University of Washington
School of Aquatic & Fishery Sciences
Columbia Basin Research
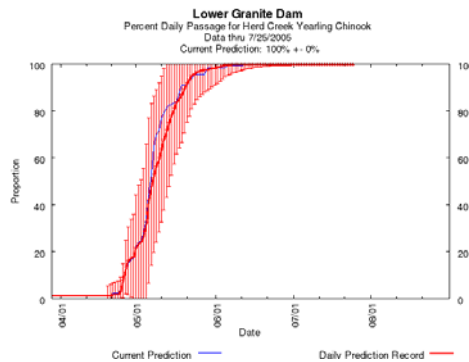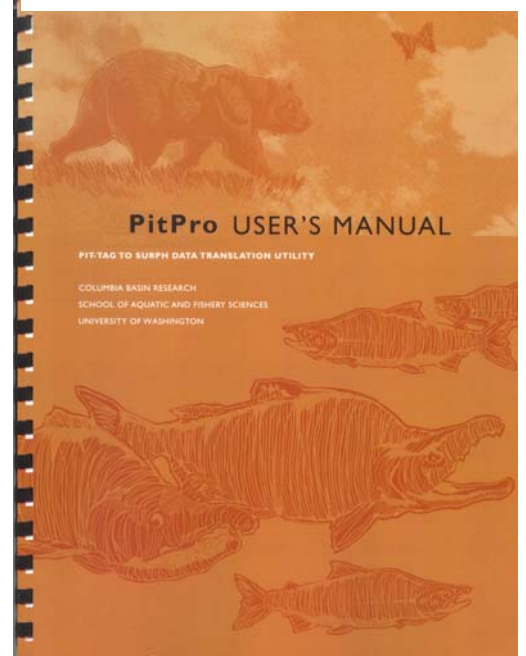
Columbia Basin Research (CBR) is a scientific research group at the University of Washington, School of Aquatic & Fishery Sciences. We investigate salmon biology and survival in the Columbia and Snake river basins. We provide user-friendly data analysis and modeling tools, and maintain DART, an interactive secondary database, for the fisheries community and the general public.
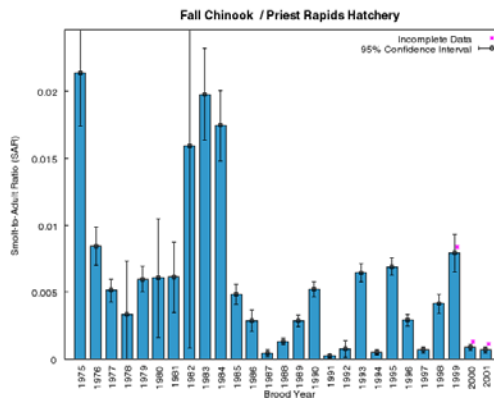
Inside . . .

Inseason Monitoring of Juvenile Salmon Outmigration

Lower Granite Dam
Percent Daily Passage for Herd Creek Yearling Chinook
Data thru 7/25/2005
Current Prediction: 100% +- 0%

Current Prediction — Daily Prediction Record

Program PitPro Upgraded

PitPro USER'S MANUAL
PIT-TAG TO SURPH DATA TRANSLATION UTILITY
COLUMBIA BASIN RESEARCH
SCHOOL OF AQUATIC AND FISHERY SCIENCES
UNIVERSITY OF WASHINGTON

Updated CWT Smolt-to-Adult Ratios

Fall Chinook / Priest Rapids Hatchery
Incomplete Data
95% Confidence Interval

Inseason Monitoring of Juvenile Salmon Outmigration

Inseason smolt passage is monitored for specific stocks, as well as several stock composites, at several monitoring sites along the Snake and Columbia rivers. Using "real time" information about the current status of the runs, along with current hydrographic information, the future progress of the migrating fish is forecasted and provided on the Inseason Forecasts web page. In addition to PIT-tag, smolt index, and hydrosystem data, stock-specific estimates of arrival distributions at the lower Snake and Columbia River dams use flow, spill and elevation forecasts provided by the Bonneville Power Administration.

Throughout the migration season, the predictions are updated daily to provide information to the public and to aid managers in decisions about mitigation efforts such as flow augmentation, spill scheduling, and fish transportation. By providing current information on the status of particular salmon runs, managers can operate the Columbia River system in a manner that will maximize salmon survival, while minimizing the costs of mitigation procedures.

The Smolt Passage Inseason Forecasts use two separate programs to generate downstream passage distributions. *RealTime*, an empirical pattern-matching routine, predicts arrival distributions for various species and stocks at Lower Granite, McNary, John Day, Bonneville, and Rock Island dams. *CRiSP1,* the Columbia River Salmon Passage model, uses the predictions from *RealTime* and adds hydrological, fish behavioral, and dam geometry information to simulate the movement and survival of juvenile salmonids through the remainder of the Columbia River system.

Juvenile passage distributions and run-timing summaries with historical passage bar graphs, cumulative passage distributions, and river condition plots are available on the web site. For more information, see http://www.cbr.washington.edu/crisprt/.
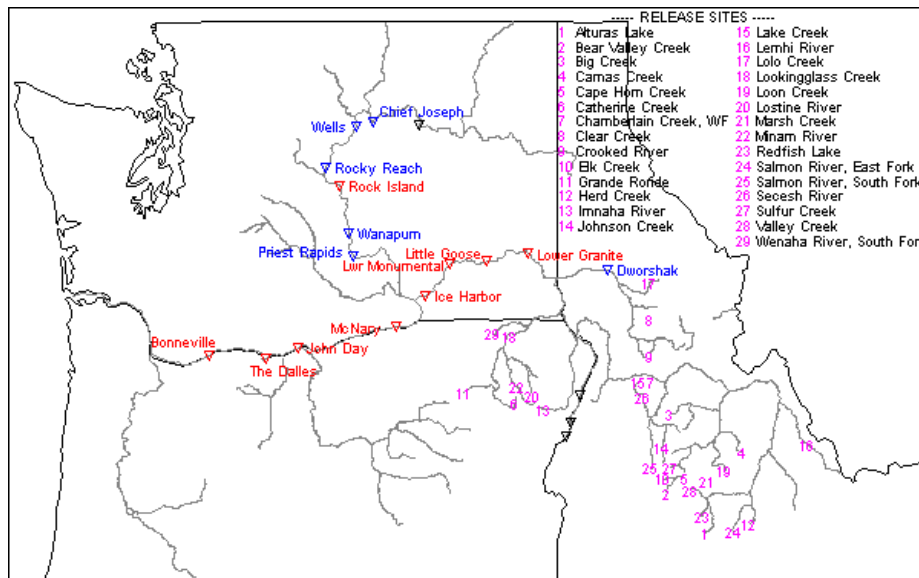

Figure 1. Map of release locations (in magenta) used by the *RealTime* program to monitor outmigration status. Triangles (in red) indicate forecast dam locations.

Smolt-to-Adult Ratios using Coded-Wire-Tag Recovery Data Updated

This project produces an annual analysis of coded-wire-tag (CWT) returns from hatcheries across the Northwest region (WA, OR, and ID) for all available years, to monitor and evaluate smolt-to-adult ratios (SARs). Annual SARs are based on all available historical CWT data collected since mid-1970s.

The CWT release and recovery data are obtained from the Regional Mark Information System (RMIS), managed by the Pacific States Marine Fisheries Commission (PSMFC). Figure 2 shows the 91 hatcheries in the Columbia Basin, Puget Sound, and outer Washington and Oregon coasts analyzed to provide a wide geographic representation and variety of species.

SAR estimates are calculated by tag code group from the total recovered tags and release size. The estimates and associated variance estimates are adjusted for the sampling fraction occurring in the recovery of each tag. For those hatcheries that release multiple CWT groups in a year, an overall weighted average of SAR is calculated using these replicate release groups. The SAR results can be retrieved by region, hatchery, or species.

SAR estimates were updated on the web site on June 22, 2005, for brood groups up to 1999. Brood groups in later years are still experiencing additional tag recoveries.
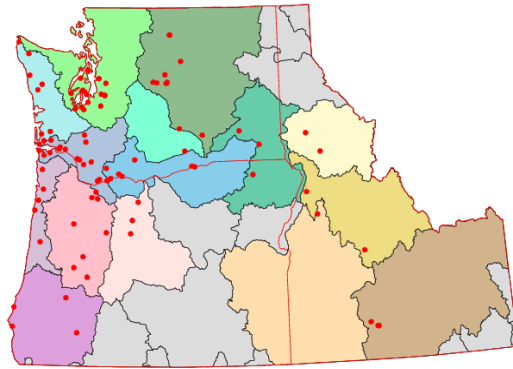

Figure 2. CWT release sites (red dots) for which SARs are estimated.
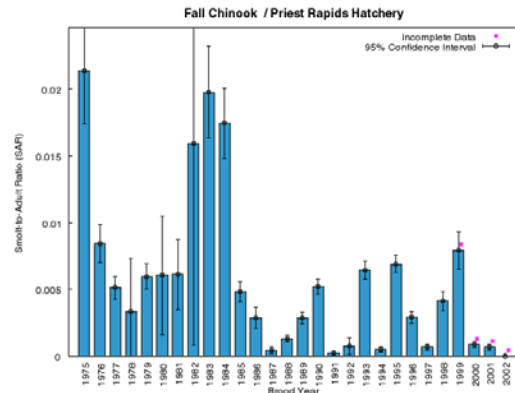

Figure 3. Updated SARs
for fall chinook at Priest Rapids.

The CWT SAR estimates are updated annually as additional return information becomes available after the beginning of the calendar year. You can access the SAR estimates at http://www.cbr.washington.edu/cwtSAR/.

Latest Version (3.0) of Program PitPro is Now Available

As the PIT-tag detection system has evolved in the Columbia Basin, Program PitPro has added new features to process adult detections and enhanced existing features for more convenient use. The main changes for 2005 include:

- Added adult detection histories to analyze adult upriver survival.
- Added the ability to adjust the logic that determines whether a detection belongs to an adult or juvenile.
- New diagnostic output displaying individual fish observation histories and the steps in determining those histories.
- Ability to read comma separated variable (CSV) data files directly downloaded from PTAGIS.
- Ability to view and manipulate PIT-tag detection site configuration and program logic as needed.
- Full site names are used instead of abbreviations in menus.

Many detection sites are becoming multi-life-stage detectors (i.e., both adults and juveniles are detected at the same site). While increasing the complexity of processing detection histories, the capability to generate histories for the complete fish life-cycle will greatly enhance the information available for analysis.

Adult life-stage detection histories are complicated by the issue of fallback at dams. The program provides two alternative methods for characterizing adult detection histories. The *time invariant* approach records adult detections at the dam, irrespective of the order of events. The second method, called the *final ascent* approach, records detection histories based on the last upriver sequence of detections for a fish, should fallback occur.

To promote transparency in processing the juvenile and adult detection histories, the ability to view the internal logic that is used by the program is now available. Also, an output file is created to give a snapshot of the creation of the detection histories at each step. These software tools allow the user to easily determine how and why the program is assigning the resultant detection histories. If the user desires a different set of rules, the internal logic can be saved to a file, manipulated by the user, and then reloaded to alter the default processing behavior of the program.

Another useful new feature allows the user to directly read data files as they are provided from the PTAGIS database system. These files are downloaded in comma separated variable (CSV) format. Previously, these files needed to be converted before being suitable for use by Program PitPro. This conversion step has been eliminated, making the process more streamlined and less prone to error.

The interface has been reorganized, and abbreviations have been replaced by the full name for detection sites for further ease of use. To download the latest version of Program PitPro 3.0, please go to http://www.cbr.washington.edu/paramest/pitpro/.

Scheduled for release later this year, Program ROSTER (*River/Ocean Survival and Transportation Effects Routine*) will allow users to analyze the expanded detection histories to estimate ocean survival, adult upriver survival, transport-inriver ratios, and delayed mortality.