation features three case studies highlighting innovative fish passage designs, such as large-span crossings that mimic natural stream conditions, in-stream features that provide immediate habitat from day one, collaborative partnership that considers the overall watershed health. Discussions will explore the challenges of balancing ecological priorities with infrastructure needs, the benefits of a dynamic crossing that encourages deposition, erosion (where prudent), passage/transport of large/small organic material, as well as the importance of engaging the community members who are intertwined in our natural resources. By rethinking traditional approaches to fish passage and focusing on habitat and floodplain-centered designs, we can create crossings that not only reconnect aquatic ecosystems but also reflect a shared commitment to sustainable resource management.

Oral Presentation
Fish Passage

2025 Statewide Fish Passage Barrier Priority List

Katherine Nordholm

It is the policy of the State of Oregon to provide for upstream and downstream passage of native migratory fish (NMF). NMF are fish species native to Oregon that migrate for their life cycle needs (OAR 635-412-0005 (33)). Oregon has approximately 40,000 inventoried artificial obstructions (AOs) that are fish passage barriers and can potentially inhibit or delay fish movement. An AO is any dam, diversion, culvert, or other human-made device placed in the waters of this state that precludes or prevents the migration of NMF. (ORS 509.585). Due to the volume of these AOs and the associated cost of repairing them, only a small proportion are addressed each year.

Oregon Department of Fish and Wildlife (ODFW) has constructed a list of priority fish passage barriers to identify locations that would maximize the return of NMF to critical habitats if addressed. Previous priority barrier lists approved by the Oregon Fish and Wildlife Commission in 2013 and 2019 were developed by ODFW staff selecting priority AOs and using a scoring methodology to rank them. In developing the 2025 priority list, ODFW updated the scoring equation to add two new factors to address climate change concerns. Climate change presents significant challenges for NMF populations, affecting habitat availability and quality, which can increase competition and strain to vulnerable NMF species. In response, the 2025 priority barrier list incorporates new scoring factors that account for current access to cold water and areas resilient to climate change. This allows ODFW to better target restoration efforts that enhance resilience in fish populations and their habitats.

Connectivity of aquatic habitats is important to Pacific Northwest fish populations because access to stream habitats is a critical element for sustained fish populations and ecosystem functions. When streams are fragmented, the restricted movement of fish is one of many repercussions to the natural environment that in turn impact fish population viability. Habitat fragmentation caused by AOs also affects water temperature and flow patterns. It alters a stream's capacity to acquire, move, and deposit sediment, and changes a stream's ability to modify the streambed through erosion and deposition. Improving connectivity between habitat types, supports increased production of NMF populations because fish require different physical and chemical conditions to grow and reproduce. Loss and degradation of fish habitats via increasing fish passage barriers has reduced the capacity of many Pacific Northwest fisheries to achieve maximum sustainable productivity. The intent of this priority barrier list is to identify the highest priority fish passage AOs in Oregon and to promote improved fish passage at these priority AOs. Addressing passage at these priority locations will enhance and contribute towards the restoration of Oregon's NMF populations while recognizing that cooperation and collaboration between public and private entities that own and manage AOs is necessary to accomplish this policy goal as envisioned by the Oregon Plan (ORS 541.898).

This presentation will outline the approach that was used to score and then rank high-priority barriers created by AOs identified by ODFW District Fish Biologists. Natural barriers such as waterfalls, estuary sedimentation, beaver dams, and debris jams are omitted from this ranking as directed in ORS 509.585 (3) and OAR 635-412-0015 (1) to prioritize AOs that are human-made structures.

Oral Presentation/Fish Passage

Optimal imprinting periods for management of straying of hatchery-reared salmon

Miriam Obley

Straying in salmonids is a natural phenomenon, but stray hatchery origin fish pose genetic and ecological risks to wild populations. The current imprinting paradigm indicates the most critical time period for imprinting is the latest stage of the parr-smolt transformation, which is why acclimation ponds just prior to release are often used. However, there is evidence imprinting is also important at earlier life stages. Determining the optimal period for imprinting could inform hatchery management. At the Oregon Hatchery Research Center, we are in the midst of conducting an experiment to better understand how timing of exposure to odors at various stages in early life history through smolting impacts physiological indicators of imprinting. We exposed Fall Chinook to complex odors (river water and cyprinids) as compared to a control for 9 weeks at three different stages; embryonic, early smolt, and late smolt to capture the period where hormone and expression of genes associated with imprinting were elevated. Currently, fast maturing males from each group are being reared into adulthood and tested with the same physiological metrics to determine if treatment influences the conservation of imprinting in adults. Data is still being processed for this experiment and will be completed after the final sampling of the mature fish. Understanding key imprinting times and suitable physiological indicators of imprinting behavior can allow hatcheries to better direct their resources and potentially decrease stray rates of hatchery reared salmon. This is applicable under recommendations through the Hatchery Climate Resiliency Review conducted by ODFW to consolidate hatchery production to fewer hatcheries which could amplify stray rates. This, coupled with the unknown impacts of climate change on straying in hatchery salmon, emphasizes the need for further research into the behavior and physiology of imprinting and homing and what hatcheries can do to mitigate stray rates.

Student Presentation
Hatcheries

Review of Laboratory and Field Studies for FishHeart Hydraulic Fishway for Passing Fish Upstream at Hydropower Dams

Nathaniel Olken

The Fishheart Hydraulic Fishway (Fishheart), a new technology developed in Finland, has potential for application in the U.S. to effectively pass anadromous and resident fishes upstream at hydropower dams. The Fishheart has been accepted for upstream passage of salmonids in Finland but there has been limited testing with migratory fishes in the USA. The Fishheart could be a major advancement in state-of-the-art upstream fish passage, especially at locations where use of traditional fish passage technologies would be very difficult. The Fishheart is a floating unit, designed to be installed on the downstream side of a dam. The Fishheart runs on either siphoned or pumped water to provide an attraction water spray and inner attraction flow, guiding the fish into the system. Once the fish swim inside one of the passage conduits,

the Artificial Intelligence (AI)-driven camera system recognizes the species and their size and then based on given orders passage is initiated and fish are transported upstream. Fishheart has conducted a laboratory and field study to start approval use in the USA. As an initial step in developing design and operational criteria for using Fishheart systems, we evaluated passage of Alewife (Alosa pseudoharengus) through a full-scale Fishheart installed in a large fish testing flume. This was followed by a field study at Santee Cooper's Santee Dam and Spillway hydropower project in South Carolina to determine the ability of the Fishheart to safely and effectively pass American Shad (Alosa sapidissima) upstream in a timely manner. Passage of resident freshwater fish were also monitored during this field study given that the technology may also have application to dams where anadromous fish are not present. This presentation will provide a review of the laboratory and field evaluations conducted as well as identify additional study needs to demonstrate effectiveness with Pacific Anadromous species.

Oral Presentation
Fish Passage

Environmental DNA augments efforts to determine the upstream distribution of a rapidly reestablishing population of coho salmon in the Klamath River following historic dam-removal

Joel Ophoff

The Klamath River Renewal Project is the largest dam-removal and river restoration project in the history of the United States. The recovery of salmon populations has long been a significant motivating factor for dam-removal in the Klamath River, and early detections of fish immediately following the restoration of passage at the former dam sites suggest the rapid reestablishment of anadromous species upstream of the dams. The upstream extent of the threatened Southern Oregon and Northern California Coast coho salmon (Oncorhynchus kisutch) is extremely important to managers working to recover the species in the Klamath River. We used environmental DNA (eDNA) to augment existing efforts to monitor coho salmon in the Klamath River in December 2024 and provide a rapid, in-season estimate for their upstream distribution in the same year that volitional fish passage was restored.

Poster

Systems thinking in the restoration of intermittent streams for steelhead recovery

Matthew Orr

A system is a set of parts whose interactions differ from the behavior of each component alone. Degraded stream systems in Central and Eastern Oregon involve interactions among groundwater, vegetation, beaver, and basin-wide anthropogenic activities. The complexity of such systems creates uncertainties in their behaviors, which complicates management decisions. Systems thinking raises the following questions regarding Thirtymile Creek's intermittency and its steelhead conservation. (1) What structural

components of this system determine intermittency? Answering this question requires an awareness of the history of intermittency, which is informed by oral accounts of its residents. (2) How can we define a boundary around this system? Watershed-wide processes on Thirtymile Creek highlight the importance of upland and plateau disturbances and their influence on beaver-based restoration. (3) What recurring events help to understand the system better? Post-project monitoring across similar systems suggests that restoration interventions using beaver dam analogs require support from beaver to succeed and are easily stressed by inputs from outside the system. (4) What underlying beliefs, values, or assumptions are at play? Intermittency offers some surprising tradeoffs to steelhead in Thirtymile Creek, which may point to other parts of the watershed as priorities for restoration. In summary, a systems thinking approach can help to integrate current knowledge in the basin and identify research and restoration priorities for steelhead in intermittent streams.

Oral Presentation
Thirtymile Creek Steelhead Recovery

Upper Klamath Basin Monitoring Strategy

Jordan Ortega

The Klamath Tribes and the Oregon Department of Fish and Wildlife have initiated a comprehensive monitoring program to assess the recovery of anadromous fishes in the Upper Klamath Basin following dam removal. This program employs a diverse suite of monitoring techniques, including experimental motion-sensing cameras, radio telemetry, visual surveys, and passive integrated transponders (PIT). Moreover, the strong response of fall Chinook salmon following Klamath River dam removal prompted the integration of additional strategies. Specifically, we intend to install video weirs in the Keno and Link River fish ladders to provide robust, species-specific escapement metrics into Upper Klamath Lake, as well as fish traps for tagging salmon, lamprey, and steelhead to monitor upstream migrations. This multi-faceted approach allows for more precise assessments of run size, migratory patterns, and habitat use. Preliminary findings reveal substantial fall Chinook salmon spawning activity in the mainstem Klamath River from the Oregon-California border to Spencer Creek, with significant additional spawning in Spencer Creek. Bureau of Reclamation staff confirmed Chinook salmon using the Keno fish ladder and a monitoring camera at the Link River fish ladder recorded large, unidentifiable salmonids (salmon or trout) ascending the structure, suggesting the potential migration of salmon beyond Upper Klamath Lake. In response, visual surveys of Upper Klamath Lake tributaries have been conducted, covering over 55 kilometers of habitat but these surveys have yet to identify salmon upstream of Upper Klamath Lake. For The Klamath Tribes, the recovery of anadromous fishes holds immense cultural, spiritual, and subsistence significance. This monitoring program represents a pivotal step toward the recovery of anadromous species and the restoration of the Klamath River ecosystem, aligning with the Tribes' vision of a thriving river system that sustains both wildlife and human communities.

Oral Presentation
Klamath Basin Monitoring

Does borrowing information improve rotary screw trap estimates of juvenile salmon production?

James Peterson

Fishery managers throughout the Pacific Northwest invest considerable resources in monitoring juvenile Pacific salmon production using rotary screw traps (RSTs). However, RST operations are often disrupted by weather events such as floods, workforce and budgetary constraints, and the availability of fish for trap calibrations. In this study, we evaluate the efficacy of borrowing information across years and locations, as well as incorporating covariates, to improve the estimation of RST efficiency and juvenile salmon production. Using long-term datasets, we assessed the accuracy of both established linear spline models and novel autoregressive models for estimating juvenile production during within-season gaps in RST operation. Additionally, we examined the benefits of incorporating multi-year calibration trials and covariates to enhance RST efficiency estimates. Simulation results revealed that the autoregressive model provided more accurate juvenile production estimates than the spline model, particularly when borrowing information across years, with or without covariates (e.g., discharge). The autoregressive model also handled within-season gaps in RST operation more effectively. However, estimation accuracy was poorest when data contained regularly spaced gaps, such as those corresponding to weekends. Incorporating efficiency trial data from multiple years significantly improved estimates of RST efficiency and juvenile production. Nevertheless, estimation accuracy decreased with a lower number of marked fish per efficiency trial, fewer efficiency trials, and the presence of extra-binomial variation. Furthermore, improvements in RST efficiency estimates diminished after approximately eight years of efficiency trials. Future work includes implementing these methods in an R package to facilitate broader application.

Oral Presentation
Native Fish

Camp Creek Restoration Effects on Yearly Growth Rate of Steelhead

Matthew Raines

Across Oregon, numerous investments have been made in stream restoration, yet many lack effective monitoring. In 2008 the Middle Fork Intensively Monitored Watershed (MFIMW) established an experimental framework to evaluate various restoration efforts along the Middle Fork John Day River basin. Camp Creek, a tributary to the Middle Fork, is designated as a subwatershed for monitoring by the MFIMW. Since 2009, several restoration initiatives have been implemented throughout the Camp Creek drainage to improve in stream habitat for summer steelhead (Oncorhynchus mykiss) and spring Chinook salmon (Oncorhynchus tshawytscha). Ongoing efforts continue to focus on improving fish passage, enhancing instream habitat, and rehabilitating riparian areas. Since 2008, four sites on Camp Creek have been sampled twice per year to collect biological data on juvenile steelhead. This sampling structure investigated the density, growth, survival, condition, and age structure at these sites. Previous analyses of this data showed no significant changes in abundance or survival, but did not investigate growth rate, age-

to-length composition, or body condition. For this study we will focus on these other biological indicators to investigate evidence of restoration success, and continuation of the abundance and survival will be monitored to see if trends emerge. We hypothesize that these restoration efforts will lead to significant improvements in the yearly growth rate and body condition of Camp Creek steelhead, with individuals attaining larger sized at younger ages. Since larger fish are more likely to survive to later life stages, we anticipate that improving the condition of out-migrating smolts will enhance smolt-to-adult ratios over time. Ultimately, this study will provide valuable new insights into the interaction between restoration and juvenile steelhead, allowing for more informed and effective restoration practices in the future.

Oral Presentation
Thirtymile Creek Steelhead Recovery

Adaptation of United States West Coast Commercial Seafood Harvesters to Environmental Stressors

Lauren Rice

Marine resource-dependent livelihoods—such as those within commercial fishing and aquaculture industries—are facing growing threats from environmental and climate changes. Their industries are vital to the economy, culture, and way of life for many along the United States West Coast, making it crucial to help these communities become more resilient. To effectively support their adaptation to environmental stressors, it is important to understand how community members themselves perceive the challenges they face; the strategies they prefer to use in their adaptation; and the economic, regulatory, and social factors that help or hinder these efforts. Through a systematic review and qualitative content analysis of interview data, I explored how people in commercial fishing and shellfish aquaculture communities in Washington, Oregon, and California are responding to these changes. My goals are to showcase the local perspectives of those working on the frontlines of change and to strengthen efforts to support the resilience of these coastal communities. Overall, results suggest that primary environmental stressors center around thermal stress, and adaptation efforts largely hinge upon the ability to switch between adaptive strategies (i.e., flexibility). However, access to assets and inflexible regulatory frameworks impede upon their adaptability. The results of this research emphasize the importance of developing and leveraging networks of commercial seafood harvesters, managers, and scientists to facilitate knowledge sharing and support adaptive strategies.

Student Poster

Marine reserves in the face of climate change: considering community-driven adaptive management in response to habitat loss

Caroline Rice

The Redfish Rocks Marine Reserve, located on the southern Oregon coast in Port Orford, was proposed by a team of community members from the commercial fishing industry to be one of the state's first marine reserves in 2008. The reserve was formally established and closed to all forms of extractive activities in 2012 to begin protecting vital marine habitat for the future health of our ocean and ecosystems. The Redfish Rocks Marine Reserve was designed by the community team to protect vital rocky reef habitat that supports biodiversity and provides essential fish habitat, including the extensive bull kelp beds found in the nearshore environment at Redfish Rocks. In 2014, a series of ecological and environmental stressors, including a marine heatwave, the outbreak of Sea Star Wasting Disease (SSWD), and subsequent loss of an important mesopredator, the sunflower sea star, led to significant declines in kelp forests along the West Coast. Researchers with the Oregon Kelp Alliance have documented a similar change at Redfish Rocks and many other locations along the Oregon coast with declines in kelp habitat and increases in populations of the herbivorous purple sea urchin. Marine reserves are important conservation tools that protect ecosystems from extractive human activities, but how do we also protect these areas from climate change? In this presentation, we will unravel the complexities of marine reserve protection and management by taking a closer look at the community-driven approach to marine reserves, changes in the ecosystem at Redfish Rocks ten years after establishment, and adaptive management strategies mandated by the state in the 2023 legislative session, putting particular focus on how to re-engage with the community to best serve and protect our marine resources.

Oral Presentation
Marine

Harvest Estimates Using Voluntary Angler Reporting

Brian Riggers

Sean Simmons, founder of Angler's Atlas, procured funding for a project comparing harvest estimates from a voluntary, incentivized program using the MyCatch app to creel estimates. Angler's Atlas, in collaboration with ODFW, conducted a study on the Salmon River, Oregon during the fall 2024 Chinook Salmon fishing season. One objective of this study was to compare Chinook Salmon harvest estimates generated from an event entitled "Salmon River Rodeo" to e-Creel harvest estimates. An e-Creel combines in-person creel interviews with data from ODFW's Electronic Licensing System database. Mark-recapture methodologies are utilized in an e-Creel to calculate harvest estimates (Riggers and Jones 2022). This study will assess how well voluntary reporting methods work in recruiting sufficient numbers of anglers to report their harvest. It will also assess the reliability and precision of harvest estimates generated from voluntary angler reported data. Preliminary results show potential biases deriving from how the creel

surveyor asks questions and recruits anglers to participate. Anglers expressed concerns to the creel surveyor about the MyCatch app and how data would be utilized; these concerns potentially influenced event participation rates. Angler's Atlas plans on communicating results with participating anglers and conducting additional evaluations of voluntary angler reporting events.

Poster

Optimizing Long-term Species Status Assessment with Environmental DNA: Independence Valley speckled dace (Rhinichthys osculus lethoporus) Conservation

Lindsey Roberts

As desert aquatic organisms face numerous threats to survival, such as habitat degradation, ground water pumping, and climate change, stress incurred from frequent handling during data collection can further affect the persistence of vulnerable species. To mitigate these effects, it is important to reduce handling time and use trapping techniques that minimize stress, especially for at risk species. Researchers should also evaluate potential monitoring methods and develop robust, statistically validated procedures for effective long-term population assessment. Environmental DNA (eDNA) has been shown to be a reliable tool for evaluating species occupancy (i.e. presence/absence) that does not require the capture and handling of focal species. Recently, eDNA has also been used to estimate species-specific population abundances, species distributions, and community assemblages. Here, we assess the feasibility of eDNA for long-term monitoring of the endemic Independence Valley speckled dace, Rhinichthys osculus lethoporus, which inhabits the Ralph's Warm Spring wetland complex in Independence Valley, Nevada. We sampled dace using minnow traps paired with eDNA samples at multiple locations within the wetland complex. Dace abundance at each location was estimated using the Huggins closed capture model and compared using qPCR standard curve copy numbers, which indicate the quantity of DNA present. Data collection is ongoing however, preliminary results suggest that eDNA may be useful for assessing the status of Independence Valley speckled dace.

Student Poster

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effective long-term population assessment. Environmental DNA (eDNA) has been shown to be a reliable tool for evaluating species occupancy (i.e. presence/absence) that does not require the capture and handling of focal species. Recently, eDNA has also been used to estimate species-specific population abundances, species distributions, and community assemblages. Here, we assess the feasibility of eDNA for long-term monitoring of the endemic Independence Valley speckled dace, Rhinichthys osculus lethoporus, which inhabits the Ralph's Warm Spring wetland complex in Independence Valley, Nevada. We sampled dace using minnow traps paired with eDNA samples at multiple locations within the wetland complex. Dace abundance at each location was estimated using the Huggins closed capture model and compared using qPCR standard curve copy numbers, which indicate the quantity of DNA present. Data collection is ongoing however, preliminary results suggest that eDNA may be useful for assessing the status of Independence Valley speckled dace.

Student Presentation
DNA and Genetics

Factors influencing smallmouth bass distribution, their impact on steelhead abundance, and implications for conservation

Erik Rook

Nonnative smallmouth bass are increasingly expanding into salmonid rearing tributaries, posing a significant threat to native salmonids. Understanding the factors that drive smallmouth bass establishment and their ecological impact across varying environmental conditions is crucial for developing effective management strategies. This study incorporated data from 20 monitoring sites located in three steelhead-bearing tributaries to examine the environmental conditions influencing smallmouth bass distribution. We analyzed smallmouth bass presence/absence in relation to elevation, weekly maximum temperature (7dAM), stream gradient, and winter temperature. Additionally, we evaluated how the interaction between 7dAM temperature and smallmouth bass presence affected steelhead abundance across monitoring sites. Smallmouth bass distribution was primarily constrained by stream gradient, intermittency, and overwintering conditions, with higher gradients and unfavorable winter temperatures reducing their presence. Steelhead productivity was significantly influenced by both 7dAM temperature and the presence of smallmouth bass. In bass-free sites, steelhead density decreased linearly with increasing 7dAM temperature. However, in streams with smallmouth bass, steelhead abundance was significantly lower, regardless of 7dAM temperature. These findings underscore the substantial impact of smallmouth bass on steelhead populations and highlight the importance of incorporating nonnative predator management into restoration and conservation plans where the two species co-occur. Targeted removal of smallmouth bass in critical spawning and rearing tributaries, combined with engineered barriers or enhanced stream gradients, could help limit their spread. Integrating these strategies into restoration efforts is essential for mitigating the ecological threat posed by smallmouth bass and supporting steelhead recovery.

Oral Presentation/Thirtymile Creek Steelhead Recovery

Where the River Meets the Road: The Culvert Repair Programmatic Agreement and helping communities reach their destinations

Kevin Rybacki

The state of Oregon has one of the most diverse landscapes in the country, encompassing a wide range of natural and anthropogenic features and ecosystems. Among its critical pathways are an intricate network of roads and a dynamic system of streams and rivers. The Oregon Department of Transportation (ODOT) manages 8,000 miles of state highways, intersecting with 112,000 miles of streams and rivers at an estimated 35,000 culvert locations. These crossings require volitional fish passage for native migratory fish, as mandated by the Oregon Department of Fish and Wildlife (ODFW). Replacing and upgrading culverts to meet full fish passage criteria is a costly endeavor, with estimates in the tens of billions of dollars. To address this challenge, ODOT and ODFW established the Culvert Repair Programmatic Agreement (CRPA) in 2014. This collaborative program enables ODOT to repair aging culverts cost-effectively while improving fish passage beyond the status quo. This effort has allowed ODOT defer millions of dollars each year and includes a requirement to allocate millions of dollars to an ODFW-managed account that helps fund the highest priority fish passage restoration projects off the state highway system. This presentation highlights the CRPA's innovative approach, demonstrating how collaboration between agencies can balance infrastructure needs with ecological priorities. By maintaining critical pathways for both humans and fish, Oregon serves as a model for efficient, cost-effective solutions.

Oral Presentation
Fish Passage

Dispatches from the 2024 OHRC Hatchbox Workshop

Ashley Sanders

The term "hatchbox" encompasses a wide variety of contraptions used to incubate eyed fish eggs to the swim-up fry stage, essentially as an artificial redd, from which fish can volitionally release to the river or are transported as unfed fry. They have been used in Oregon for reintroduction and supplementation purposes in the past, but operations have been mostly small scale and low-tech compared to hatchery operations that raise fish to the smolt or pre-smolt stage in a facility. The Oregon Hatchery Research Center hosted a workshop on November 14, 2024 at the OSU Corvallis campus to share what is known about hatchboxes to better inform managers interested in their use. The workshop was attended by almost 40 participants that represented wild fish advocacy groups, pro-hatchery angling groups, state fisheries management, Tribal fisheries management, biological and social fisheries science, etc. We organized a session to hear about case studies on the existing use of hatchboxes, followed by another session with NOAA fisheries scientists who elaborated on the potential ecological and genetic risks based on extensive hatchery/wild fish research. At the end of the workshop, we split into groups to discuss what was learned among participants, which was recorded by notetakers and summarized in a larger group discussion. From

feedback forms and conversations afterwards, we learned that many participants were satisfied with the event but came away with different messages regarding the appropriateness of hatchbox use in different contexts. A summary of the workshop will be presented as well as a discussion about the takeaways and next steps for the work.

Oral Presentation
Education and Outreach

Using genetics to monitor artificially propagated Pacific Lamprey in the Tucannon River

Zach Seilo

Artificial Propagation of Pacific Lamprey (Entosphenus tridentatus) is a new frontier of restoration research that aims to produce large numbers of larval Pacific Lamprey in the hatchery to accomplish the following two objectives: 1) supplementation of natural populations with novel sources of larval abundance and 2) provide high sample sizes of Pacific Lamprey migrants for researching downstream passage without impacting natural populations. Twelve female and eighteen male lampreys were cross-fertilized in the lab. The resulting larval lamprey were reared to a minimum of 30 days post-fertilization. Approximately 800,000 artificially propagated larval lamprey were released into the Tucannon River in the spring of 2021 and 2022. Crosses were isolated into two release treatments (staggered release vs direct release) that were released at two sites in the Tucannon River. After the release of larval lamprey, electro-fishing surveys were conducted at multiple index sites along the river. Genetic analysis was conducted on all sampled larvae to determine whether they were from artificial propagation efforts. Larval lampreys (n=262) collected during electrofishing surveys in 2023, were submitted for genetic analysis. Four of the larval lampreys collected during surveys were not successfully genotyped. Larval lampreys were only found at four index sites (river kilometer 0, 10.1, 50.1, and 60.1). There were no artificially propagated larval lampreys identified at the lower river index sites (river kilometers 0 and 10.1). The two index sites in the upper Tucannon (river kilometers 50.1 and 60.1) were located near larval lamprey release locations. At river kilometer 50.1, 53% of the larvae collected were from artificial propagation, and at river kilometer 60.1, 96% of the larvae were from artificial propagation. Moreover, most of the fish were assigned to both parents, increasing the credibility of the assignment.

Poster

Effect of diet on susceptibility to Aeromonas salmonicida in juvenile Chinook Salmon

Molly Shannon

This study investigated the effect of diet on susceptibility to Aeromonas salmonicida in juvenile Chinook Salmon (Oncorhynchus tshawytscha). A. salmonicida is a bacterial pathogen commonly occurring in hatchery-reared salmonids that can cause high levels of mortality due to furunculosis, leading to economic loss for aquaculture facilities. We hypothesized that a low-lipid diet would cause the fish to be less

susceptible to infection. We reared juvenile Chinook Salmon from South Santiam brood stock on either the low-lipid Wild Chinook Grower (WCG) or Bio-Oregon BioClark's Fry diet (Bio-OR). Two separate experiments were conducted in this study, with the first using duplicate tanks at 18ºC and the second with triplicate tanks at 16ºC. Infection was carried out through bath exposures using A. salmonicida cultures obtained from an ODFW hatchery. Twice a day, we checked for morbidities. Mortalities and moribund fish were collected, fork length was recorded, and kidney samples were streaked on tryptic soy agar plates to culture for A. salmonicida. In the first experiment, morbidity and mortality were slightly, but not significantly lower, in the low-lipid WCG fish. The second experiment showed slightly, but not significantly lower, morbidity and mortality in the BIO-OR fish. Overall, there was no significant difference in disease susceptibility between the two diet treatments. This may indicate that diet is not an important factor for disease susceptibility in parr and smolt life stages compared to other factors.

Student Poster

Ambodat c'waam and koptu assisted rearing

Carlie Sharpes Barrera

The c'waam (Deltistes luxatus) and koptu (Chasmistes brevirostris) are two closely related, endangered sucker species endemic to the Upper Klamath Basin (UKB). These fishes play vital ecological roles to the UKB and are seen as indicators of the health of the ecosystem. However, they also hold profound cultural, spiritual, and ecological significance for the Klamath Tribes, serving as sacred symbols of sustenance, resilience, and environmental stewardship. Early life mortality and lack of juvenile recruitment to the spawning population are the largest components contributing to these species' continued population decline. The Klamath Tribes' Ambodat Department (Ambodat) has adopted an assisted rearing strategy during the fishes' most vulnerable life stages with subsequent supplementation back to Upper Klamath Lake and its tributaries. During the 2023 and 2024 seasons, Ambodat monitored and evaluated sucker growth and survival as responses to demographic information and environmental conditions in rearing ponds. Ambodat was able to compare water quality conditions in the rearing ponds to sucker habitat in the UKB. Further, Ambodat has analyzed biometric, geographic, and other demographic data on PIT tag detections in the UKB associated the Tribes' fish releases in 2022 and 2023The USGS monitoring efforts provide PIT tag detections across several monitoring stations in the UKB. Refining both the assisted rearing and release strategies are crucial to the success of assisted rearing efforts, and ultimately the recovery of both species. Through on-site data analysis of water quality, sucker survival, and sucker growth, Ambodat will be able to make informed decisions to refine future assisted rearing methods for c'waam and koptu. Likewise, this analysis of PIT tag encounters from released Ambodat fishes in the UKB will inform management of avenues to improve release strategies for enhanced survival.

Oral Presentation/Klamath Basin Monitoring

Using telemetry to characterize the distribution of adult Lost River Suckers (Deltistes luxatus) in Upper Klamath Lake, OR

Matthew Sholtis

The Upper Klamath Lake recovery unit of Lost River Suckers (Deltistes luxatus, LRS) is managed as a single population comprising two spawning aggregations: river and shoreline spring spawners. Despite assumptions of shared summer habitats, lower survival rates among spring spawners suggest distinct summer distributions influenced by environmental factors such as water depth, shoreline vegetation, and temperature. Understanding these differences is critical for assessing whether these groups should be treated as separate management units and for identifying habitat restoration opportunities to enhance survival. In spring 2024, a total of 198 adult LRS, including 135 river spawners and 63 shoreline spring spawners, were surgically implanted with Innovasea 69 kHz acoustic transmitters over six weeks beginning in early March. Movements of tagged fish were monitored using an array of 80 Innovasea 69 kHz acoustic telemetry receivers deployed in a grid-like pattern across Upper Klamath Lake to provide comprehensive detection coverage optimized for spatial distribution, depth preferences, and correlations with environmental variables. Detection events were analyzed to characterize and compare post-tagging spatial movements of male and female fish from both spawning groups.

Oral Presentation
Klamath Basin Monitoring

Passive Integrated Transponder use in Marine Survival Estimates for threatened Oregon Coastal Natural origin Coho Salmon

Wesley Shum

Salmon marine survival rates are one of the most critical pieces of data needed to inform commercial and recreational harvest limits. However, this parameter is often different by species and basin, making generalized marine survival estimates uninformative for fisheries managers. Thus, specific marine (and sometimes freshwater) survival rates are needed from individual species and basins. The Oregon Department of Fish and Wildlife's Salmonid Life Cycle Monitoring Project has been tracking marine survival rates for Coastal Coho Salmon populations at the Mill Creek Reservoir in the Yaquina River since 1997. This monitoring stemmed from a dramatic drop in Coho populations which lead to the listing of Oregon Coastal Natural origin Coho as threatened under the endangered species act in 1998. Over 20 years of data has revealed that the marine survival in Mill Creek is much higher when compared to other study sites. This most likely occurs because a portion of the Coho Fry leave the lake early to rear in the estuary instead of the reservoir. These fish may account for the larger adult returns than what would be expected with just the smolt out migration estimates. To determine a more accurate marine survival rate, starting in 2020 Passive Integrated Transponders were placed in roughly 1000 juvenile Coho each spring as they out-migrated to the ocean. Adults the following years were then scanned for tags to determine how

many had survived their journeys to and from the ocean. Our efforts show that the actual Marine Survival rates for lake reared Coho Smolts is more inline with out-migrating smolts from other sampling sites. This step in generating a more accurate Marine Survival rate is essential to understanding this population of ecologically and economically important Coho Salmon. As well as the ability of fisheries management to make decisions that affect the population.

Oral Presentation
Monitoring

Impacts of restoration and temperature on fish size in Catherine Creek, NE Oregon

William Sisley

The Grande Ronde River and its tributaries have experienced severe anthropogenic impacts, causing declines in spring Chinook Salmon populations. Chinook Salmon are culturally important to communities throughout the Columbia River Basin, including the Confederated Tribes of the Umatilla Reservation. Chinook Salmon are currently listed as Threatened in the Grande Ronde basin, and declines are largely due to agriculture, habitat degradation, and climate change impacts. Habitat restoration is commonly implemented to restore the natural riverscape and moderate increasing river temperatures. As part of a larger project coordinated with several partners and led by Oregon State University, we investigated how restoration and temperature were associated with fish length, weight, and condition factor in Catherine Creek. In summer 2024, we captured spring Chinook Salmon parr (n = 2431) using snorkel-seining and backpack electrofishing. We sampled 42 sites, with 15 sites being randomly selected and 27 selected based on accessible property and to leverage concurrent sampling. We used modelled August mean temperatures retrieved from the US Forest Service NorWeST temperature database in our model. We ran generalized additive mixed models for both length and mass with temperature as a smoothed predictor, restoration as a categorical linear predictor, and site as a random effect. Preliminary results indicate that restoration was not associated with fish length or weight, but higher temperatures were correlated with increasing fish size. Therefore, understanding the dynamics between fish size, temperature, and restoration can provide guidance on restoration implementation in the face of climate change.

Student Poster

Genetic Population Assignment of Ocean-Caught Juvenile Chum Salmon (Oncorhynchus keta) to Evaluate Early Marine Survival

Kelcee Smith

Chum Salmon (Oncorhynchus keta) populations in the Lower Columbia River (LCR) have experienced significant declines, leading to their listing as Threatened under the Endangered Species Act. Historically abundant, current populations are a fraction of their former size, with tributaries in Oregon considered

functionally extirpated. Here, we seek to understand the effects of hatchery practices and environmental conditions on the early marine survival of juvenile Chum Salmon, a critical life stage with limited existing research. By analyzing genetic and environmental data from over 600 juvenile samples collected during annual surveys from 2014 to 2024, this study aims to determine the population and hatchery origin of the juveniles. It will examine how changes in hatchery release practices and environmental conditions influence juvenile survival, using advanced genetic and statistical methods. The findings will inform management practices to improve hatchery operations and support recovery efforts for Chum Salmon in the LCR. This is particularly important for the LCR-ESU, since a wide variety of recovery techniques are being implemented between Oregon and Washington and evaluation of their efficacy is needed. Results will be shared with relevant agencies and stakeholders through reports, publications, and meetings, contributing to the broader conservation and management of this at-risk species.

Oral Presentation
DNA and Genetics

Spawning site modification and gravel augmentation for imperiled Bull Trout in the Odell Lake Basin

Steven Starcevich

Recent basin-wide assessments of Bull Trout in the Odell Lake Basin revealed low adult abundance in Trapper Creek, the primary spawning stream, and identified poor spawning habitat as one of the potential limiting factors. To test this hypothesis, we modified spawning habitat and monitored the study sites and population response from 2021-2024. The objectives were to increase the availability of spawning gravel through excavation and gravel augmentation of embedded pool tailouts, assess substrate characteristics before and after modification and, in subsequent years, monitor substrate, spawning use, and relative juvenile abundance. In 2023, there were 29 modified sites, ranging from 2.4-12.2 m2 in surface area. Site excavation depths ranged from 9-35 cm. Excavations were filled with 39.9 cubic meters of gravel ranging in diameter from 27-35 mm. Mean gravel depth in sites immediately after modification was 31.6 cm (range, 27-35 cm), which did not significantly change one year later. In before-and-after modification comparisons, there was significant decline in mean surface fine sediment (15% to 2%) and mean surface cobble and boulder (30% to 0%). In 2022-2023, 83-86% of observed Bull Trout redds were in modified sites and these redds were larger than redds in unmodified sites. We also observed native Redband Trout and nonnative Kokanee spawning in the modified sites. Annual night-time snorkel surveys in 2023 and 2024 showed an increase in relative juvenile abundance. To evaluate the limited spawning habitat hypothesis and site modification effectiveness, we will continue annual monitoring of site substrate, spawning use, and population abundance.

Oral Presentation
Bull Trout

State-space models for integrating multiple data time series: An application to Grande Ronde spring Chinook salmon

Ben Staton

Pacific salmon populations face many different mortality sources throughout life, requiring monitoring and modeling at various life stages to understand the relative influence of regulating processes. This produces multiple data time series where fish are monitored to produce abundance and survival by life stage. Analyzing these data can be difficult due to a variety of biases and losses of information if not appropriately accounted for, including spatiotemporal synchrony. State-space models are a flexible and robust approach to analyzing time series population data. We constructed a state-space model for Grande Ronde Basin (NE Oregon, USA) spring Chinook Salmon that tracks stage-specific abundance of ~30 cohorts from 4 spawning populations, modeling variability in freshwater juvenile growth/survival using density-dependent relationships and stochastic process noise that acknowledges synchrony among populations. Other model substructures include rearing origin type, juvenile life history type, and adult age-of-return to account for heterogeneity at these scales. The model fits to empirical information collected by many monitoring projects and includes an index of habitat quality to scale density-dependent processes. Posterior predictive examinations revealed the model could reproduce data patterns and that noise terms largely conformed to model assumptions. We found evidence of early-life density-dependent survival and growth, with subsequent over-wintering and out-migration survival mediated by early-life growth rates. Parr rearing capacity and growth rates showed positive, though uncertain, relationships with habitat quantity. Covariances were overwhelmingly positive, indicating synchrony among populations within the basin. Simple post-hoc analyses illustrated that juvenile life history diversity is important for increasing smolt production and maintaining inter-annual stability, and that increasing habitat availability would reduce density dependence. Posterior distributions from this model reflect our current understanding of regulating processes throughout life for these populations that can be used to parameterize prospective simulations of alternative management actions on future population status.

Oral Presentation
Chinook

Long-term data provide insights into directional and periodic community change in a wilderness watershed

Loren Stearman

Long-term community datasets provide invaluable insights into both patterns of change and underlying ecological dynamics. In this talk we examine a 32-year fish community dataset collected from 16 headwater streams of the Salmon River, Idaho. Increasing wildfire severity has reduced forest cover by approximately 30% over our study period. Community structure showed significant drift through time ($R^2 = 0.23$, $P < 0.001$); however, a periodic pattern was also apparent. NMDS analyses revealed gradients

between communities dominated by the three most abundant taxa, juvenile Chinook salmon, Steelhead, and sculpins. Only a few landscape level variables correlated to NMDS axes at the broadest scales (e.g., elevation, rho = 0.59, $P < 0.001$). CCA suggested that landscape and land cover variables were better predictors of less common species in samples. Evaluation of individual species through time revealed contrasting patterns. Directional change was apparent with declines in Steelhead and increases in cypriniform fishes over time. Periodic change was apparent with alternating dominance of Chinook Salmon and sculpins over time ($r = -0.44$, $P < 0.001$). Directional changes may be attributable to stream warming due to wildfire or changes in snowpack, while periodic changes may relate to interspecific interactions, particularly as mediated by abundance of returning adult Chinook Salmon. Our data provide a critical look into a highly protected, yet changing, montane ecosystem.

Oral Presentation
Freshwater habitat

Hey, what about me! Passage considerations for the other native fishes

Leah Tai

Human-caused fish passage barriers, both longitudinal and lateral, reduce aquatic connectivity and cause habitat fragmentation for migratory fish species. To complete their life cycles, most fishes must migrate between habitat types, flow conditions, and thermal regimes, which has become more critical in the face of climate change. Fragmentation often interrupts the completion of fish life cycles and is therefore a primary threat to their continued survival. On a broader population-level scale, connectivity facilitates the recolonization, range expansion, and migration of native fish species. Preserving and restoring aquatic connectivity will help ensure the long-term viability of fish populations. Passage restoration is a ubiquitous high priority for migratory native fish conservation and recovery in the Pacific Northwest; however, no consolidated approaches exist to help project proponents improve passage and connectivity for the wide spectrum of native fish species in the PNW. Until now! The US Fish and Wildlife Service recently developed fish passage guidelines that summarize the state-of-the-science and provide recommendations for implementation of nature-based and technical fish passage solutions. Passage needs for Bull Trout (Salvelinus confluentus), Pacific Lamprey (Entosphenus tridentatus), White Sturgeon (Acipenser transmontanus), and small-bodied (<150 mm) fishes in the PNW are specifically addressed. This includes behaviors and life histories, swimming performance and endurance, and passage needs and observations. Additional considerations, including climate change, aquatic invasive species, lateral connectivity, passage performance, dewatering, tide gates, and engineered fishway design, are also addressed.

Oral Presentation
Fish Passage

C'iyaals Come Home- A study to inform Klamath River Basin Spring-run Salmon Reintroduction

Rachelle Tallman

For over a century, four large hydroelectric dams have obstructed access to hundreds of miles of habitat for anadromous fish in the Klamath River Basin. While dam removal efforts have been completed, the Link River Dam at the outlet of Upper Klamath Lake in the upper basin is not scheduled for removal. This raises questions about the outmigration success of reintroduced spring Chinook Salmon, particularly their ability to navigate Upper Klamath Lake and the Link River Dam after fish passage restoration. To address this, we conducted an acoustic telemetry study in the upper Klamath River Basin. Our aim was to estimate outmigration survival of experimentally released hatchery-reared spring Chinook yearlings using a space-for-time Cormack-Jolly-Seber model.

Oral Presentation
Klamath Basin Monitoring

Hammers, Saws, and Salmon: Chipping Our Way Through the Last Major Mainstem Barrier in the Coos Basin

Allison Tarbox

Nearly one hundred miles of critical habitat has been opened and restored through partnered efforts over the last decade in the Coos basin. Prior to 2023, Tioga Falls remained the last mainstem passage barrier despite multiple projects aimed at improving passage conditions to nearly 14 miles of critical habitat located upstream. This 10-foot bedrock falls is the downstream-most and most heavily altered of three bedrock falls on Tioga Creek, with multiple phases of alterations such as a rock-cut ladder and a concrete fish ladder. Unfortunately, all the historical alterations have been problematic since their construction. The most recent alteration included an "L" shaped concrete wall intended to support the seasonal installation of a fish trap and help deflect high flows and debris around the left-side rock-cut and concrete fish ladder. A fishway exit was installed in the upstream facing concrete wall perpendicular to the primary flow direction and immediately downstream of a vegetated gravel bar located on the inside of a bend. Consequently, the fishway exit suffered from frequent accumulation of sediment and debris resulting in complete blockage and impassability. Fish passage through the rock-cut bedrock falls is limited during the key migratory periods due to changes resulting in flashier flow conditions. When the ladder is blocked and flow conditions are not matched for passage through the rock-cut bedrock falls, fish are unable to access the nearly 14 miles of habitat upstream that partners have worked to restore. This upper portion of the Tioga basin has seen multiple decades worth of restoration, making it critical habitat for the resiliency of salmonids as climates and ocean conditions shift. Since 2017, Coos Watershed Association has been working with ODFW, BLM, and Bavarian Olympus Timber to improve passage at Tioga Falls, specifically passage through the falls independent of the ill-functioning ladder. In 2023, we broke ground on a two-year project in which three bedrock channels were carved into the main falls to provide access outside of

the fish ladder prior to any alterations on the fish ladder to ensure there is passage independent of the ladder. This bedrock cutting design was based on the successful project that carved channels into Stulls Falls over the West Fork Millicoma River in the Coos basin. The new channels on Tioga Falls were heavily monitored over the first winter for passage success by intentionally blocking the fish ladder. Through a combination of spawning surveys, time-lapse cameras, and in-person observations, coho were documented throughout the upstream habitat, although their passage windows were still a bit restrictive, and unfortunately, there was no documented Chinook passage. It was determined, however, that by modifying one of the new channels, the passage window for coho could greatly improve and Chinook passage would be possible. In 2024, the channel modifications were completed along with the removal of the concrete wall on the fish ladder that caused many historic problems. Through monitoring efforts this fall, both Chinook and coho are successfully passing the falls using both the new carved channels and the fish ladder, dispersing through the restored habitat upstream. This project builds upon past mainstem passage projects by improving access to an additional 14 miles to the nearly 100 miles of critical habitat opened in the last decade, further enhancing the productivity in the basin and eliminating a huge maintenance problem for ODFW. Improving the connectivity to diverse instream habitats as this project has, is key to improving resiliency of Oregon Coast coho.

Oral Presentation
Fish Passage

Experimental reduction of a non-native predator fish increases steelhead smolt production

Ian Tattam

Expansion of invasive smallmouth bass into salmonid rearing habitats presents an emerging predation risk for native species, including summer steelhead. Understanding whether predation creates additive or compensatory mortality is crucial for informing management strategies aimed at mitigating population-limiting factors. In this study, we experimentally reduced the number of smallmouth bass present in a reach of Thirtymile Creek during steelhead fry emergence and early rearing to evaluate the impact of predation reduction on steelhead smolt production. Reducing smallmouth bass abundance significantly increased smolt production compared to years when smallmouth bass were present. The observed increase in smolt production was driven by higher total abundance, although the fish produced were smaller, indicating a carrying capacity limit in the studied stream reach and hence a density-dependent response to reduced predation. These finding support the hypothesis that smallmouth bass predation during early steelhead life stages represents additive mortality and demonstrates that reducing smallmouth bass abundance in or access to rearing tributaries can be a cost-effective strategy to increase steelhead smolt abundance.

Oral Presentation
Thirtymile Creek Steelhead Recovery

Modelling the spatial distribution of char in the Wallowa Mountains, Oregon.

Lora Tennant

Resident and migratory Bull Trout Salvelinus confluentus occupy portions of the Bear Creek, Lostine River, and Minam River watersheds in northeast Oregon's Wallowa Mountains. Hybridization and competition with nonnative Brook Trout S. fontinalis is considered to be one of the greatest threats to Bull Trout persistence in these watersheds. Brook Trout were introduced into high elevation, headwater lakes throughout the Wallowa Mountains prior to 1940 and have subsequently expanded their range downstream into historically fishless stream habitats and areas occupied by native fish species, such as Bull Trout. The Nez Perce Tribe and the Oregon Department of Fish and Wildlife conducted backpack electrofishing surveys among 99 sample sites in the Bear Creek, Lostine River, and Minam River watersheds in 2021 and 2024 to document the distribution and relative abundance of Bull Trout and Brook Trout. Sample sites were systematically spaced where logistically feasible. We will use spatial stream network models to evaluate the influence of stream morphology, estimated stream temperature, and fish assemblage characteristics on the distribution and relative abundance of Bull Trout and Brook Trout. Additionally, spatial patterns of Brook Trout relative abundance will be considered within the context of putative colonization sources. The best performing models will be used to predict and map Bull Trout and Brook Trout distribution and relative abundance at systematically spaced points along the stream network throughout the study area. We anticipate using these model results to inform on-going and proposed management actions related to Brook Trout removal from headwater lakes and stream reaches within the study area. Our long-term goal is to reduce interactions between Bull Trout and Brook Trout in the Wallowa Mountains.

Oral Presentation
Bull Trout

Transmitter Implantation into Lost River Suckers: An Evaluation of Incision Location and Suture Material

Ryan Tomka

The endangered Lost River sucker in Upper Klamath Lake has struggled for years to repopulate due to lack of recruitment. Little is known about habitat use and movements of this fish during the year when it is not spawning. Acoustic telemetry studies on Lost River suckers would provide this movement data to help management make decisions on this species. Establishing best-practice tagging protocols are needed for this benthic dwelling fish. We conducted a study to develop a tagging procedure that produced best wound healing with the least amount of inflammation. We acoustically tagged 16 Lost River suckers using two different suture materials (monofilament vs. braid) and two different incision locations (ventral vs. lateral) in a laboratory study. Pictures of incisions were taken at weeks 1, 2, 3, 5, 9, and 13. At week 5 USGS removed suture from 8 of the Lost River suckers because full healing had occurred, and suture

was not needed. The remaining fish had healed incisions, but we did not remove retained suture to see if they would fall-out over time. Braided suture resulted in inflammation throughout the study while monofilament had no inflammation. The lateral incision had a high risk of organ penetration by the scalpel and healed slower due to the depth of tissue. The results from the study showed that a monofilament suture on a ventral incision produced the best healed incision with no inflammation.

Oral Presentation
Klamath Basin Monitoring

Conservation Trade-offs in Oregon's Nearshore: The Case of Sea Otters and Abalone

Faith Townsend

Serving as crucial ecosystem engineers along the Oregon coast, kelp forests support many cultural, ecologic, and economically valuable marine organisms. In the last decade, the effects of marine heat waves, sea star wasting disease, and subsequent overgrazing by purple sea urchins have decimated kelp forests at an estimated two-thirds along Oregon's southern coast. The environmental stressors, coupled with habitat loss and food competition from proliferated sea urchin populations, have caused significant declines in culturally important abalone, resulting in the permanent 2023 closure of the recreational abalone fishery in Oregon. Without thorough information on the roles and importance of abalone, it is challenging to support species recovery efforts properly. Using current and historic survey data, the Oregon Kelp Alliance assessed the intertidal and subtidal presence and depth preferences of H. rufescens, H. walallensis, and H. kamtschatkana. Current data indicates a preference for shallower depths and the significant rarity of the species. New research shows that the current purple sea urchin GI is unsustainable for sea otters. Abalone serve as a favored food source for otters; therefore, reintroduction efforts may prove catastrophic for remaining abalone. Continued and more frequent monitoring will give a more comprehensive understanding of the condition and preferences of this iconic species. Monitoring will greatly inform the best route of conservation strategies to increase restoration efficacy and fully restore kelp forest ecosystems to the southern Oregon coast.

Oral Presentation
Marine

Local Perceptions of Non-Native Salmon at High Latitudes

Jenna Travers

Historically, most bioinvasions originated from species introduced by humans either by accident through vectors like ballast water or on purpose as people tried to cultivate a new agricultural resource or fishery. However, as climate change continues to increase water temperatures beyond the physiological constraints of species, more species have begun to expand outside their typical range into new habitats and affect the

existing ecosystems and economic industries. Despite the potential harm to native species and coastal communities posed by these species, climate change induced range expansions are not labeled or regulated as invasive species as they are not technically 'introduced.' To better situate climate-induced range expansions within the larger context of invasive species, we compare local perceptions of non-native Pacific salmon species (Oncorhynchus spp.) in two geographic regions: 1) the Alaskan and West Canadian Arctic where salmon are expanding their range due to warming oceans and rivers and 2) the Falkland Islands where an intense debate over the establishment of salmon farms and the risk of invasive species is ongoing. Utilizing a mix of primary and secondary interviews with community members, we employ a mixed methods, iterative coding analysis to identify similarities and differences in perspectives, narratives, and themes between these two situations. We argue that the definition of invasive species may need to broaden to include range expansions fueled by climate change to ensure adequate regulations and management of these species are put into place.

Student Poster

Running Wild in the Wenaha: Estimating hatchery spring Chinook spawning in a wilderness population

Emily Treadway

In the Grande Ronde basin, a hatchery supplementation program has been targeting the conservation and harvest mitigation of spring Chinook Salmon, Oncorhynchus tshawytscha. This program aims to maintain the balance of conservation and mitigation objectives by minimizing the impact of hatchery supplementation on wild salmon populations. The Wenaha River, a tributary to the Grande Ronde River, is a designated Wild and Scenic River that is home to a small, locally adapted population of wild spring Chinook Salmon. In the last decade, results from spawning grounds surveys in the Wenaha suggest that hatchery spawners may have exceeded 50% in some years. These hatchery spawners could have adverse genetic and ecological impacts on the wild population. The primary objective of this project is to assess potential impacts of hatchery strays by estimating the proportion of hatchery origin spawners (pHOS) and weighted pHOS (pHOSw) which accounts for spatial and temporal partitioning of habitat between hatchery and wild fish. The secondary objective is to provide guidance to managers on methods of efficient data collection techniques in a data poor system that can be used to estimate pHOS. This study will provide recommendations on effective sampling techniques, strategies for inhospitable survey environments, more informed estimates of hatchery impacts, and investigations into the ecological and genetic consequences of hatchery chinook straying into a small population of wild chinook salmon. Additionally, this project will result in a framework for selecting the appropriate parameters and survey methods to get a valid pHOSw estimate. The first field season yielded 30 carcasses, 101 live adult observations, and 57 passively detected uniquely tagged Chinook salmon. Analyses from these data will be presented along with ideas and questions about the use and understanding of proxies to estimate hatchery impact on a wild population in a targeted way.

Student Presentation/Hatcheries

Do top-down controls on riparian vegetation influence benthic biofilm community dynamics in headwater streams?

Hannah Trommlitz

Benthic algal communities are vital to stream ecosystems because they play a critical role at the base of the food web supporting fish and other consumers. In evaluating benthic biofilms, standing stock values provide a broad overview of basal resource availability, and algal community structure provides valuable insight into stream ecosystem processes and potential links between ecosystem structure and function. With this in mind, this study explored stream algal communities across five streams in Yellowstone National Park's northern range where it has been suggested that presence of top-down control of ungulate populations can influence riparian plant communities and in-turn stream ecosystem processes. We assessed algal community dynamics throughout the summer months of 2019 and 2020, characterizing three time-periods– early, middle, and late summer. Specifically, we were interested in comparing algal diversity between early to mid-summer, mid to late summer, and yearly between the mid-summer time periods and whether there were differences in these succession trajectories associated with riparian plant communities (herbaceous versus woody vegetation). Beta diversity was calculated in five streams to quantify algal community changes through time, and beta diversity was additionally broken down into nestedness and turnover components. In general, the highest beta diversities among the streams were between early to mid-summer months, while the lowest beta diversities were between middle to late summer months indicating larger differences in algal communities from early to mid-summer than mid-summer to late summer. The yearly mid-summer comparison revealed similar but slightly lower beta-diversity values relative to those observed between early to mid-summer time periods. There were not clear differences associated with riparian plant communities suggesting that the terrestrial trophic cascades in this system – while important for stream light and temperature – did not have anticipated extended indirect effects on biofilm communities.

Student Poster

Photos show the story of the Klamath River dam-removal: why photo monitoring remains an essential tool and key considerations for establishing and maintaining photo monitoring

Olivia Vosburg

The Klamath River Renewal Project is the largest dam-removal and river restoration project in the history of the United States, and the observed scope of landscape-scale change is historic. Photo monitoring has long been a valuable and regularly required monitoring approach for documenting restoration effectiveness and archiving historic landscape changes. However, significant logistical challenges exist in maintaining an effective photo monitoring program across such a large restoration project. Herein, we discuss best practices and lessons learned from maintaining a photo monitoring network encompassing thousands of acres of remote and rugged terrain across Oregon and California, as well as provide an

exhibition of images documenting project progress towards a free Klamath River and successful revegetation.

Poster

Wetland Systems are the Key to Ecosystem and Fish Recovery in the Klamath Basin

John Vradenburg

Historically the Upper Klamath Basin was a wetland-dominated ecosystem. Pre-European settlement approximately 450,000 acres of lakes, wetlands, and seasonally inundated floodplains formed a network of aquatic habitat along the edge of the dry Great Basin. This reliable wetland system supported fish species found nowhere else on earth, connected the Pacific Ocean to spawning grounds in the Cascade Mountains, and supported migratory waterbird populations cited as the greatest concentrations on Earth. The abundance of fish, wildlife, edible and medicinal plants supported indigenous people since time immemorial yet in a geological blink of an eye the Upper Basin transitioned from the "Everglades of the West" to an arid system. Dramatic anthropogenic modifications to the lands and hydrology that supported the hydrologic function of the entire watershed drove this change. The impacts of this change continue to reverberate throughout the watershed impacting ecosystems, species, and people. However, the historical role and benefits provided by wetland restoration opportunities receive little discussion in the context of modern conflicts and challenges. Wetlands provided ecological and hydrological resiliency in the Klamath Basin Watershed for thousands of years and their removal from the landscape initiated catastrophic impacts to the hydrologic and nutrient budgets of the watershed. Disconnection of wetland systems disrupted essential seasonal and annual habitat for fish, waterbirds, and numerous wetland dependent species. Increasing demands on decreasing water supplies spurred conflict among invested parties and communities fueling a litigious landscape and paralyzing solutions. Restoration of wetland systems could be the solution. Their historical presence serves as a case example of the role they play in ecological and hydrological resiliency and their removal serves as evidence of the impacts to species, people, and ecosystem services. Restoration of wetlands could restore hydrological and ecological resiliency thereby improving resiliency of human and ecological systems dependent upon water resources.

Oral Presentation
Klamath Basin Monitoring

The potential of nineteenth-century landscape art to explore historic stream and riparian habitats in the western US

Dana Warren

Shifting baselines is a phenomenon by which collective human perception of reference conditions for an environmental feature or resource slowly changes over time from generation to generation as that resource

declines. The concept of shifting baselines was first widely introduced into conservation science in the context of fisheries, but it applies to a range of ecological and environmental conditions and landscapes. Shifted baselines are a particularly important process to consider in restoration efforts. Empirical data from early records, museum specimens, lake cores, and other sources help to quantify changes and can address our understanding of earlier ecological conditions. However, in many cases, we have limited early quantitative data to address shifted baselines. In considering historic stream conditions in the western US, early landscape pictures may be a tool to understand conditions prior to widespread 20th century land development and fire suppression. Nineteenth century landscape art provides a set of images that could be analyzed to yield empirical data on historic landscapes (acknowledging that they do not reflect a "true baseline" for these systems; but they can push our shifted baselines back). However, questions about veracity of landscape art has hampered their use in scientific research. In this talk, I suggest that interdisciplinary collaboration with art historians may provide a pathway to address concerns and criticisms associated with artistic license and image accuracy in 19th century landscape paintings and thereby open these images up to use in research. These paintings and sketches provide a broad sense of the riverscape and may yield data that we can use to explore aspects of these pre-industrial landscapes before extensive damming, intense grazing, and fire suppression.

Oral Presentation
Freshwater habitat

The movement, distribution, and survival of Klamath Falls National Fish Hatchery released suckers in Upper Klamath Lake; preliminary results from radio telemetry studies.

McKenzie Wasley

In the Upper Klamath Basin, a recruitment bottleneck is one of the major causes of decline in populations of endangered c'waam and koptu, or Lost River and shortnose suckers. In efforts to bolster the number of juvenile suckers that survive to adulthood, the Klamath Falls National Fish Hatchery (KFNFH), previously known as the Sucker Assisted Rearing Program (SARP), was established in 2015. To better understand the movement, distribution, and survival of KFNFH released fish, radio telemetry studies were conducted during 2018–2024. Telemetry studies initially focused on developing methods to handle, tag, and track fish movements with aerial, boat, and ground-based survey techniques. More recent telemetry studies have investigated the association between sucker release location, timing, and size on sucker behavior and survival in Upper Klamath Lake. As part of this presentation, we will provide preliminary results from these telemetry studies, with a focus on tagging and tracking methods, including methods to more accurately triangulate detections and apparent fish fates. Preliminary data on fish movement and distribution in Upper Klamath Lake will also be provided, as well as a discussion of on-going analyses that will help to inform future management decisions associated with the KFNFH.

Oral Presentation
Klamath Basin Monitoring

Building Bridges: Science and Community Collaboration in Restoring Thirtymile Creek

Gus Wathen

Once a forgotten series of canyons among the productive wheat fields of the Columbia Plateau, Thirtymile Creek has recently emerged as a focal point for watershed-scale restoration and research surrounding steelhead and their habitat in the high desert. Historically, The Thirtymile Creek riverscape was degraded by common human land-use impairments such as beaver extirpation, channelization, and overgrazing. Despite these impacts, it remained a hidden gem for some of the local community, which recognized its ecological productivity. In recent years, steelhead demographic research has quantified what locals long knew: the creek's habitat holds significant potential, though its habitat limitations were painfully evident. Concurrently, a growing body of research has focused on hydrologic function, steelhead habitat quantity and quality, and the ecological role of intermittent streams. Beginning in 2020, floodplain restoration initiatives using low-tech, process-based restoration techniques were launched. These efforts have gained momentum and expanded in scope over the past four years while being continuously informed, refined, and tailored to the watershed by the emerging research. Locally driven initiatives have played a central role in raising awareness and inspiring landowner engagement in comprehensive watershed restoration. This growing collaboration has enabled the prioritization of restoration and conservation across the Thirtymile Creek watershed, encompassing over 1000 acres of floodplain habitat. The ongoing partnership between researchers, landowners, and local stakeholders highlights the power of communal effort in achieving sustainable ecosystem recovery.

Oral Presentation
Thirtymile Creek Steelhead Recovery

Monitoring Bull Trout spawning grounds in Oregon's North Fork Malheur River core area using environmental DNA

Ben Wiley

Annual redd counts are one of few presently available non-invasive, cost- and time-efficient methods to monitor adult Bull Trout (Salvelinus confluentus) population trends. However, the frequency and severity of wildfires in the northwestern United States is increasing, and efficiency of redd counts may be reduced by fire-induced influxes of large woody debris into riparian zones and instream habitat. Redd counts are currently used to monitor Bull Trout population trends in the North Fork Malheur River Bull Trout Core Area, which has been identified as the highest priority core area for conservation in Oregon. Two recent wildfires in this core area have caused fallen trees to obscure large tracts of instream habitat from redd counter visibility, thereby reducing the efficiency of Bull Trout monitoring. Here, we present the objectives, design, and preliminary results of a study assessing the use of waterborne environmental DNA (eDNA) sampling to predict Bull Trout redd counts in the North Fork Malheur River core area. We

established 34 eDNA sample sites at approximately 500-meter intervals in the North Fork Malheur River and three headwater tributaries (Little Crane Creek, Sheep Creek, and Swamp Creek). For three consecutive years (2022, 2023, and 2024), samples were collected from sites twice annually with the first sampling season occurring in June and the second sampling season occurring in August. Preliminary results from samples collected in 2022 and 2023 indicate that August eDNA concentrations partially predict numbers of Bull Trout redds later observed in each site, while June eDNA concentrations do not predict redd counts.

Oral Presentation
Bull Trout

Brook Trout Eradication and Bull Trout Restoration in Crooked River, Idaho

Richard Wilkison

The distribution and abundance of a small, resident Bull Trout population in the headwaters of Crooked River, Idaho decreased dramatically over a four-year period after an intense wildfire burned the entire occupied portion of the basin in 2020. Concurrently, a sympatric nonnative Brook Trout population experienced significant population growth and range expansion following the fire, threatening recovery of the resident Bull Trout population through increased competition, predation, and hybridization. In 2024, Idaho Department of Fish and Game, Idaho Power Company, and the US Forest Service implemented a plan to eradicate nonnative Brook Trout from the upper 4 km of Crooked River and restore the resident Bull Trout population by installing a fish migration barrier and chemically treating the entire reach above the barrier. We used backpack electrofishing equipment to capture and relocate 155 Bull Trout to a temporary holding facility in a nearby stream before applying rotenone to the 4-km reach using drip stations and backpack sprayers. During the backpack electrofishing salvage effort and rotenone treatment, fisheries crews removed 3,562 Brook Trout and 294 Bull Trout x Brook Trout hybrids. Following rotenone treatment and a 72-hour recovery period, 128 Bull Trout (61 males and 67 females) were released back to the stream. In 2025, we will evaluate the success of the Brook Trout eradication effort using eDNA sampling techniques while also assessing annual survival and reproduction within the restored Bull Trout population.

Oral Presentation
Bull Trout

Synthesizing three decades of Steelhead focused restoration and research in Oregon's Blue Mountains

Marshall Wolf

Stream restoration has become increasingly widespread since the 1980's within Oregon and the wider Pacific Northwest region as runs of threatened and endangered Pacific salmon species (Oncorhynchus

spp.) have continued to decline. Few studies have addressed the effects of multiple restoration efforts across several decades within one watershed. Our study focuses on synthesizing 30 years of restoration and research on Meadow Creek within the Starkey Experimental Forest near La Grande, OR. We analyzed annual spawning ground surveys, historical smolt trapping efforts, and recent habitat surveys in conjunction with juvenile salmonid snorkel counts to assess the efficacy of two large woody debris (LWD) restoration efforts within the Meadow Creek watershed in 1990 and 2014. The study period across our synthesized datasets was 1987-2017. Our focal species was O. mykiss, as they are the only salmonid species currently spawning in Meadow Creek. Peak O. mykiss redd counts occurred in 2015 with 68 redds, with a low of 0 redds in 2008. From 1990-1999, we estimated peak outmigrant numbers of over 30,000 O. mykiss in 1990 and 1998. The worst year for outmigrant numbers was 1996. After the second LWD treatment in 2014, we observed significant changes to side channel area and substrate D16 (Two-Way ANOVAs; $\alpha = 0.05$). However, many habitat characteristics that we expected the restoration treatment to influence such as pool frequency, residual pool depth, or LWD density were statistically unaffected. Juvenile O. mykiss densities normalized by Steelhead reproductive effort increased by approximately 1.5x within the treated reaches, while control reaches saw no increases. Our results provide context for a future watershed-scale Stage-0 restoration project being implemented in the coming years.

Oral Presentation
Native Fish

Monitoring the reproductive success of a reintroduced population of coastal cutthroat trout in the upper McKenzie River Basin

Caleb Yann

In 1963, the Eugene Water and Electric Board (EWEB) constructed the Carmen-Smith Hydroelectric Project, downstream of Sahalie and Koosah Falls, which rerouted the majority of the McKenzie River flow from it's natural channel for power production. As a result, most of the historic channel (UCBR) was dewatered limiting available habitat for native cutthroat trout. In 2019, ODFW, USFWS, NMFS, and USFS implemented a comprehensive plan to restore fish and habitat in the UCBR. The primary objectives of the project aimed to 1) support native cutthroat trout populations, 2) control non-native brook trout, 3) maintain sufficient spawning gravel. In 2021, EWEB contracted with ODFW to investigate fish assemblage, abundance and distribution within Carmen Reservoir and the UCBR. Brook trout were the dominant species in all project locations prior to removal methods. In 2021, EWEB curtailed all flow entering the UCBR to attempt to remove as many brook trout as possible and 1,466 mortalities were recovered. In the spring of 2022, ODFW released yearling and adult Hackleman stock cutthroat trout from Oak Springs Hatchery to seed reproduction within the UCBR. Crews regularly sampled mid-July through August utilizing passive and active trapping methods such as lake trap nets, minnow traps, angling, channel traps, and hoop nets. Trap nets are set within the reservoir largely to remove brook trout and see average catches of around 1,700 brook trout per season. The UCBR has seen an immense reduction in brook trout since dewatering and only about 100 brook trout are being captured per year. Continued

removal and monitoring are necessary moving forward. Since the initial reintroduction release in 2022 of Hackleman stock cutthroat trout, crews have documented natural reproduction continue to document mixed age classes (age-0+, age-1+, spawning adult). In 2024, additional adults were released into the UCBR to further supplement reproductive success. Since the initial sampling in 2021 when no cutthroat were detected, we have documented a total of 130 coastal cutthroat trout in mixed age categories. Crews will continue efforts in 2025.

Poster

Fish management implications of reestablishing bull trout populations in the upper Willamette Basin – Is it worth the effort?

Jeff Ziller

Bull trout populations in the upper Willamette Basin were severely impacted by a combination of man-caused events including the construction of dams for flood control and hydropower production, non-native species introductions, overfishing and targeted removal of populations. By the early 1990's the McKenzie River basin was the only Willamette River subbasin that contained reproducing bull trout. Efforts to restore some of these extirpated populations have been underway since the early 1990's with some limited successes in Sweetwater Creek, Olallie Creek and Middle Fork Willamette River tributaries where bull trout began spawning again in 2000, 1995 and 2005, respectively. Restoration efforts in the 1990's were relatively low cost, relying on cooperative partnerships including the Willamette National Forest and annual seasonal employees funded by the Bonneville Power Administration. More recent efforts have been funded by the US Army Corps of Engineers associated with the Reasonable and Prudent Measures contained in the 2008 Willamette Project Biological opinion. Through the restoration process, there has been large amount of personnel time incurred by state and federal biologists in the area. Now that bull trout have been reestablished, there will be additional reservoir management and fish passage costs associated with maintaining the populations. Restoration efforts have also had social costs including restricted or removed fisheries along with complications in angling regulations. Time spent by agencies educating the public about the details and reasoning for these changes is another cost associated with restoration. The discussion of the presentation will focus on what has been accomplished with these restoration efforts and whether or not the results are worth the costs.

Oral Presentation/Bull Trout

Habitat Criteria Indicating Suitability for Potential Reintroduction of Bull Trout – Observations from the Field

Nik Zymonas

An initial step in a potential reintroduction effort is the assessment of suitability of habitat conditions for supporting a population. Criteria that define suitability may be derived from laboratory studies and field

observations, although factors such as knowledge gaps and variability in conditions across watersheds may complicate assessments. In recent years, agencies participating in the Upper Willamette and North Santiam Bull Trout working groups have conducted collaborative habitat suitability assessments for potential reintroduction of Bull Trout in four watersheds in the Upper Willamette Basin, with particular attention on water temperatures, connectivity among habitats, and presence of Brook Trout populations. This presentation focuses on data from these assessments, opportunities and constraints as indicated by suitability criteria, and implications for confidence in success of potential reintroduction efforts.

Oral Presentation
Bull Trout