PACIFIC NORTHWEST MONITORING PARTNERSHIP
FISH MONITORING WORK GROUP
PIT TAG DATA AND ANALYSIS
2025 WEBINAR SERIES

Schedule at a Glance

Every Thursday starting April 24th – May 22nd from 10:00-11:30 (PDT). There is an optional 30-minute "office hours" after each session, approximately 11:30 - 12 pm. Presenters will be available for more hands-on assistance. Note, if there are no further questions during the "office hours", we will conclude the session.

Starting Your Journey with PIT Tag Data – Thursday, April 24th, 2025, 10:00 AM – 11:30 AM (PDT)

- *Using the PTAGIS advanced reporting system to query and download PIT tag data* – **Nicole Tancreto**; Pacific States Marine Fisheries Commission/PTAGIS
- *Managing PIT Tag Detection Data with Microsoft Excel* – **Marika Dobos**; Idaho Department of Fish and Game

GitHub for Data Analysis Projects – Thursday, May 1st, 2025, 10:00 AM – 11:30 AM (PDT)

- *Live Tutorial for Using and Navigating GitHub for Data Analysis Projects* - **Ben Staton**; Columbia River Inter-Tribal Fish Commission

Applications: Clean & Organize Your PIT Tag Data – Thursday, May 8th, 2025, 10:00 AM – 11:30 AM (PDT)

- *Wrangling and Preparing PIT Tag Data using PITcleanr* – **Kevin See**; Washington Department of Fish and Game
- *Strategies for Bringing PTAGIS to the Masses* – **Brian Maschhoff**; Salmonetics

Columbia Basin Research: Data Access in Real Time and Tools – Thursday, May 15th, 2025, 10:00 AM – 11:30 AM (PDT)

- *Columbia Basin Research: DART & Tools* – **Susannah Iltis, Matt Carter, Rich Townsend, Jennifer L. Gosselin, and Rebecca Buchanan**; Columbia Basin Research, School of Aquatic and Fishery Sciences, University of Washington

Beyond PTAGIS: More on applying R and Other Regional PIT Tag Systems – Thursday, May 22nd, 2025, 10:00 AM – 11:30 AM (PDT)

- *Beyond PTAGIS: Using R for biological data management, visualization, and reporting* - **Jennifer Fredrickson, Jennifer Rowe**; U.S. Geological Survey Forest and Rangeland Ecosystem Science Center
- *Friends You Didn't Know You Needed* - ⚡ Lightning Talks ⚡
    - *Klamath Basin Fisheries Collaborative Database* - **Monica Diaz**, Pacific States Marine Fisheries Commission;
    - *Bottlenecks to Survival Data System & Orphan Tag Database* - **Brahm White-Gluz**, Pacific Salmon Foundation;
    - *Using PIT tags to guide salmon recovery in the Green River* - **Chris Gregersen**, King County

Presentation Abstracts by Session

Starting Your Journey with PIT Tag Data

Thursday, April 24th, 2025, 10:00 AM – 11:30 AM (PDT)

Nicole Tancreto, John Tenney, Craig White; Pacific States Marine Fisheries Commission, PTAGIS

Using the PTAGIS advanced reporting system to query and download PIT tag data

The Columbia Basin PIT Tag Information System (PTAGIS) serves as the central database for PIT-tagged fish in the Columbia River Basin. It contains records for over 59 million PIT-tagged fish and more than 312 million observations dating back to 1987. The PIT tag data stored in PTAGIS is accessible to anyone through a web-based reporting system, which allows users to query and download the data. The advanced reporting system enables users to create and save custom queries, export query results, and subscribe to scheduled queries. This presentation will demonstrate how to use the advanced reporting system to build a report that queries the history of events recorded in PTAGIS for a set of tags, export the results to a CSV file, and schedule the report to run automatically and deliver the results via email or URL.

Marika Dobos; Idaho Department of Fish and Game

Managing PIT Tag Detection Data with Microsoft Excel

There are many tools that can be used to manage data (e.g., R, Access, GIS, Excel) and some tools can be more efficient and effective than others. This will vary depending on the experience and competence of the individual as well as the specific needs. Microsoft Excel can be an efficient and effective tool in simple situations for managing and summarizing PIT tag data. In this workshop, we will provide you with tools and functions in Excel that can help better manage PIT tag detection data downloaded from PTAGIS. We will work on examples from an interrogation detail report, interrogation summary report, and a complete tag history report downloaded from PTAGIS to explore different functions in Excel that can aid in more effective data management. We will discuss ways to sort adult detections from juvenile detections and shed tag detections. We will also discuss linking up data from one tab to another through static and dynamic joining tools.

We will attempt to cover these topics: IF function, DATEDIF function, UNIQUE function, VLOOKUP function, XLOOKUP function, CHOOSE function, INDEX-MATCH functions, and DGET function

We will also have discussions on use and structures of:

1. Dynamic arrays
2. Pivot tables

GitHub for Data Analysis Projects

Thursday, May 1st, 2025, 10:00 AM – 11:30 AM (PDT)

Ben Staton; Columbia River Inter-Tribal Fish Commission
Live Tutorial for Using and Navigating GitHub for Data Analysis Projects

GitHub has emerged as a widely used version control system (VCS) for fisheries data analysts and developers of statistical tools for the analysis of fisheries data sets. GitHub is useful for storing code/data, tracking the development of data analysis projects, and facilitates collaboration with colleagues. However, a lack of exposure at educational institutions has resulted in some mystery around how to use GitHub for some in our field. There are two objectives of this tutorial, and both seek to alleviate some of this mystery. First is a basic (local, single-user, not collaborative) workflow demonstrating how GitHub is used in a data analysis context; the tutorial will include tasks like creating a new repository, adding files, committing changes, working with branches, and pushing changes to a remote repository. Second, navigation of the online-side of GitHub will be demonstrated, including the issue tracker, inviting collaborators, and exploring repositories/accessing code created by others. More advanced topics that will likely not be covered in this tutorial will include GitHub Organizations, publishing releases, collaborative workflows involving forks, resolving merge conflicts, and automation with GitHub Actions. Participants are encouraged to ask questions and should come away from the tutorial with a better understanding of what GitHub is, how it is used, and ways it can facilitate their own research.

Applications: Clean & Organize Your PIT Tag Data

Thursday, May 8th, 2025, 10:00 AM – 11:30 AM (PDT)

Kevin See, Ryan Kinzer, Mike Ackerman; Washington Department of Fish and Wildlife, Nez Perce Tribe
Wrangling and Preparing PIT Tag Data using PITcleanr

Have you ever found yourself using PIT tags to study fish survival and movement, only to become overwhelmed by the sheer volume of tag detections and the challenges of organizing and analyzing the data? PIT tag data can simultaneously be full of valuable information, yet overwhelming to analyze. A single tag may trigger numerous detections, often resulting in tens and sometimes hundreds of redundant records. Furthermore, determining the direction and path of a fish's movement based on tag detections requires knowledge of how sites are situated relative to each other along a stream network, which can be complex to achieve. PITcleanr is a freely available R package thoughtfully designed to assist biologists in managing PIT tag data. It streamlines the process of importing data into R, condensing it, introducing directionality, applying necessary filters, and generally preparing the data for further analysis, such as converting it into capture history matrices. In addition, PITcleanr contains functions to map sites on a stream network, helping researchers build tables and figures describing the connectivity and upstream/downstream relationships between sites and the fish being studied. This talk will introduce the need for PIT tag data processing tools and much of the functionality of PITcleanr through a series of examples.

Brian Maschhoff; Salmonetics
Strategies for Bringing PTAGIS to the Masses

The PTAGIS database contains PIT-tag detections of tens of millions of fish at hundreds of locations across the Columbia Basin. Effectively utilizing this data requires two key steps: isolating the relevant data and selecting or developing the necessary tools for analysis. The PTAGIS Advanced Query tool is a powerful resource for the former, though crafting the perfect query can be challenging and requires distinguishing relevant information from noise. The Columbia Basin Research DART website offers another option for data extraction, with more limited query flexibility, but it additionally processes the data to remove extraneous information and adds additional annotations. For analysis, users often rely on general tools like Excel, Access, or other RDBMS, or on programs tailored to very specific analyses.

In this paper, I propose strategies to improve the management of these two stages of PIT-tag data processing. I introduce PIThy (PIT-tag Hypertool), a web-based tool that allows for drag-and-drop loading of PTAGIS raw data, interactive visualization and filtering, as well as the integration of environmental attributes (e.g., temperature, flow) and data export. Additionally, I highlight several GitHub repositories containing tools for working with both PTAGIS and DART data, including resources for data exports and programmatic access via APIs. I also present a GitHub repository for PIThy, with the goal of making the tool and its underlying components reusable for other PIT-tag analysis projects.

Columbia Basin Research: Data Access in Real Time and Tools

Thursday, May 15th, 2025, 10:00 AM – 11:30 AM (PDT)

Susannah Iltis, Matt Carter, Rich Townsend, Jennifer L. Gosselin, and Rebecca Buchanan; Columbia Basin Research, School of Aquatic and Fishery Sciences, University of Washington
Columbia Basin Research: DART & Tools

Columbia Basin Research (CBR, University of Washington) provides Data Access in Real Time (Columbia River DART; www.cbr.washington.edu/dart) and data analysis software tools (Tools; www.cbr.washington.edu/analysis).

In the first part of the presentation, we will provide an overview of DART, which serves as a second-tier, centralized repository of fish and environmental data in the Columbia River Basin. We use automated processes to access, format, and prepare data from a wide variety of data providers for use in value-added products on the CBR website. The value-added products are made publicly available and geared to decision makers, managers, scientists, practitioners, and the public. These products include data summaries, data visualizations, and interactive queries. We will highlight some of these products for passive integrated transponder (PIT) tag data (PTAGIS, PSMFC; www.ptagis.org), including: 1) filters applied to the PIT data for ESU/DPS, Life Stage, and Transportation, 2) estimates of smolt-to-adult survival, and 3) adult metrics of adult project delay, fallback and conversion rates.

In the second part of the presentation, we will give an overview of CBR's desktop analysis tools for use with mark-recapture data and will provide an in-depth look at our PIT-tag processing tool, PitPro. PitPro can be used either alone or in conjunction with other CBR applications or third-party software. It was written to process and analyze PIT-tag data from the Columbia River Basin in a flexible and reproducible manner. All data processing depends on assumptions related to expected fish movements, tag longevity, dam operations, and detection capabilities. PitPro enables the user to review and/or modify the

assumptions it uses to process PIT-tag data and tabulates possible assumption violations for easy review. We will provide an overview of PitPro's features and demonstrate the program's flexibility to adapt to time-changing conditions and assumptions.

Beyond PTAGIS: More on applying R and Other Regional PIT Tag Systems

Thursday, May 22nd, 2025, 10:00 AM – 11:30 AM (PDT)

Jennifer Fredrickson, Jennifer Rowe; U.S. Geological Survey Forest and Rangeland Ecosystem Science Center
Beyond PTAGIS: Using R for biological data management, visualization, and reporting

Writing code in R open-source programming language is a valuable skill for scientists to promote reproducible research. This webinar is intended for biologists of all career stages wishing to develop skills in R to efficiently manage and summarize data and communicate results. We will use existing R packages and custom solutions to explore: 1) how to import data from different sources (Excel, Access, FieldMaps/Survey123) while preserving data integrity, 2) ways to easily format or restructure data, and 3) methods to summarize and visualize data using tables, graphics, and maps. We will also introduce RMarkdown to automate data QA/QC and streamline generating and exporting standardized reports. Other topics covered will be how to avoid common pitfalls in R and where to look for additional in-depth R resources. At the end of the workshop, participants will have the tools necessary to wrangle PIT tag and other types of ecological data (e.g., telemetry, geospatial, abundance) into formats needed for further analyses of questions of interest.

⚡ LIGHTNING TALKS ⚡
Monica Diaz, Pacific States Marine Fisheries Commission; Brahm White-Gluz, Pacific Salmon Foundation; Chris Gregersen, King County
Friends You Didn't Know You Needed

Discover the incredible work happening with regional PIT tag systems. Join us for a series of dynamic lightning talks where we'll introduce you to some tools you may not be familiar with, as well as the talented individuals behind them. With some fish in our region migrating across vast distances, let's come together to broaden our community and cast a wider "net" of collaboration and knowledge!

- **Monica Diaz, Pacific States Marine Fisheries Commission**; *Klamath Basin Fisheries Collaborative*
  - Overview of the KBFC Database for PIT tag data and other associated metadata
- **Brahm White-Gluz, Pacific Salmon Foundation**; *Bottlenecks to Survival Data System & Orphan Tag Database*
  - Overview of the data management system used by the Bottlenecks to Survival Program & Orphan Tag Database
- **Chris Gregersen, King County;** *Using PIT tags to guide salmon recovery in the Green River*
  - Since 2021, King County has implemented a PIT tagging program on the Green River. This project is focused on tagging juvenile Chinook salmon, with the goal of informing salmon recovery actions and assessing project effectiveness.