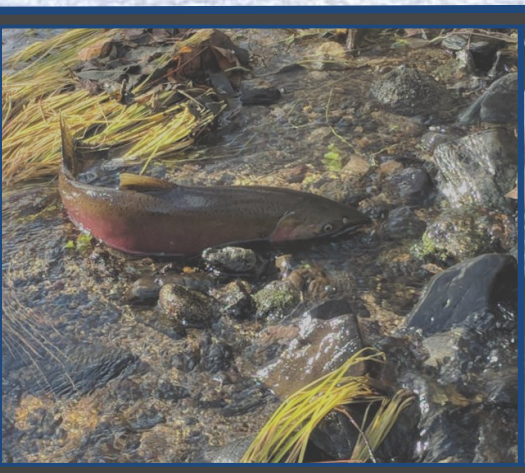
2024 Annual Meeting

Klamath Basin Fisheries Collaborative



"If you want to go fast, go alone; If you want to go far, go together"

June 12-13, 2024

June 11: Optional KBFC Leadership Team social 12 –1 pm, meeting 1-4:30 pm

Sky Lakes Community Health Education Center
2200 North Eldorado Avenue, Klamath Falls, OR

Wednesday June 12, 2024

Microsoft Teams meeting for Day 1 & 2. **Only registered participants are permitted.**

Join the meeting now
Meeting ID: 236 589 273 678
Passcode: tw9Q5X

Or Call In by Phone
+1 207-387-0436,
Phone conference ID: 644 792 37#

Time	Item	Presenter
8:00	Welcome, leadership team announcements	KBFC Co-chairs
8:30	Keynote Presentation: Conceptualizing the ecosystem response to dam removal – experiences from the Elwha	Jeff Duda (USGS)
9:10	The Changing Ocean for Klamath Salmon and Steelhead	Nate Mantua (NOAA)
9:30	Assessing migratory life history variation and population genetic structure of Oncorhynchus mykiss in a spring-fed Klamath River tributary	Christopher Adams (MTU)
9:50	Salmon and Mid-Klamath Rivers Spring-Run Chinook (Ishyâat) research collaboration: results from the first year	Amy Fingerle (UC Berkeley)
10:10	**Break**	
10:20	Overview of PIT tag detection sites in the Klamath Basin	Jacob Krause (USGS) Betsy Stapleton (SRWC)
11:00	Array Workshop	Gabriel Brooks (NOAA)
12:00	**Lunch**	
1:00	Monitoring for diversity: tracking movement and timing	Tommy Williams (NOAA)
1:20	Evaluating the effectiveness of dam removal on the Klamath River using SONAR and radio telemetry	Damon Goodman (California Trout)
1:40	KBFC Website, Database and User Interface	Erin Benham (PSMFC) Greg Wilke (PSMFC)
2:40	**Break**	
2:50	The Use of Coho Salmon PIT Tag Data to Determine Juvenile Life History Contributions to Adult Returns and More!	Toz Soto (Karuk Tribe)
3:20	Survival of spring-run Chinook Salmon released in the Upper Klamath River Basin	Rachelle Tallman (UC Davis)
3:40	Basin Updates	KBFC Members
4:45	**Adjourn**	

Thursday June 13, 2024

Time	Item	Presenter
8:30	Welcome	KBFC Co-chairs
8:35	Juvenile Fish Passage at Youngs Point Fish Ladder on the Scott River	Christopher Adams (Fish Wiz LLC)
8:55	Insights from Acoustic Telemetry Studies on the Influence of Flow Dynamics on Juvenile Chinook Salmon Migration in the Lower Klamath River	Summer Burdick (USGS)
9:15	Avian Predation: A Synopsis of Methods and Results from Studies in the Klamath River and Columbia River basins	Nate Banet (Real Time Research)
9:35	5 Components of a Successful PIT Tag Study	Jacob Krause (USGS)
10:15	**Break**	
10:30	Seasonal detections of PIT-tagged suckers in Pelican Bay, Upper Klamath Lake, OR	Rachelle Johnson (USGS)
10:50	Ambodat Sucker Rearing Strategy	Ryan Bart (The Klamath Tribes)
11:10	USFWS Sucker Assisted Rearing Program Post Stocking Monitoring	McKenzie Wasley (USFWS)
11:30	**Adjourn** Gather for field visit to Klamath Basin National Wildlife Refuge Complex	

Day 1 Dinner

Dinner Social June 12th at 6pm
No-host.
The Falls Taphouse, 2215 Shallock Ave, Klamath Falls, OR 97601

Scan for address and directions

Day 2 Field Site Visit

Field site visit to Klamath Basin National Wildlife Refuge Complex and avian refugia locations

Limited enrollment, pre-registration required
Meet at 12:00pm at Sky Lakes Community Health Education Center for box lunch and tour of the refuge complex. A charter bus will take us on a tour of avian refugia locations.

Day 1 Presentations

Conceptualizing the ecosystem response to dam removal – experiences from the Elwha

Jeff Duda, Research Ecologist, United States Geological Survey

Research suggests that river ecosystems—when given the opportunity—can recover after dams come down. Importantly, the trajectory of ecological recovery can be predicted. Given each river's unique history, surrounding land use, regional setting, and size of dams, it is reasonable to expect that ecological responses to each dam removal will differ. However, the physical and biological processes that govern how ecosystems respond to dam removal are similar, particularly when drivers and responses are segregated into upstream, within reservoir, and downstream reaches. Using empirical studies and established theories about how rivers work, recently developed conceptual models that elucidate these shared physical and biological processes have been described. These models can help resource managers, river restoration practitioners and other stakeholders identify the major factors likely to control ecological responses to future dam removals. By identifying the most important factors involved with ecosystem response, this approach should also help scientists predict ecological outcomes and identify which variables should be monitored. This presentation will outline the ecological response with a focus on the Elwha River dam removal project and the trajectories of fish populations and the freshwater ecosystems that support them after a decade following dam removal. Lessons learned from collaborative work will also be discussed in the context of the current dam removal project on the Klamath River. Experience from the Elwha suggests that collaboration networks, among federal, state, tribal, academic, and NGO partners will be key to establishing a robust science portfolio. The advantages of such collaboration include increasing the resources available to study the outcomes of dam removal, both in terms of the duration and density of information generated. It also fosters coordinated multidisciplinary studies, which can expand the scope and complexity of the scientific questions being addressed. Reinforcing and reinvigorating the collaborations will arise from communicating the scientific results to multiple audiences, including the Klamath research community, the greater scientific community, and the public. Having regular information exchanges, including dedicated science symposia and pre-field work coordination meetings, was an effective tool in the Elwha to keep researchers abreast of each other's work, foster internal and external communications about results, and identify potential cost savings and/or conflicts (especially for fieldwork). Working in parallel with strategies for communicating within the scientific community will be strategies for making scientific findings public.

Day 1 Presentations (Cont.)

The Changing Ocean for Klamath Salmon and Steelhead

Nate Mantua, Program Lead, Landscape and Seascape Ecology, NOAA Fisheries

Ocean conditions for Klamath Basin salmon and steelhead are subject to substantial changes within and between years and decades. Notable climate patterns like El Niño, the Pacific Decadal Oscillation, and the North Pacific Gyre Oscillate coordinate ocean conditions and productivity swings across vast areas by changing physical ocean habitat and food webs. Starting with the warm blob of 2013-2016, the past decade has also featured a series of persistent marine heatwaves that have had profound impacts on marine life and fisheries along the west coast. Recent marine heat waves developed without warning, ecosystem impacts and surprises have been widespread, and they have come with a variety of new management challenges. An important message for salmon conservation and recovery is that promoting, protecting, and restoring the integrity and diversity of the smolt production system is critical for buffering the impacts of changing ocean conditions, and this may become even more important in the face of the rapidly changing ocean.

Assessing migratory life history variation and population genetic structure of Oncorhynchus mykiss in a spring-fed Klamath River tributary

Christopher Adams, PhD Student, Michigan Technological University

We used outmigrant trapping and individual tracking data from Passive Integrative Transponder (PIT) tagging to identify life history variants of O. mykiss in the Shasta River and assessed their relatedness using restriction site-associated DNA sequencing (RADseq). We also used a multi-state mark-recapture model to estimate survival and movement probabilities of O. mykiss before and after habitat restoration efforts, which included cattle exclusion fencing and conservation of cold spring inflows. Population structure was identified among O. mykiss collected in the upstream area near spring inflows and the seasonally impacted area downstream. Both resident and migratory individuals were identified in the upper spring-fed reach, but they were likely from one partially migrating population. Probability of out-migration from the spring inflow area did not change from pre- to post-restoration phases but was higher from the mainstem reach (0.71) than in a spring fed tributary (0.14). Reproductively divergent population segments may in part be a result of anthropogenic alterations that diminish habitat quality in parts of a watershed or restrict periods when migrations are possible. The ability to differentiate subpopulations within a given system can help shape restoration goals, while understanding how habitat conditions influence life histories can shape restoration strategies and predict how subpopulations might respond to changes in habitat conditions.

Day 1 Presentations (Cont.)

Salmon and Mid-Klamath Rivers Spring-Run Chinook (Ishyâat) research collaboration: results from the first year

Amy Fingerle, PhD Student, University of California, Berkeley
Toz Soto, Fisheries Program Manager, Karuk Tribe
Matthew R. Sloat, Director of Science, Wild Salmon Center
Karuna Greenberg, Restoration Director, Salmon River Restoration Council
Beau Quinter, Karuk Tribe
Miranda Velarde, Fisheries Program Assistant, Salmon River Restoration Council
Tasha Q. Thompson, PhD Science Fellow, Wild Salmon Center
Jon Hart, GIS Spatial Analyst, Wild Salmon Center
Michael R. Miller, Professor, University of California, Davis
Theodore E. Grantham, Associate University of California, Berkeley
Stephanie M. Carlson, Professor, University of California, Berkeley

Spring-run Chinook salmon (Oncorhynchus tshawytscha) are imperiled across their range. The Salmon River hosts the largest remaining non-hatchery population of spring-run Chinook salmon in the Klamath Basin, making it a high priority for efforts to conserve Klamath Chinook salmon biodiversity. In 2023, UC Berkeley and the Karuk Tribe, Salmon River Restoration Council, UC Davis, and Wild Salmon Center began a multiyear study in the Salmon River to improve understanding of run-type distribution and the degree to which interbreeding among spring-run and fall-run Chinook salmon is occurring. We collected fin clips from adult carcasses and juveniles captured via a suite of methods. We then genotyped these fish at the GREB1L genomic region, where alleles strongly correlate with run timing (spring-run or fall-run). Results from our first year indicate that fall-run Chinook salmon spawn upstream of dynamited seasonal-hydrologic migration barriers that historically maintained a degree of reproductive isolation between runs, and that heterozygous Chinook salmon are a major component of the run-type composition of Salmon River Chinook salmon. We discuss this cooperative effort, plans for 2024 and beyond, and the implications of this work in the context of spring-run Chinook salmon recovery and reintroduction.

Day 1 Presentations (Cont.)

Monitoring for diversity: tracking movement and timing

Tommy Williams, Fish Biologist, NOAA Fisheries
Jimmy Faukner, Fisheries Biologist, Yurok Tribe

For Pacific salmonids, providing opportunities for the expression of diverse life histories is foundational to having persistent and viable (i.e., low extinction risk) wild populations. Because of their potential diverse life-history expression, tracking the distribution and movement of Oncorhynchus mykiss following dam removals may be critical to inform and understand fish and fish habitat response to dam removals. Anadromous and non-anadromous O. mykiss are distributed throughout the Klamath River Basin downstream of Iron Gate Dam, able to express a diversity of life-history types ranging from fish that complete their life cycle in freshwater (i.e., non-anadromous) to fish that express an anadromous life history. Non-anadromous O. mykiss occur throughout the Basin upstream of Iron Gate. In addition, upper Basin river reaches and tributaries contain Redband Trout (O. m. newberri). With a more connected and diverse river network throughout the Basin following dam removals, there will be opportunities for life-history expression unique to a re-connected Klamath Basin. With the existing and additional establishment of PIT arrays at various tributaries downstream, between, and upstream of the four dams being removed there is an opportunity to track fish movement not possible since the construction of the dams. Strategic PIT tagging efforts in association with other research activities provide an opportunity to track patterns of movement for O. mykiss across the landscape through time associated with location, environmental conditions (e.g., temperature, flow, etc.), and genetics/genomics. The purpose of our presentation is to introduce a sampling framework leveraging existing and planned PIT arrays to examine movement patterns of O. mykiss throughout the Project Reach and adjacent stream reaches. This study framework will provide information to understand O. mykiss in relation to dam removals and inform related recovery, management, and restoration actions for anadromous and non-anadromous Pacific salmonids.

Day 1 Presentations (Cont.)

Evaluating the effectiveness of dam removal on the Klamath River using SONAR and radio telemetry

Damon Goodman, Klamath Regional Director, California Trout
Bob Pagliuco, Marine Resource Habitat Specialist, NOAA Fisheries
Toz Soto, Fisheries Program Manager, Karuk Tribe
Alex Corum, Fisheries Biologist, Karuk Tribe
Oshun O'Rourke, Fisheries Biologist, Yurok Tribe
Kurt Bainbridge, Wildlife Biologist, California Department of Fish and Wildlife
Crystal Robinson, Senior Environmental Scientist, California Department of Fish and Wildlife
Mark Hereford, Klamath Fisheries Reintroduction Coordinator, Oregon Department of Fish and Wildlife
Keith Denton, CEO President, Keith Denton and Associates
Nicholas A. Som, Unit Leader, USGS California Cooperative Fish and Wildlife Research Unit, Professor, California Polytechnic University Humboldt
Cyril Michel, Assistant Project Scientist, NOAA Fisheries
Tommy Williams, Fish Biologist, NOAA Fisheries

The removal of four dams on the Klamath River will restore hydrologic connectivity to the Upper Klamath River Basin. For anadromous fish, habitat and ecological processes not available for over 100 years will be accessible. Traditional ecological knowledge, as well as historical accounts provides us some general understanding of the historical movement patterns and distribution of anadromous fish, although greater understanding is required to inform future restoration and fish management actions. For this reason, monitoring focused evaluating the re-establishment of salmon populations as they return to their historical range is critical. Specifically, how many salmon and steelhead disperse into the reconnected watershed and the timing of that dispersal. This project will result in abundance estimates of salmon and steelhead entering the reach previously blocked by the dams and follow their migrations to spawning grounds. Understanding the time of movement and habitat use of adult fish moving upstream to historical habitat will inform current and future restoration actions to effectively use available funds in the most impactful manner, guiding future restoration efforts in the newly accessible habitats. This data will provide a foundation for assessing key ESA viability criteria such as diversity, spatial structure, and abundance. The project will provide a toolset to support information to inform the sequencing and prioritization of future restoration and monitoring in the Klamath River as well as other dam removals around the world.

Day 1 Presentations (Cont.)

The Use of Coho Salmon PIT Tag Data to Determine Juvenile Life History Contributions to Adult Returns and More!

Toz Soto, Fisheries Program Manager, Karuk Tribe
Harrison Morrow, Fish Biologist/Field Technician, Scott River Watershed Council
Jimmy Faukner, Fisheries Biologist, Yurok Tribe

Non-natal life history behaviors are frequently employed by juvenile Klamath River Coho Salmon. Two common non-natal life history tactics involve leaving their natal stream in either late spring/early summer or late fall/early winter and then rearing in non-natal locations until ocean entry the following spring. Juveniles PIT tagged in rearing locations can be traced back to their natal streams through detection histories of both juvenile and adult life stages. Following detection histories from juvenile to adult life stages in both natal and non-natal locations provide valuable information regarding the effectiveness of restoration projects. Examples of PIT Tag detection histories from tributaries of the Klamath River will be presented. The importance of these detection histories will be discussed.

Survival of spring-run Chinook Salmon released in the Upper Klamath River Basin

Rachael Tallman, PhD Student, University of California, Davis

Two dams will remain after the Klamath River Dam Removal Project is completed: Link River and Keno Dams. This historic dam removal will restore hundreds of miles of anadromous fish passage, but it remains unclear whether native fishes will recover post dam removal. The Oregon Department of Fish and Wildlife (ODFW), The Klamath Tribes (TKT) and the NOAA-Southwest Fisheries Science Center (NOAA-SWFSC) plan to actively reintroduce pathogen-screened spring-run Chinook salmon into suitable habitats within tributaries of Upper Klamath Lake. The goal of this reintroduction is to reestablish self-sustaining populations of spring-run in the upper basin. It has been over 100 years since spring-run have accessed the upper basin, and there is uncertainty surrounding the fishes' ability to survive and breed within this heavily altered habitat. Reintroduced spring-run would need to migrate through the hypereutrophic conditions of Upper Klamath Lake (UKL) and over two dams as part of their out-migration to the ocean. There is interest to assess their survival prior to an official reintroduction effort. During the spring of 2022, we released juvenile spring-run from the Klamath Fish Hatchery into the Wood and Williamson Rivers to evaluate juvenile salmon survival to the entry of UKL, through UKL, and Link River Dam. This study will provide crucial data that ODFW, TKT, and NOAA to design an optimal reintroduction program to support a self-sustaining population of spring-run Chinook in the upper basin.

Day 2 Presentations

Juvenile Fish Passage at Youngs Point Fish Ladder on the Scott River

Christopher Adams, Fish Wiz LLC

We assessed juvenile salmonid passage at the Youngs Point fish ladder at River Kilometer 76 on the Scott River. A combination of PIT tag antennas, underwater cameras, and physical measurements were used. Six percent of the juvenile salmonids tagged in locations adjacent to the ladder were detected using the ladder. Several of those individuals ascended the ladder but then immediately descended. Video camera observations of juvenile salmonids in the downstream most ladder bay occurred throughout summer 2022 until flows ceased (early August), however observations mid-way up the ladder declined sharply in mid-July when discharge downstream of ladder reached fell below approximately 20 cubic feet per second. These data suggest that upstream passage in the ladder is minimal during the summer months. Modifications to the ladder/channel area are recommended to maximize upstream juvenile fish passage. Under the current configuration, water should be directed to the main channel rather than into the ladder during the low flow summer period.

Insights from Acoustic Telemetry Studies on the Influence of Flow Dynamics on Juvenile Chinook Salmon Migration in the Lower Klamath River

Summer Burdick, Fish Biologist, United States Geological Survey
Collin Smith, Fish Biologist, United States Geological Survey
Russel Perry, Fish Biologist, United States Geological Survey
John Plumb, Fish Biologist, United States Geological Survey
Tyson Hatton, Fish Biologist, United States Geological Survey

Enhancing the survival of juvenile Chinook salmon during their migration to the ocean is a crucial objective of flow management in the lower Klamath River. Flow management strategies aim to mitigate the impact of the parasite C. Shasta, regulate water temperatures, and expedite the migration of juvenile Chinook to the ocean. Therefore, a solid understanding of the relation between flow, outmigration timing, and survival through the lower Klamath River is needed. With the removal of four Klamath River Dams, changes in flow and temperature dynamics will further emphasize the need to understand the effects of dam removal and water flow on fish migration. We used acoustic telemetry to investigate the outmigration timing and survival of juvenile Chinook salmon. Two sizes of acoustic transmitters (SS400 and ELAT) were surgically implanted in juvenile salmon sourced from the Shasta River, Kinsman screw trap, and Iron Gate Hatchery. Tagged fish were detected at nine interrogation sites between Iron Gate Hatchery and the mouth of the Klamath River. Actively migrating fish from the Shasta River and Kinsman screw trap exhibited rapid migration to the ocean. Whereas hatchery-reared fish delayed migration for 7 to 24-days after release. Survival rates were found to be correlated with migration rates, which appeared to be influenced by the timing of release and fish size. The findings of this study will provide valuable input for refining the Stream Salmonid Simulator model, enhancing its capability to forecast the impact of habitat conditions on the abundance of juvenile salmonids. Additionally, these insights will contribute to the development of flow management strategies intended to improve the survival rates of juvenile salmonids.

Day 2 Presentations (Cont.)

Avian Predation: A Synopsis of Methods and Results from Studies in the Klamath River and Columbia River basins

Nate Banet, Fish and Wildlife Biologist, Real Time Research
Allen Evans, Fisheries Scientist, Real Time Research
Quinn Payton, Statistician, Real Time Research

Identifying where, when, and how many animals live and die over time is principal to understanding factors that influence population dynamics. Capture–recapture models are widely used to estimate fish survival in the Klamath River basin and Columbia River basin. The integration of tag recoveries from piscivorous waterbird colonies can be used to increase the precision of survival estimates in these models and to provide information on where, when, and how many fish succumb to avian predation. As part of our presentation, we will describe the general methods used to recover (detect) and analyze passive integrated transponder (PIT) tags from juvenile and adult fish that were consumed by piscivorous colonial waterbirds in the Upper Klamath basin and Columbia River basin. Results will include predation on Lost River Suckers, Shortnose Suckers, and several endangered salmonid species. Predator species will include Caspian Terns, Double-crested Cormorants, American White Pelicans, California Gulls, and Ring-billed Gulls, with examples of predation effects by individual colonies and the cumulative effects of avian predation (predation by all predator species and colonies combined).

Seasonal detections of PIT-tagged suckers in Pelican Bay, Upper Klamath Lake, OR

Rachelle Johnson, Fish Biologist, United States Geological Survey
Jacob Krause, Research Fish Biologist, United States Geological Survey
Brian Hayes, Fish Biologist, United States Geological Survey
Mark Hereford, Fisheries Reintroduction Coordinator, Oregon Department of Fish and Wildlife

Pelican Bay – a shallow, groundwater-influenced area in Upper Klamath Lake, OR – is considered a water quality refuge for endangered suckers in summer, when water quality in the rest of the lake deteriorates, typically with low dissolved oxygen (DO), high pH, and high temperatures. However, little is known about the degree to which sucker populations use this habitat. Starting in 2020, submersible PIT-tag antennas were deployed in Pelican Bay during non-winter months with the goal of characterizing seasonal PIT-tag detections by Lost River suckers Deltistes luxatus and shortnose suckers Chasmistes brevirostris. The total number of individual suckers detected in Pelican Bay varied across years, with more suckers detected in 2023 than previous years. Comparing detections to the numbers of known PIT-tagged fish indicated that females of both species were detected in Pelican Bay more than males, and 54% of PIT-tagged shortnose suckers were detected in Pelican Bay in 2023 compared to 37% of tagged lake-spawning Lost River suckers and 21% of tagged river-spawning Lost River suckers. On average suckers were first detected at Pelican Bay from late June to mid-July, around 7-13 weeks following their last detection at the spawning grounds. The mean date of last detection in Pelican Bay varied across years from mid-July to early-August. Interestingly, this meant that in 2022 and 2023, 50% of suckers had left Pelican Bay before mean daily water temperatures exceeded or mean daily DO in the mid-north lake fell below stress thresholds of 24°C or 2.1 mg/L, respectively. Preliminary data suggest that use of Pelican Bay by suckers may be related to physical and biological drivers other than water quality. Continued deployment of PIT-tag antennas in Pelican Bay along with new research questions may help to decipher the factors driving the temporal use of this important habitat.

Day 2 Presentations (Cont.)

Ambodat Sucker Rearing Strategy

Ryan Bart, Fisheries Biologist, The Klamath Tribes
Carlie Sharpes, Aquaculturist, The Klamath Tribes

The Klamath Tribes Ambodat Department have been participating in assisted rearing of c'waam (Lost River sucker) and koptu (Shortnose sucker) since 2015. Ambodat fisheries has six rearing ponds and is in the process of building three more. Suckers for assisted rearing are obtained through gamete collection at the East Side Springs and fry collections along the margins of the Williamson River. C'waam and koptu are reared through pond culture and are kept at densities that allow for optimum growth. Ponds are harvested a minimum of once per-year for maintenance and to inventory suckers. Suckers are inserted with PIT tags post pond harvest and are observed for healing prior to release. The current Ambodat rearing strategy is to raise suckers to a minimum length of 300 mm prior to release into Upper Klamath Lake. As we continue to learn about the mechanisms behind recruitment success and failure, the Ambodat Sucker Rearing strategy will adapt based on future results.

USFWS Sucker Assisted Rearing Program Post Stocking Monitoring

McKenzie Wasley, Biological Science Technician, Unites State Fish and Wildlife Services
Josh Gondek, Fish Biologist, USFWS - Klamath Falls National Fish Hatchery

The Klamath Falls National Fish Hatchery (KFNFH) has been rearing wild caught c'waam and koptu (Lost River and Shortnose sucker) larvae since 2016. One metric used to inform success of the Sucker Assisted Rearing Program (SARP) and KFNFH repatriation efforts into Upper Klamath Lake is the observation of hatchery reared suckers at spawning grounds detected by various PIT arrays maintained by USGS Klamath Falls Field Station. Considering the age of release at approximately 1.5 years and the age at sexual maturity being 4+ years, there is a multiyear period between time of release and when researchers might begin observing SARP individuals returning to spawning grounds. With the goal to provide insight on the juvenile age class between time of release and detection at spawning grounds, KFNFH initiated supplemental PIT monitoring efforts in spring of 2024. Areas of interest for these additional PIT arrays were informed by heat maps created using data from a concurrent radio telemetry project conducted by the Klamath Falls Fish and Wildlife Office. The radio telemetry project was initiated in spring of 2022 and focuses on hatchery reared suckers. There have been four cohorts of radio tagged SARP fish released into Upper Klamath Lake with tags lasting roughly 1-1.5 years. Primary methods of data collection include active tracking via aerial surveys and passive tracking using remote stations. Formal data analyses are currently in process for the 2022 and 2023 radio telemetry data but demographics of fish released, detection summaries, and project overview will be presented.

Day 1 Interactive Discussions

KBFC Array Map Discussion

Jacob Krause, Research Fish Biologist, United States Geological Survey
Betsy Stapleton, Project Development and Permitting Specialist, Scott River Watershed Council

In this interactive discussion, we will review the current KBFC PIT tag detection array map and discuss gaps in coverage, ongoing and new research and management questions throughout the Klamath Basin, and collaborative project needs.

PIT Antenna Workshop: From Design to Deployment

Gabriel Brooks, Electronics Tech, NOAA Fisheries, Northwest Fisheries Science Center

Join Gabriel Brooks as we delve deeper into the intricacies of PIT tag antennas, offering practical experience and expert guidance.

In this interactive session, you'll have the opportunity to gain an understanding of the essential components that make up loop antennas, while exploring the delicate balance of inductance and capacitance that dictates their resonant frequency. We'll cover calculating the proper capacitance values for your antennas and understanding inductance and "Q".

We'll explore common antenna types and techniques for installation in stream environments, discuss our experience in real-world scenarios, from single antenna temporary PIT sites to Lower Granite style installations. We will have some antennas on-site for demonstration and will cover how to build an antenna from scratch. Whether you're a beginner or an experienced user, this presentation will provide valuable insights and practical know-how for your PIT tag sites.

Day 1 Interactive Discussions (cont.)

KBFC Website, Database & User interface

Erin Benham, Data Management Specialist, Pacific States Marine Fisheries Commission
Greg Wilke, Programmer/Analyst, Pacific States Marine Fisheries Commission
Monica Diaz, Project Lead/Data Management Specialist, Pacific States Marine Fisheries Commission
Rachael Paul-Wilson, Biological Science Technician, United States Geological Survey

Over the past year, the KBFC has launched a public website and developed a standardized controlled vocabulary and data exchange standards. These efforts supported the creation of a collaborative database accessible to KBFC members through a web-based user interface. Currently, a subset of users is reviewing and testing the interface, with plans for a full rollout to KBFC members in summer 2024. The launch will be accompanied by optional training sessions on using the interface and integrating electronic data collection.

Day 2 Interactive Discussions

5 Components of a Successful PIT Tag Study

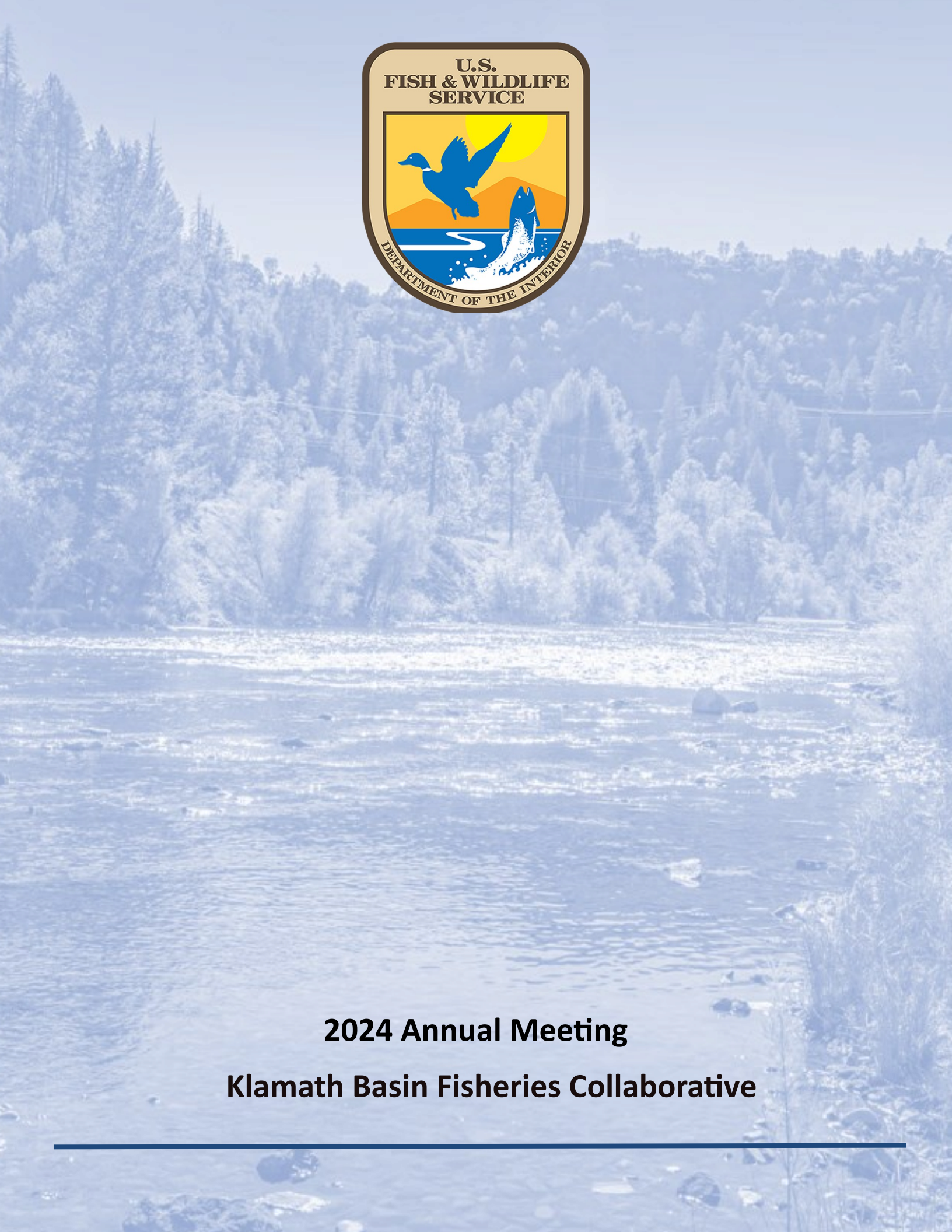
Jacob Krause, Research Fish Biologist, United States Geological Survey
Brian Hayes, Fish Biologist, United States Geological Survey

This module will examine the 5 components for designing a successful study involving detecting PIT tags: 1. hypothesis, 2. experimental design, 3. experimental execution, 4. statistical analysis, and 5. interpretation. We will review the difference between observational and experimental field studies, design principles for experimental studies, statistical analysis options, logistical and practical considerations for determining antenna types and data storage, and end on a relevant fish PIT tag case study.

Complete the survey to share your thoughts on how we can improve our future annual meetings:

Klamath Basin Fisheries Collaborative 2024 Annual Meeting

https://forms.office.com/r/6Urju5p1tU



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