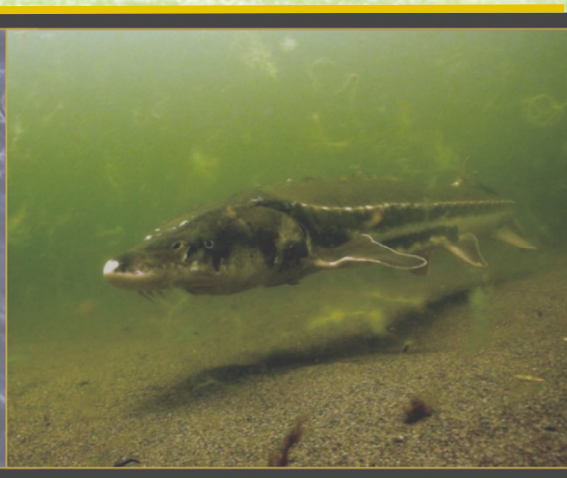
2023 Annual Meeting

Klamath Basin Fisheries Collaborative





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

June 13-15, 2023

Karuk Housing Center
1836 Apsuun, Yreka, California

Tuesday June 13, 2023

Microsoft Teams meeting for Day 1 and Day 2:

Click here to join the meeting
Meeting ID: 244 372 893 378
Passcode: SN2K5a

Or call in (audio only)
+1 207-387-0436,,843358102#
Phone Conference ID: 843 358 102#

Time	Item	Presenter
8:00	Gather Review Interest Group Boards and Klamath Basin Map	All
8:30	Welcome	Betsy Stapleton
8:45	Invocation	Karuk Tribe
9:00	Keynote: The Benefits of Working Collaboratively: Highlights from the 2022 IYS Pan-Pacific Winter High Seas Expedition	Laurie Weitkamp
9:30	Governance: Working Together to Reach Interim Consensus on Structure for the KBFC	Betsy Stapleton
10:45	**Break**	
11:00	Governance: Working Together to Reach Interim Consensus on Structure for the KBFC	Nancy Leonard
12:00	**Lunch** Leadership Team Meeting, all welcome	
1:00	Bull Trout and Redband Trout PIT Telemetry in Upper Klamath Headwaters and the Benefits of Collaboration	Dave Hering
1:30	Demonstrations on Electronic Data Entry Platforms *(details on page 6)*	Tyler "Ty" Wallin, Rachael Paul-Wilson, and Erin Benham
2:00	**Break and Depart for Field Tour**	
2:10	Optional: Field Tour of CDFW Irongate Hatchery & Bogus Creek PIT Tag Array *(details on page 4)*	Morgan Knechtle, Harrison Morrow, and Shannon Wedgley
6:00	Optional: Dinner *(details on page 4)*	

Wednesday June 14, 2023

Time	Item	Presenter
8:00	Gather Review Interest Group Boards and Klamath Basin Map	All
8:30	Welcome	Betsy Stapleton
8:45	A Strategy for Monitoring Repopulation and Pre-dam Removal Studies in the Upper Klamath Basin	Mark Hereford
9:10	The Klamath River Anadromous Fishery Reintroduction and Restoration Monitoring Plan	Crystal Robinson
9:35	Where are the Upper Klamath Basin PIT Tag Arrays and How Do We Use the Detections to Inform Sucker Management	Jacob Krause
10:00	**Break**	
10:15	Klamath Basin Fisheries Collaborative PIT Tagging Database Update	Rachael Paul-Wilson, and Greg Wilke
10:45	Developing a Data Exchange Standard to Inform Accurate Data Sharing	Erin Benham, and Nancy Leonard
11:15	Capitalizing on the Best of Both Worlds: Leveraging Acoustic Tags to Estimate Detection and Survival of PIT Tagged Fish	Russell Perry, Summer Burdick, Collin Smith, and John Plumb
12:00	**Lunch** *Facilitated Group Discussion on Monitoring Needs Across the Basin* Find your interest group and talk: ***Group 1***: Array Technologies—Existing and Future, led by Jacob and Shannon ***Group 2***: Communication and Collaboration — Tools and Forums, led by Betsy and Nancy ***Group 3***: Future Research and Monitoring Directions: How Data Can be Best Used to Inform Management, led by Summer and Jimmy ***Virtual Group***: discuss one or all of the above topics, led by Lara Erikson and Greg	
1:00	Report from the Lunch Interest Group Discussions	Discussion Leaders
2:15	PIT Tag Monitoring Below the Dams: Lightening Round Presentations and Discussion	Alex Corum, Jimmy Faulkner, Harrison Morrow, and Hans Voight
3:20	**Break**	
3:40	From Datasheets to Dashboards	Rebecca Croy
4:05	Fish Monitoring Needs, Expectations, and Considerations in the Context of Klamath River Dam Removals	Tommy Williams
4:30	Wrap Up	

Day 1 Field Site Visits

Tour CDFW Irongate Hatchery
Morgan Knechtle, Environmental Scientist Specialist, California, Department of Fish & Wildlife.

Tour Bogus Creek PIT Tag station "Past, current and future salmonid life cycle monitoring in Bogus Creek", and a discussion of array deployment
Harrison Morrow, Fisheries Biologist, Scott River Watershed Council
Shannon Wedgley, Field Technician, Scott River Watershed Council

Day 1 Dinner

Dinner at 6pm
No Host. Bring cash to facilitate individual payment
Jefferson Roadhouse, 1281 S Main St, Yreka, CA

Day 3 Field Site Visits

Field site visits of cold water refugia and habitat restoration accessed by non-motorized boat/raft.

Limited enrollment, pre-registration required
At 9am meet in Happy Camp, CA @ Indian Creek River Access

Day 1 Presentations

The Benefits of Working Collaboratively: Highlights from the 2022 IYS Pan-Pacific Winter High Seas Expedition

Laurie Weitkamp, NOAA Fisheries, Northwest Fisheries Science Center

During February-April 2022, a large scale, coordinated survey of Pacific salmon high seas habitats was conducted as a signature project of the International Year of the Salmon (IYS). An international fleet of five ships concurrently sampled the physical environment, pelagic ecosystems, and Pacific salmon across 2.5 million km^2 of the North Pacific Ocean using complementary methodologies. The overarching goal of this Pan-Pacific survey was to understand how increasingly extreme climate and associated physical environmental variability influence pelagic ecosystems, and the abundance, distribution, growth, and condition of Pacific salmon. The survey was focused on salmon ocean ecology during winter, a period hypothesized to be an important regulator of salmon survival. This talk has two purposes: 1) to provide highlights of the survey results, and 2) demonstrate how working collaboratively ensured datasets were as seamless as possible, despite many bumps along the way. Above all, it emphasizes how working together created something far greater than the individual pieces.

Bull Trout and Redband Trout PIT Telemetry in Upper Klamath Headwaters and the Benefits of Collaboration.

Dave Hering, Supervisory Aquatic Ecologist, Crater Lake National Park, National Park Service

Native fish migration in the Klamath Basin is not limited to anadromy. In the upper basin, two native salmonids, Bull Trout and Redband Trout, exhibit potamodromous migration within river and stream systems and between lotic spawning habitats and lacustrine rearing environments in Upper Klamath Lake. At Crater Lake National Park, in the highest headwaters of the basin, we have been working on conservation and recovery of ESA-listed Bull Trout since the early 1990s. Recovery goals for Bull Trout include expression of migratory life history, and PIT telemetry is our primary tool to assess this recovery metric. I will describe our approach using PIT-tags to study movement of these mostly headwater-resident char since 2008. More recently, we have expanded our program to include tagging juvenile Redband Trout in tributaries that flow out of the park. As habitat restoration on downstream federal, state, and private land continues to improve stream network connectivity, movement of native fish between the protected area of the national park and other land management units should increase. Improved collaboration and data sharing with our downstream neighbors will facilitate understanding the recovery of these native migratory fish.

Day 1 Demonstrations

Demonstration of an Electronic Data Entry Platform for Juvenile Salmonid Trapping in the Klamath Basin

Tyler "Ty" Wallin, Fish Biologist, USFWS

The U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office's Fish and Aquatic Conservation Program will be demonstrating the application of a cloud based electronic data entry platform. The system utilizes consumer grade, affordable tablets with a custom designed application developed by Realtime Research to allow field professionals to record data, upload to a cloud-based database, and update an online dashboard. This demonstration will highlight the approachable workflow, adaptability for expansion, and the customizable nature of the data collection software. We will also demonstrate the utility and convenience of the cloud-based dashboard and data portal.

Using Survey 123 Data Entry Forms to Streamline Data Collection and Exchange with the KBFC Database

Rachael Paul-Wilson, Biological Science Technician USGS
Erin Benham, Data Management Specialist, Pacific States Marine Fisheries Commission

High quality fisheries data are essential for organizations, Tribes, and agencies to make informed management decisions in a timely manner. To produce high-quality data, it is important to use appropriate and efficient data collection tools. Field data collection can involve multiple components including paper forms, photos, and GPS. These data must then be manually digitized for analysis, which is error prone and time and labor intensive. Survey123, an ESRI-produced data collection software, enables users to utilize, develop, share, and analyze surveys and forms for data collection. Users can further customize forms by incorporating spatial data, QR codes, voice recordings, and images. The forms can also be easily shared among collaborators. Adopting Survey123 for data collection is relatively inexpensive and can streamline the data collection process, facilitate collaborative efforts, and improve data quality.

Day 2 Presentations

A Strategy for Monitoring Repopulation and Pre-dam Removal Studies in the Upper Klamath Basin

Mark Hereford, Klamath Fisheries Reintroduction Biologist, ODFW

The Federal Energy Regulatory Commission approved the removal of the four lower Klamath hydroelectric dams on the Klamath River. The removal of these dams will allow access to hundreds of miles of habitat for anadromous fishes that have been blocked for over 100 years. The schedule for dam removal is set to begin in 2023 with full passage available in late 2024. In preparation for dam removal and the subsequent repopulation of anadromous fishes into Oregon, ODFW and partners have developed a strategy for monitoring Chinook Salmon, Coho, Steelhead, and Pacific Lamprey. Along with developing a monitoring strategy, ODFW and partners have conducted and continue to develop multiple pre-dam removal studies that investigate the basin-wide genetics of *O. mykiss* as well as the migratory behaviors and survival of juvenile Chinook Salmon in the upper basin. This presentation will briefly summarize the strategy for monitoring repopulation, genetic population structure of Steelhead and resident Redband and Rainbow Trout, and summarize preliminary data associated with a multi-year mark-detection study of released juvenile Chinook Salmon in the upper basin.

The Klamath River Anadromous Fishery Reintroduction and Restoration Monitoring Plan

Crystal Robinson, Klamath Watershed Program Supervisor, CDFW

Klamath dam removal has begun this spring and the California Department of Fish and Wildlife (CDFW) has drafted a reintroduction and monitoring plan for the portion of the Klamath watershed from Iron Gate Dam to the California/Oregon border. The upper Klamath basin was occupied by several anadromous species prior to dam construction such as fall- and spring-run Chinook salmon, Coho salmon, steelhead and Pacific lamprey. Volitional fish passage through the dam removal project reach to the upper basin is expected by late 2024. As a state trustee agency of California's fish, wildlife, and plant resources, CDFW has prepared this plan to provide a framework for reintroduction and monitoring of anadromous fish in California once passage is restored. Monitoring will be used to support Tribal, federal, and state fisheries management and ecological restoration.

Day 2 Presentations

Where are the Upper Klamath Basin PIT Tag Arrays and How Do We Use the Detections to Inform Sucker Management

Jacob Krause, Research Fish Biologist, Western Fisheries Research Center (WFRC)-Klamath Falls Field Station U.S. Geological Survey (USGS)
Rachael Paul-Wilson, Biological Science Technician, WFRC-Klamath Falls Field Station USGS
Brian Hayes, Fish Biologist, WFRC-Klamath Falls Field Station USGS

USGS with support of partners maintains a network of PIT tag arrays to inform managers of Shortnose suckers (*Chasmistes brevirostris)* and Lost River suckers *(Deltistes luxatus)* in the Upper Klamath River Basin. PIT tag arrays in the Williamson River, shoreline springs in Upper Klamath Lake, Gerber Reservoir, and Clear Lake provide information on the timing and duration of spawning suckers, as well as survival. Habitat use is assessed by detections on PIT tag arrays in Pelican Bay, Hagelstein Pond, and ODOT Pond. Emigration out of the lake is assessed by PIT tag arrays in the tributaries and outfall in the Link River. Avian colonies across the Upper Basin are scanned annually for PIT tagged suckers to quantify predation. Although much of the work is focused on suckers, the current PIT arrays provide the infrastructure to answer concurrent studies on salmonids.

Klamath Basin Fisheries Collaborative PIT Tagging Database Update

Rachael Paul-Wilson, Biological Science Technician, Klamath Falls Field Station USGS
Greg Wilke, Application Software Specialist, Pacific States Marine Fisheries Commission

We will highlight the progress made on the Klamath Basin Fisheries Collaborative PIT Tagging Database project. We will provide an overview of the data collection process, the types of data gathered from three collaborators - the Scott River Watershed, Karuk Tribe, and Yurok Tribe, and the categorization of these data types. We will also discuss the ongoing development of the administrative web-based application and the recent migration of the database to PSMFC. The presentation aims to provide an update on the project's status and its future plans.

Developing a Data Exchange Standard

Erin Benham, Data Management Specialist, Pacific States Marine Fisheries Commission
Nancy Leonard, Program Manager, Pacific States Marine Fisheries Commission

Over half a million PIT tag detections have been collected within the Klamath Basin in 2023 alone. The current data sharing process among different state, federal, tribal, and non-profit organizations is vulnerable to human error and unsustainable. A basin-wide collaborative data system is needed to support cooperative projects, consistent data submittal, reduce confusion, and improve interoperability. The first step in this process is to develop a controlled vocabulary and data exchange standards. The Klamath Basin Fisheries Collaborative (KBFC), Pacific States Marine Fisheries Commission, and U.S. Geological Survey are building on existing regional PIT-tag data standards and input that will be received from KBFC members to develop a list of terms and definitions to establish a controlled vocabulary. These efforts will ultimately inform KBFC's data exchange standards which are integral to preserve data and ensure its accessibility and consistency over time.

Day 2 Presentations

Capitalizing on the Best of Both Worlds: Leveraging Acoustic Tags to Estimate Detection and Survival of PIT Tagged Fish

Russell Perry, Research Fish Biologist, Western Fisheries Research Center (WFRC)-Columbia River Research Laboratory, U.S. Geological Survey (USGS)
Summer Burdick, Research Fish Biologist, WFRC-Columbia River Research Laboratory, USGS
Collin Smith, Fish Biologist, WFRC-Columbia River Research Laboratory, USGS
John Plumb, Research Fish Biologist, WFRC-Columbia River Research Laboratory, USGS

Passive Integrated Transponder (PIT) technology has led to a wealth of insights about fish movement, growth, and survival in small streams, but implementing PIT tag studies in large rivers remains a formidable challenge. Large flow volumes, river depths, and channel widths require major capital investments in monitoring equipment that often has very low detection probabilities. In turn, low detection probabilities (e.g., <0.2) often limit or preclude estimation of demographic parameters such as survival. In contrast, acoustic telemetry technology typically has very high detection probabilities in large rivers, allowing precise estimation of survival; however, sample sizes are small and inferences are typically limited to large individuals. In this presentation, we propose a study design whose ultimate goal is to estimate survival of PIT tagged fish recaptured at mainstem Klamath River fish trapping sites (e.g. I5 and Kinsman) from upstream release locations (e.g., Shasta R. or Bogus Cr.). Such a design also requires estimates of capture probability to distinguish survival from imperfect capture. However, estimating capture probability using standard mark-recapture designs is infeasible due to extremely low capture probabilities at trapping sites (e.g., <0.05) and the need for multiple downstream recapture sites to estimate capture probability at an upstream site. To overcome this limitation, we propose an auxiliary study to estimate capture probability of fish traps by pairing large releases of hatchery-origin PIT tagged fish (e.g., thousands) with a smaller sample of acoustic tagged fish (e.g., hundreds). By deploying acoustic receivers at trapping sites, this design 1) uses the acoustic tags to estimate survival of fish to a trapping site, 2) uses the survival probability to estimate the number of PIT tags available to be captured, and 3) estimates capture probability from the number of PIT tags captured relative to the number available. Given adequate replication of paired releases over a number of years, an auxiliary model for daily capture probability can be developed, allowing us to estimate survival of PIT tagged fish that are not paired with acoustic tags but are released from other upstream locations or tributaries. We illustrate the successful application of this paired release design in the Sacramento-San Joaquin Delta where the goal was to estimate the efficiency of a mid-water trawl and estimate abundance of endangered winter run Chinook salmon.

Day 2 Presentations

From Datasheets to Dashboards

Rebecca Croy, Project Leader/Biologist, Shoshone Bannock Tribes

The Shoshone Bannock Tribes Fish and Wildlife Sockeye and Bear Valley Programs, in an attempt to increase efficiency, data flow, and natural resources, teamed up with funding support from the Pacific States Marine Fisheries Commission and technical expertise from Q/W Consulting to enter the "technological age." Electronic datasheets now replace conventional paper and daily data streams instantaneously. Instead of time consuming manual spreadsheet generation and data entry, coded back end reports summarize and calculate data pertinent to the end user. This information is rolled up into dashboards, for managers to validate daily program operations and to share as necessary with the general public.

Fish Monitoring Needs, Expectations, and Considerations in the Context of Klamath River Dam Removals

Tommy Williams, Research Fisheries Biologist, Southwest Fisheries Science Center, National Marine Fisheries Service

As the Klamath River transitions from a dams in to dams out condition the ecological and physical processes throughout the Basin will change. The spatial and temporal nature of these changes will depend on a range of factors including the specific process of interest, the interactions of various processes, and the environmental conditions throughout the Basin and marine environment. In terms of fish, specifically conservation and management of salmonids, information on the presence, distribution, movement, and abundance of individuals is of keen interest. We have a general understanding of ecology of salmonids and we have species specific, regional specific, basin specific, and population specific understanding of fish in the Klamath Basin in its current dams in condition. As we transition to a more connected, more diverse, and more dynamic environment with dams removed, we need to anticipate different responses within and among species and populations of fish. In terms of dynamics, the initial dispersal and movement of fish within the Basin will not likely be "linear" or systematic in space and time. Distribution within the mainstem and tributaries may not necessarily progress systematically upstream with time. Nor may occupancy be continuous once fish move into a specific location (mainstem reach, tributary, etc.). In addition, the movement of emigrating (smolts, downstream migrants), immigrating (return of adults from ocean into the river), and juvenile fish (e.g., natal and non-natal habitat) using areas upstream of the former dam locations will be novel to our monitoring efforts. Moreover, with the establishment of populations in the areas upstream of the former dams, use and movement of fish in areas downstream is likely to change. The temporal nature of our expectations needs to consider the physical and biological processes require time and depend on environmental conditions. Droughts, high flow events, variable ocean conditions, and other environmental variability will influence the time and nature of the reestablishment of fish populations in the Basin.

As we move forward at this exciting time, we must manage our expectations with anticipation of novel changes in the dynamics of fish in the Klamath Basin.

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

Klamath Basin Fisheries Collaborative Annual Meeting

https://forms.office.com/r/n7gWsftzGM

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