PTAGIS newsletter

In This Issue:

ISO Transition Project Update

Work has concluded on the installation of the new ISO-based transceiver systems at interrogation locations in the Columbia and Snake River Basin. PIT tag interrogation systems at all permanent facilities are operational and transmitting transceiver electrical parameters to the PIT Tag Operations Center (PTOC) four times a day. The PTOC will be conducting the final system tuning, and NMFS will be calibrating the system (using live fish) after fish bypass systems are watered-up in March and early April.

Changes

Be aware that a number of physical changes have been made at interrogation sites within the Basin. Specifically:

1. Monitors and fish separation gate controllers which comprised the GRX (NMFS Lower Granite Separation by Code experimental sub-system) site have been incorporated into the GRJ (Lower Granite Juvenile) site;
2. Gate controllers that were part of GOX (NMFS Little Goose Separation by Code experimental sub-system) have been incorporated into the GOJ (Little Goose Juvenile) site;
3. Coil numbers and monitor names throughout the Basin have been changed to conform to standardized naming/numbering conventions.

Please refer to the "Current Site Configurations" link at www.pittag.org/Ptoc_OM for details on site configurations.

("ISO Update" continued on page 5.)

Adult Interrogation Update

Status Report on the Development of PIT Tag Interrogation Systems for Adult Salmon Transiting Fish Ladders. This article was submitted by Dr. Sandra Downing (NMFS), Dave Askren (BPA), and Blaine Ebberts and Dave Hurson (COE).

Introduction

Due to the importance to the entire fisheries community of the development of ISO-based PIT tag interrogation systems for adult salmon for deployment in adult fish passage facilities at mainstem Federal hydropower projects of the Federal Columbia River Power System (FCRPS), we have started to submit quarterly updates to the PTAGIS Newsletter. This is the second quarterly update in this series and covers work performed between October 1999 and mid-January 2000.

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The PTAGIS newsletter is published periodically by the PIT Tag Operations Center (PTOC). We welcome input from the PTAGIS community, so feel free to call (503.650.5400), fax (503.650.5426), e-mail, or write us with your story ideas. If you have any questions regarding the contents of this publication, or about the PTAGIS program, please contact Carter Stein, PTAGIS Program Manager. Editing and layout by Liza Bauman. Unless otherwise noted, contributors include Carter Stein (carters@psmfc.org), Dave Marvin (dave_marvin@psmfc.org), John Tenney (john_tenney@psmfc.org), and Liza Bauman (liza_bauman@psmfc.org).

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PIT TAG Operations Center

PITTag2 Update

Thanks to everyone who filled out a PITTag2 Software Survey at the Workshop. The feedback was very positive. Below is a summary of common problems and new feature requests.

First the problems:

- **Configuring the Baytech Multiport** generates the most support calls. This device is difficult to configure and is prone to losing configuration settings and locking data ports. To prevent configuration loss and port locking, make sure the Multiport is powered on last, and powered off first in the device chain. Also, this device should always be powered off while connecting or disconnecting cables.

  The next version of PITTag2 will be designed to support devices connected to multiple serial ports. This, combined with a new generation of simple USB/Serial hub devices will provide a better alternative to the Baytech Multiport.

- **General Device Configuration** can frustrate even the most experienced PITTag2 user. The usual problems are incorrect serial communication settings (*e.g.* 9600-N-8-1), missing "null-modem" adapters, or an incorrect digitizer map alignment.

  The design for the next version of PITTag2 has a configuration wizard that will provide a step-by-step guide for configuring devices with built in troubleshooting and the ability to set default device configuration settings.

New Feature Requests:

The following are popular feature requests for the next version PITTag2:

- Support for the new generation of CalComp digitizer boards.
- Improved data analysis and editing tools, such as customizable Session Info page, search and replace, and global updates.
- Other export formats such as mdb, csv, xls.
- Resizing capabilities.
- Additional sound alerts – especially when a tag is detected.
- Reverse clip file validation to detect target recaptured fish.
- Duplicate detection across multiple tag sessions.

Development of the next version of PITTAG2 will begin sometime this spring. □

Facility Water-Up Schedule

Lower Granite will begin collection for transport at 0700 on March 25. The other fish transport projects on the Snake River will begin collection at 0700 on April 1. McNary will also begin sampling on April 1.

Sampling at the new fish facility at Bonneville II started on Monday, March 6. The first powerhouse will start up on April 3, with immediate 24 hour operation of the flat plate. John Day will start collecting fish on Monday, April 3. The Prosser facility has been operating and interrogating ISO tags since November 24, 1999. □

Tag Costs Decline: What does this mean for your program?

The following is a general interim policy for implementation of the Northwest Power Planning Council's (Council) Fish and Wildlife Program and may be modified based on agreement among BPA, the Council and CBFWA.

PIT tag costs continue to decline. This is good news. However, it has raised some questions regarding what PIT tag cost assumption project sponsors should make when preparing their FY00 budgets for submittal to their COTRs at BPA. Project sponsors should assume the same tag cost as when they prepared their initial budget for the FY00 regional prioritization process, since that budget total is the one that CBFWA and the Council used for estimating the overall Fish and Wildlife Program budget. By doing this, the savings will be passed on to the entire Fish and Wildlife Program for redistribution through the regional prioritization process. Project sponsors should not assume that the savings are kept within the individual project to augment a budget shortfall. □

Responsibilities of PTAGIS Data Users

The PIT Tag Steering Committee (PTSC) would like to address the issue of ethics and responsibility of PTAGIS data consumers.

To put this issue into the context of the expanding scope, scale, and complexity of the PTAGIS data store, there were only six tag coordinators in 1989, whereas in today's system, there are more than 50! Another change is that PTAGIS data was not used as a management tool in 1989.

Over the past year or two, the PIT Tag Operations Center (PTOC) has received a number of telephone calls from data providers. At issue was the fact that data these users provided was being extracted for use by others for purposes of publication.

In their "rush to publish," users who extracted these data did not contact the data providers. The data was at risk of being mis-used because the extract users did not contact the data providers, and learn key assumptions and facts relative to the data extracted. This type of usage compromises the integrity of the entire PTAGIS data set.

Side effects of this issue include the fact that data providers have tended to withhold non-required textual or anecdotal data from their file submissions, or they may have delayed submission of raw data sets to PTAGIS.

Over the next few months, the PTSC will establish a recommended guideline for data consumers. People who use data from other research projects should contact the sponsor or tag coordinator who provided the original data, in order to obtain the necessary information related to proper usage of that data set.

This is an issue of data integrity. Please talk to your PTSC representative and give them your ideas about how to deal with this issue. □

Old 400kHz Gear?

Let your PIT Tag Steering Committee representative know if you or your project has any left over 400kHz PIT tags or PIT tag readers. The PTSC will help to find new homes within public agencies where you can donate this obsolete equipment. □

Test Tags, Anyone?

Test tags, test sticks, timer tags, reference tags, and fixed reference tags are used to test the functionality of portable or stationary PIT tag readers. The fish keyrings are another example of a test tag. All of the keyring tag codes have been registered in PTAGIS as test tags.

If you use any other tags in testing your system, please contact PTOC to register them. □

PIT Tag Steering Committee Members

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Interrogating?

If your project will be generating INTERROGATION or MULTIMON data files, please note the following:

1. Verify that your interrogation site is set up on PTAGIS. To do this, view the report at www.pittag.org/Ptoc_OM called "Current Site Configurations". Verify that your three character site identifier is listed, along with any monitors that you are operating. Also, and most importantly, verify that the coil identifiers listed in this report match your system hardware. If your site is not in this report, it will need to be set up prior to the time that you submit Interrogation files to PTAGIS. Please allow at least 14 days for PTOC to set up your new or changed site configurations.
2. If you are submitting your interrogation files via e-mail, please note the new e-mail address for Interrogation files only: intdata@ptagis.org. The Subject line for your interrogation file e-mail messages should be INTERROGATION for interrogation files and MULTIMON for files created with the NMFS multimon.exe program. □

Please Report Adult Recaptures

To date, most PIT tag research has been directed at parr and smolts. Many researchers want to know when a fish of theirs has been handled. We have done a good job getting the word out to juvenile salmon researchers to scan every collected smolt and parr for the presence of PIT tags.

Now, more and more research programs are coming online that are at least partially based on adult returns. These programs are just as interested in the handling of their adults and collecting that recapture information.

The following is extracted from the Appendix G of the 1999 PIT Tag Specifications Document:

> *Adult fish that are recaptured at hatcheries should have RE RF flag codes. The RE flag code will assure that a record is inserted into the recap_hdr and recap_data tables. The RF flag will be used to report the adult return in the "Final Disposition Analysis" reports that will provide life-cycle information for each tagged fish.* □

PTAGIS Procedures

On December 1, 1999, the PIT Tag Operations Center (PTOC) implemented a new PTAGIS database process to receive, validate, and instantiate tagging, recapture, and mortality records. The new process addresses deficiencies in the old process that required us to manually start and track data loads. With the new process, data are loaded automatically as they are received.

Most of the changes between the old and new process are transparent to the PTAGIS user. A few, such as improved messaging, are intentionally obvious. Some of the process changes have resulted in modifications to the way data are stored in the PTAGIS database. Below are the changes you should be aware of:

1) We've improved the messaging regarding our processing of your data files. For each Tag File or Release Information File received, you'll receive separate messages indicating a) receipt of the file, b) validation of the file form and contents, and c) confirmation that the file and contents were loaded to the PTAGIS database. If you have enabled the "Forwarding E-Mail" option within your PTAGIS account, the forwarding recipient will also receive each of these messages.

2) For Tag Files, the confirmation message includes a summary of the number of records loaded as a) new tags, b) mortalities, c) recaptures, d) dotouts, and e) duplicate tags.

3) There is now a "precedence rule" in place such that tagging detail records with both a Mortality flag and Recapture flag are loaded only to the PTAGIS *mort_data* table, rather than to both the *mort_data* and *recap_data* tables as they were in the past. All detail records contained in Tag

("Procedures" continued on page 5.)

Procedures (cont.)

Files processed since December 1, 1999 have a one-to-one assignment to their appropriate data tables in the PTAGIS database.

4) All of the data files contributed to PTAGIS since 1987 are now available directly from the PTAGIS archives. They can be accessed through our FTP server at ftp.pittag.org/pub/pittag/data_loaded, or through the "Data and Reports" page on our web site at www.pittag.org. Coincident with the process change on December 1, we instituted file "versioning". The most recent version of each data file processed prior to that date was assigned a version number of "0". Each data file processed since that date is initially versioned as "1", and the version number increments with each successfully loaded correction to that data file.

5) Speaking of corrections, new and corrected Tag Files can be submitted via either the PTAGIS application or by e-mail (by specifying either "TAGGING" or "TAGGING CORRECTIONS" on the e-mail subject line). New Release Information files can be submitted either through the PTAGIS application or by e-mail, but corrections to Release Information files can only be submitted by e-mail (specifying "RELEASE CORRECTIONS" on the e-mail subject line). Please remember that if you re-load a corrected Tag File to the PTAGIS database you MUST either include release information directly in the Tag File OR "re-patch" that release data by uploading a "corrected" Release Information file. We strongly recommend including all release information directly in the Tag File.

6) Finally, the Mortality and Monitored Release data file classes became obsolete on December 31, 1999. Henceforth, please report any PIT tag mortality information using the Tag File format. The process to "patch" individual PTAGIS tagging records with release dates and times from Monitored Release files has been discontinued. Interrogations associated with individual PIT tag detections at release site exits will now be considered discrete and separate events from the release of the PIT tag population. The small number of Monitored Release records currently instantiated in the PTAGIS database will be converted into Interrogation records.

Coincident with, but separate from, the modifications to our data processing operations, we made one significant modification in a PTAGIS database field definition. The Migration Year field, while submitted in data files as a *two*-digit value, is now stored in, and displayed by, the PTAGIS database as a *four*-digit value. If you construct any report queries that include references to the Migration Year field, make sure that they reference the full four-digit value(s).

The PTOC staff hopes the changes implemented in the last few months will improve users' abilities to ensure and verify the inclusion of the data contributions to the PTAGIS database. If you have questions about these or any other new or existing PTAGIS operations, don't hesitate to contact the PTOC staff. □

ISO Update (cont.)

Thanks!

Kudos to the PTOC Field Operations Staff—Don Warf, Scott Livingston and Darren Chase, who worked long hours through most of the fall and winter to assure that the new system was installed and operational in time for the 2000 outmigration.

Special thanks to Dave Hurson from the Walla Walla District, Army Corps of Engineers, for the work he performed coordinating PTOC operational requirements with other contractors to assure that the access platforms, electrical and communications infrastructure was completed on time.

We also want to thank Sean Casey, Fisheries Program Manager for Destron Fearing, who has worked especially hard with many members of the fisheries community in the Columbia Basin to develop the components of our new system.

Questions?

If you have any questions regarding the ISO Transition, please contact your PIT Tag Steering Committee representative or the co-chairs of the Transition Planning Team, Charles Morrill at 360.902.2747, John Rowan at 503.230.4238, or Carter Stein at 503.650.5400. □

Adult Update (cont.)

Regional coordination and participation in critical planning and decisions are essential to the success of this project. To this end, the Action Agencies (BPA, COE, and their contractors) established an Adult PIT Tag Oversight Committee (APTOC) in early 2000. The APTOC presently includes NMFS, USFWS, the separate States, CRITFC, CBFWA, and PSMFC, as well as BPA and COE. BPA and COE are the Action Agencies with ultimate responsibility for implementation and policy decisions with their separate responsibilities outlined in their June 1996 Memorandum of Understanding. The APTOC will address technical issues and provide collective insight on policy and implementation matters. The APTOC will be releasing a Management Plan this winter for regional review. Other regional coordination efforts include periodic updates to the Fish Facility Design Review Work Group (FFDRWG) and Fish Passage Advisory Committee (FPAC). These committees were updated in November. Updates on the project were also presented by Dave Askren, Blaine Ebberts, Laurie Ebner (COE), and Brad Peterson (NMFS-R&D team) at the January PIT tag Workshop.

Gary Fredricks from the NMFS-Portland Office stated in November that to satisfy the Biological Opinion, the NMFS immediate objectives include the determination of adult conversion rates through the FCRPS and the support of transport studies. Ideally, this would involve the detection of every PIT-tagged adult transiting FCRPS projects, irrespective of how they transit the adult ladders. Practically, Gary recommended focusing efforts on orifice detection and to delay development efforts on overflow detection pending a review of passage route monitoring to be conducted by the COE during 2000. The immediate goal supported by NMFS-Portland and the Action Agencies was to have all of the ladders at Bonneville Dam covered for 2002 when fish tagged with ISO tags start returning in statistically significant numbers. Installation of interrogation systems at additional dams will be planned by APTOC for 2003 and later.

The goal of this development project is to develop an ISO-based interrogation system that can be installed into any fish ladder of the FCRPS. PIT tag interrogation systems consist of antennas (coils of wires), antenna housings, and transceiver systems that decode the return signals and transmit tag codes to the computer. All three of these components must be developed to produce interrogation systems that will work in fish ladders. In addition, some new evaluation techniques must be developed to enable the community to evaluate the interrogation systems in this new environment. We anticipate that the development of the interrogation systems and evaluation techniques will go through three phases: Development Phase, Evaluation Phase, and an Implementation Phase. The work that has been completed this quarter and some that is planned for each phase is described below.

Development Phase

The development efforts will continue to focus on the interrogation of fish passing through weir orifices since the majority (anecdotal evidence suggests around 90%) of fish use them; however, some development work is being done on interrogating fish transiting the weir overflows.

Antenna systems—The design for the insert-only antenna housing has been refined during this quarter. Instead of the housing being composed of one piece, the NMFS-R&D team has recommended that the housing be split into two sections. The outer section would be a permanent frame onto which an internal section would be attached. The internal section would contain the antenna and the orifice. This design would make it much easier to replace the antenna section should this be necessary due to failure or technology advancements.

At this time, the different prototype transceiver systems require different antenna configurations within the housings. While our goal is to have all transceiver systems use a single antenna configuration, the two-piece housing design will allow the internal sections to be interchangeable in different weirs for tests conducted in 2000.

The COE's contractors have finished fabricating the physical hydraulic model that will be used to determine whether weir overflows can be modified to permit antennas wider than the thickness of the weir wall. Several weir overflow antenna-housing designs will be examined with the model this spring.

This past quarter, the COE also finished installing hardware for video cameras that will monitor the orifices and weir overflows in the Washington Shore Ladder. They will use this equipment to document actual numbers of fish using overflows and orifices.

Transceiver systems—To meet the 2002 goal of installing PIT tag

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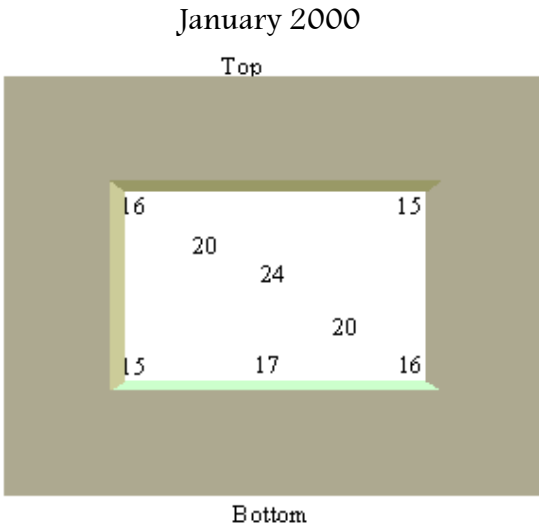
Adult Update (cont.)

interrogation systems for adult salmon in all fish ladders at Bonneville Dam, the NMFS-R&D team and BPA have taken a "spread the risk" approach and supported several development efforts simultaneously. The result is that, at the end of 1999, we have two promising transceiver systems. Destron Fearing (DF) is developing one system and the other is an "open architecture" system that separates the analog signal analysis module from the module responsible for processing codes and interfacing with data processing systems. In this open-architecture system, NMFS has contracted two engineering companies to design and build analog boards while NMFS is developing the interface module. NMFS identified some weaknesses on the RF Engineering board and so returned it for more work. NMFS received an excellent analog board from Patten Engineering (PE). Thus, at the end of 1999, we have both the DF-Adult and the PE/NMFS open-architecture systems.

The two promising prototype systems, DF-Adult and the PE/NMFS open-architecture systems, were further developed last fall and winter to improve their electronics and other features needed for reliable year-round operation at Columbia River Basin dams. For example, measurements made in January with the DF-Adult system showed 2-4 inch improvement on maximum read range values compared to those measured in August 1999 (Figure 1). In addition, during December and January preliminary tests were performed to determine the feasibility of combining the strengths of both systems. These tests were favorable, so NMFS and the two contractors are exploring the technical and legal hurdles that must be overcome for this "hybrid" system to be developed.

Figure 1. Below are presented maximum read-range values (the farthest distance a tag can be read at least once out of 100 consecutive tag transmissions) recorded with the prototype DF-Adult system connected to a 24" orifice antenna in January 2000. These measurements were taken at various positions throughout the orifice opening with a PIT tag oriented in the optimal 0° orientation. The read-range values are given in inches. DF is still working on this system, so these results should be looked at as a snapshot in their development curve.



In order to ensure that any transceiver system that is developed will meet the needs of the fisheries community, the NMFS-R&D team has written a draft requirements document for orifice transceivers. APTOC is currrently reviewing this document.

Evaluation Phase

Transceiver/Antenna Systems Testing—Extended-range PIT tag interrogation systems can only be tested to a limited extent in a laboratory setting; field evaluation tests are required to verify laboratory findings and to determine such things as the behavioral responses of fish to antenna systems, effects of field environmental conditions (*e.g.*, radio frequency noise), and reading efficiencies with fish. The Adult Fish Facility (AFF) exit ladder at Bonneville Dam is an ideal site for many of these evaluation tests because it provides good access to power and equipment, and can be dewatered throughout the year. The plan is to install more antenna housings in this ladder so that fish tests can be run simultaneously on multiple transceiver systems. Unfortunately, the AFF exit ladder normally contains the smallest sized orifices (18" x 18") located at FCRPS projects, which are significantly easier to read tags in than are 24" and 26" square orifices. Since the future interrogation systems will also need to work in 24" and 26" orifices, the NMFS-R&D team proposed to the Action Agencies (BPA and COE) and NMFS-Portland that the AFF's orifices be changed to 26" orifices for testing the transceivers. This way, the fisheries commu-

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Adult Update (cont.)

nity could be more confident that any transceivers that passed the evaluation tests scheduled for the summer of 2000 would work in all of the FCRPS fish ladders.

It is important to note that the 26" orifice internal sections will only be installed during the time needed to run the evaluation tests (current schedule blocks out 1-2 weeks in April and in August-September). Otherwise, the internal sections of the antenna housings will contain 18" orifice sections and flow through the ladder will be identical to what it is normally. At this time, NMFS-Portland and the COE engineers and biologists have given approval to proceed with fabricating the 26" orifice sections, but with one provision: They want to inspect the hydraulics within the ladder in March to affirm that it is acceptable – they are concerned about creating conditions that might encourage salmonids to hold up. The NMFS-R&D team also indicated to them that if the 26" orifices do cause problems during our tests, the 18" sections could be quickly re-installed (one day) without needing a complete ladder dewatering. If this situation occurs, then the 18" orifice sections would remain in place for the rest of the field season.

Antenna systems—All antenna systems are being evaluated using the same criteria: ease and cost of installation, water tightness, pressure effects on the housing, resistance to damage, fish response to the antenna housings, ability to read tags when attached to transceiver systems, and electronic stability. The antenna housings installed last January in Cascades Island Ladder were inspected in December 1999. The fiberglass housings had held up amazingly well, only a single nick (~0.25 inch) in the fiberglass gel-coat was apparent on one of the housings.

During 1999, the COE videotaped fish going through modified and unmodified orifices in Cascades Island Ladder and did not find any significant difference in the percentage of fish using the two types of orifices; nor did they document any fish species (*e.g.*, salmonids or lamprey) hesitating to use the modified orifice. To get their techniques down for their 2000 passage-route study, the COE did some simultaneous videotaping of fish transiting orifices and weir overflows this past fall. From this preliminary work, they got estimates of approximately 7% of salmon using the weir overflows. To help finalize the recommendation on the antenna housing design, in January 2000 NMFS replaced two antenna housings in Cascades Island Ladder with insert-only designs. Replacing two antenna housings and using the insert-only design makes it possible to test both prototype transceiver systems (DF-Adult and PE/NMFS) in this ladder. The transceiver systems will be connected periodically to test for electronic stability of the housings. Furthermore, the COE will concentrate its video work for Cascades Island Ladder in 2000 on comparing fish movement through the insert-only modified and unmodified orifices.

Transceiver systems—The results from the evaluation tests run during the summer of 1999 suggested that both PE/NMFS and DF-Adult systems should be able to read PIT-tagged fish in the orifices found in the fish ladders of the FCRPS. To confirm this conclusion and to start gathering more information on how well these systems will perform in fish ladders, some development tests are scheduled during spring 2000 using PIT-tagged spring chinook salmon. At this time, we do not know if these tests will include the "hybrid" transceiver. Luckily, the new two-piece antenna housing design will allow us to easily adapt the placement of the different antenna sections, depending on whether there are two or three transceiver systems being evaluated.

The spring development tests will include a fish test to get estimates of reading efficiencies for PIT-tagged adult spring chinook salmon transiting both 18" and 26" orifices. The tests will also include making read-range measurements within an EMI-shielded room in the laboratory and in the dewatered or dry ladder. The EMI-shielded room will allow measurements to be made where we know there is minimal ambient radio-frequency (RF) noise (*i.e.*, levels too weak to interfere with the performance of the transceivers). In-band noise can significantly impact read-range values. The problem is worse with the orifice application than with the bypass/collection facilities for juvenile salmon because we cannot shield these antennas and they are also larger and more sensitive to ambient RF noise.

RF noise was an intermittent problem in the AFF exit ladder during the tests last summer; however, new measurements made with both prototype transceiver systems in January 2000 did not detect any problematic levels. Unfortunately, an ambient RF situation can change at any time and it is complicated because noise from different sources that alone would not interfere with the transceivers can

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Diatribes From Dave: Suggestions for Reporting and Using PIT Tag Release Dates

When fish are released from a hatchery, acclimation site, or other large-volume containment location, it may require hours to fully evacuate a raceway, and days to evacuate a pond. Under extreme circumstances, such as the volitional release of fish from Rapid River Hatchery, the duration of possible egress (that is, the interval from when the hatchery personnel first open the outfall gates to when they finally sweep through the pond and chase out any stragglers) may approach a month. When hatchery managers report these general releases to their agencies and other interested parties, they specify the first and last date of release. When they report the release of any PIT-tagged fish in that general population, they must provide a single date and time of release.

In the last ten years, PIT tag data contributers have used their own discretion to compute and report this discrete value. For example, the release date and time for the Smolt Monitoring Program's volitional PIT tag releases at Rapid River was estimated from the median date of egress, as observed by hatchery personnel. As with all release date and times, date/time values for hatchery releases of PIT tags are reported with an implied precision of +/- 0.5 minutes. And, relative to the true release time of each individual tagged animal, this population value is inaccurate, to the tune of up to two weeks in the case of the aforementioned volitional release at Rapid River. (I'm not picking on Rapid River Hatchery or the Smolt Monitoring Program. The tag coordinator for the Rapid River group has explicitly noted the "calculation" of the release date/time value for most of the years fish have been marked there, and has always advised those PIT tag data users that care to ask of the unsuitability of those data for travel-time estimates from the hatchery).

The Problem

These extended PIT tag releases pose a danger to those who (mis)use the reported release date and time to calculate travel times for fish detected downstream, or to infer the presence or absence of these hatchery fish in the river system. Those researchers and analysts directly responsible for or familiar with hatchery PIT tag releases can determine whether those releases can be utilized for travel-time estimates, and with what precision. All other PTAGIS users should be considered to be "naive" regarding these hatchery operations, and dependent solely on the release information available to them through the database.

("Suggestions" continued on page10.)

Adult Update (cont.)

combine to create frequencies that do cause problems. We will continue to take ambient RF measurements in different fish ladders, but the fisheries community needs to recognize that these are just snapshots in time and that there will be times when ambient noise will affect the performance of the installed interrogation systems.

During this spring, APTOC will form a multi-agency evaluation team. This team will conduct a thorough evaluation of the prototype transceiver systems in late August-September with tagged adult fall chinook salmon and steelhead. The results will be used by APTOC to recommend to the Action Agencies what transceiver system will be used in the Washington Shore Fish Ladder tests scheduled for 2001. As indicated before, the late summer tests will cover electronic performance as well as evaluate the transceiver systems for ease of installation, reliability of operation and maintenance issues, diagnostic capabilities, and purchasing costs.

Implementation Phase

Antenna systems—Evaluation of antenna systems for orifices during 2000 should facilitate a final recommendation by APTOC on the antenna housing design for future installations.

Transceiver systems—Results from the late-summer 2000 evaluation should yield a transceiver system that the evaluation team can recommend to the APTOC. A decision in the September-October time frame should allow ample time for the manufacture of units needed for a full-ladder (Washington Shore Fish Ladder) study in 2001. □

Suggestions (cont.)

Here's a relatively common scenario I have personal experience with. A volitional hatchery release with tagged fish extends over a two-week period. The PIT tag release date is calculated from the observed median date of egress for the total pond population, and is assigned to the eighth day of the pond evacuation. It takes about a week for fish to move downstream from the hatchery to Lower Granite Dam. Two months after the release I get a call from somebody wanting to know why they're seeing "all these fish" with negative travel times. I determine that they're looking at interrogation data from the fish that exited the hatchery early in the volitional release, and moved directly downstream, arriving at Lower Granite before the "Release Date" calculated after the fact from the general population and reported to PTAGIS. They'll ask, "Then, what should I do with these negative values?" "Don't use them," I'll say, "and for that matter, don't calculate *any* travel times from this group." "Why not?" they ask. "Because each one may be up to a week longer or shorter than reported," I reply. Sometimes the caller follows my advice, and sometimes they "eyeball" the individual travel times and try to use the data that look "reasonable" to them.

Not everybody calls to question the data, thus missing out on unintentionally receiving my cautionary phone lecture. Most extended hatchery releases occur far enough upstream of an interrogation site and have a short enough release interval that most people never observe unexpected or anomalous behavior (like negative travel times) that would otherwise alert them to the imprecision of the reported release date/time value.

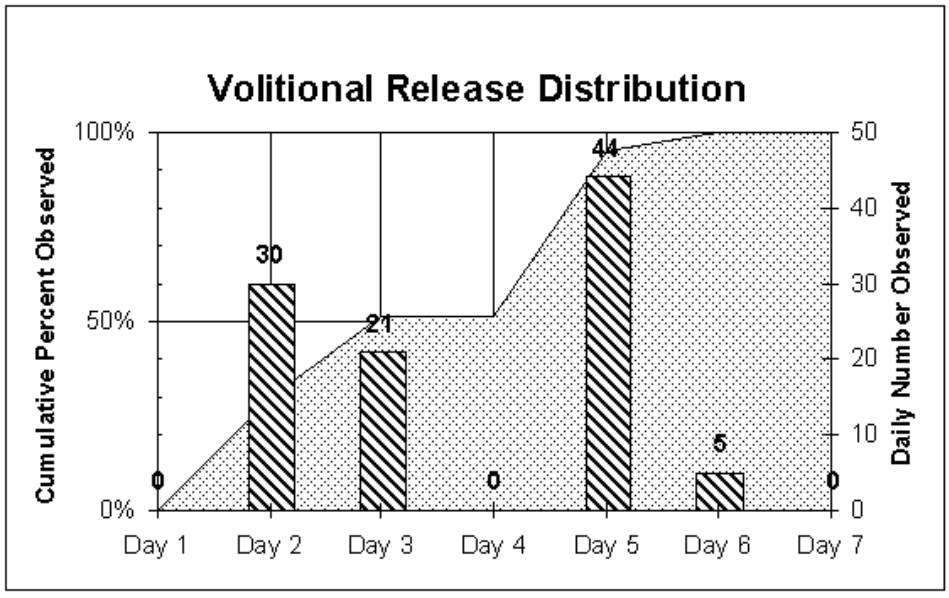
The Choices

Given the problems I've described with the use of a single date/time value to describe a mass release, the conscientious data contributor might ask "What's the 'best' date and time value to use to describe an extended release?" To attempt to answer this, I've devised a hypothetical release from a hypothetical hatchery pond. The release at this location occurs over a seven-day period, starting and ending exactly at midnight. We're fortunate, at this location, to have a PIT tag interrogation system that detects 100% of the 100 tagged fish in the general population as the fish exit the facility. Based on those interrogations, we are able to construct a highly-unlikely hypothetical histogram (shown below), after the fact. The graph bars show daily tag detection totals, while the area plot indicates cumulative detection through the week.

The minimum release date for the general population was Day One, but none of the PIT-tagged fish moved out until Day Two. The median point of release for the tagged fish occurred some time on Day Three; 50 fish moved out before this time, and the other 50 fish left the pond after this time. The mean of the release occurred at noon on Day Four, even though no tagged fish were detected that day. The mode of the release occurred on Day Five. This is the single date when the most tagged fish were detected as leaving the pond. The last tagged fish was detected on Day Six, although untagged fish may have been present in the pond right up to the end of the release operation at the stroke of midnight on Day Seven.

Let's assume that the tagging records for the 100 PIT-tagged fish are contained in a single Tag File. What Release Date and Time should the coordinator provide for this Release?

("Suggestions" continued on page11.)



Suggestions (cont.)

Is it:

A) Midnight at the start of Day One, when the release began?
B) The date and time on Day Two when the first PIT-tagged fish was detected leaving the pond?
C) The calculated median on Day Three between the detections of the 50th and 51st tagged fish?
D) Noon on Day Four, halfway through the interval of the general pond release?
E) Sometime on Day Five, the mode of the tagged population? (If the coordinator decides to use this date, s/he'll still have to decide whether to use a median, mean, or weighted mean time of passage for that date.)
F) The date and time on Day Six when the last PIT tag fish was detected leaving the pond?
G) Midnight at the end of Day Seven, when the release concluded?

What release date/time value should a tagging coordinator provide if s/he doesn't or can't record the exit date and time for 100% of the PIT tags in a hatchery release? In this case, s/he is limited to the known values of A and G above, and the mean, D, calculated from A and G.

The Solution

I suggest that all extended releases, hatchery or otherwise, should reference the same release date/time protocol, from the seven choices above. Four of those values require the ability to observe or estimate the movement of tagged fish (by means of tag interrogation or direct observation). These values can't be obtained in every release scenario. Of the seven choices, only the absolute minimum, mean, and maximum release date/time values can be measured for all releases. Using the minimum date/time value (A) for an extended release would guarantee that no one would calculate a negative travel-time for an otherwise valid downstream detection of a fish from this tagged population. On the other hand, using the maximum date/time (G) value might generate enough negative travel-times, especially for fish from a release spanning many days or weeks, and traveling a short distance downstream, to alert even the most naive user to the "anomalous" condition of this release. From these three choices, however, I think the best solution in this imperfect situation is to report the mean (average) date/time of release (D). In the absence of other data specific to the tagged fish in the release, we can reasonably assume that this value provides the best precision for the entire general population (and the tagged fish distributed within that population).

Regardless of the value used to describe a hatchery release, no user should calculate a travel-time, or infer the survival of the tagged animal at the time of release, without a subsequent independent interrogation event. Conversely, in the presence of precise date/time data, specifically one or more interrogations at the release site, the PIT tag data user can make confident and accurate measurements of viability at the time of release, and of travel-time to subsequent downstream locations. The new interrogation system at the Rapid River Hatchery outfall, and similar systems located at acclimation ponds in the Yakima River system, should detect most or all PIT-tagged fish exiting these locations in 2000. A valid travel-time estimate can be constructed for each of these fish with an interrogation at the release site and a subsequent release downstream. Travel-time estimates based solely on the reported release date/time, including the travel-time value provided by the PTAGIS database, should *not* be used for *any* extended release. I leave it to the individual PIT tag data user to determine for her- or himself the appropriate definition of an "extended release," be it 15 minutes or six weeks.

The Bottom Line

There are two important take-home messages here. First, PIT tag data contributors should strive to maintain the implied precision of data submitted to the PTAGIS database. In the case of date and time values, this means trying to record the time of release as accurately as possible, and reporting these releases as discrete events when known groups of tagged fish are continually released. For extended releases, the data contributor should report the mean release date/time value, and document this usage in the verbose notes of the Tag File.

The second message is for PIT tag data users. *Travel-time calculations are not to be used or trusted without independent corroboration of the veracity of the release date/time value!* My constant and trusty admonition is especially true in this situation: *Always confirm the validity and applicability of any PIT tag data with the original data contributor before performing any analysis.* In general, releases of fish tagged at a hatchery or other holding site, regardless if they are released from that site or directly into a river,

("Suggestions" continued on page12.)

Suggestions (cont.)

should not be used to calculate travel-time values, or infer viability at release, with but the coarsest of confidence.

In conclusion, use common sense when analysing these or any PIT tag data. Make inquiries of tag coordinators before using unknown data sets. Recognize and accommodate the potential for different levels of precision of estimates contained within the PTAGIS database. Learn to identify and delicately select the data that are applicable to your inquiry, rather than crashing blindly through the PTAGIS data warehouse. And if you want to obtain precise, accurate PIT tag travel-time estimates, use precise, accurate release date/time values. □

PIT Tag Workshop 2000

The year 2000 International PIT Tag Workshop was held January 11–14 at Skamania Lodge in Stevenson, Washington. Respondents to the participant survey commented on the excellent breadth of material offered from the Tagging Demonstration and tour of Bonneville Dam, to the presentation of the honey bee application. Respondents also learned much from the vendor exhibits and the opportunity to meet and talk to people working on similar types of projects.

The Columbia Basin PIT Tag Steering Committee and the PIT Tag Operations Center would like to thank all of the participants of the workshop. We especially want to thank the workshop sponsors, Destron Fearing and Biomark. We would also like to thank the other vendors, EZ-ID/Avid and Fish Eagle.

In addition, we wish to thank all of the presenters for sharing their research and knowledge with the user community. "Presentation Abstracts for the 2000 PIT Tag Workshop" are available on the PTAGIS web site at www.pittag.org/Software_and_Documentation. □

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