



PIT Tag Information System Columbia Basin

Newsletter

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The PTAGIS Newsletter is published periodically by Pacific States Marine Fisheries Commission.

We welcome input from the PTAGIS community, so email us at ptagis_newsletter@ptagis.org with your story ideas.

If you have questions regarding the contents of this publication, or about the PTAGIS program, please contact PTAGIS Staff.

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A Fisheries Data Project of the Pacific States Marine Fisheries Commission

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2015 PIT Tag Workshop Announced

NICOLE TANCRETO (PTAGIS Portland Office)

PTAGIS and the Pacific States Marine Fisheries Commission will be holding a PIT Tag Workshop at Skamania Lodge, **January 27-30, 2015**. Please mark your calendars and look for more information coming in the near future. The best way to ensure that you receive future information about the workshop is to subscribe to the PTAGIS newsletter: <http://www.ptagis.org/resources/subscribe>. We will be using this list to distribute all information about the workshop.

The PTAGIS team held several information sessions throughout the region in January and February of this year. The follow-up survey indicated that these sessions were well received, but there were many requests for more in-depth training on the new reporting system. We also periodically receive requests for training on PTAGIS tagging and interrogation software. The 2015 workshop will be an ideal venue to provide in-depth training, along with presentations from researchers using PIT tag technology.

If you are interested in attending the 2015 workshop, please take the time to complete this short survey about what you are interested in seeing at the workshop: <https://www.surveymonkey.com/s/2015workshop>

PIT Tag Steering Committee Update

JOHN TENNEY (PTAGIS Portland Office)

Brandon Chockley with the Fish Passage Center is the newest member of the PIT Tag Steering Committee. Brandon is responsible for overseeing the in-season implementation of the Smolt Monitoring Program (SMP), including the acquisition of PIT-tags for SMP marking. In addition, Brandon is responsible for forecasting and placing PIT-tag orders for the Comparative Survival Study (CSS) and coordinating CSS sort-by-code requests. He replaces Jack Tumoikoski who has moved on from the Basin. We appreciate Jack's service to the program and wish him the very best in his next endeavors. 🌀

PTAGIS Staff Update

JOHN TENNEY (PTAGIS Portland Office)

Tricia Ledegwood retired last month as a part-time administrative assistant to the PTAGIS team in Portland. She was instrumental in helping the program navigate a challenging transition to new technology and procedures. We wish her the very best in her next chapter and truly miss the energy, insight and sense of humor she brought to the team. 🌀

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Mark-Recapture-Mortality Data Model Evolution

NICOLE TANCRETO (PTAGIS Portland Office)

PTAGIS is developing the next generation tagging software, P4, which provides a good opportunity to review and potentially evolve the PTAGIS mark-recapture-mortality (MRR) data model. The PIT Tag Steering Committee (PTSC), working with PTAGIS, has developed some potential changes to the MRR data model and would like to invite the larger Columbia Basin PIT tag community to review and comment on these ideas. They are available to view in an online Excel workbook (you don't need Excel installed to view it), and discuss in the PTAGIS forums.

To view the workbook, follow this read-only link: <http://1drv.ms/1qobPf8>

There are two main worksheets:

MRR – Existing: lists fields, specifications, and suggested changes to the current data model

MRR – Proposed: lists new fields that have been proposed be added to the MRR data model

To comment on any of the proposed changes in these two worksheets, please use the following forums (you will need to be logged in to comment, but not to view):

MRR – Existing: <http://www.ptagis.org/community/forums/existing-mrr-fields>

To suggest a change to an existing field, add a new thread with that field name as its title (unless a thread already exists for that field). Then post your suggested changes in that thread.

MRR – Proposed: <http://www.ptagis.org/community/forums/proposed-mrr-fields>

To suggest a new field be added, add a new thread with the field name as its title and some details about why you feel it should be added to the PTAGIS data model and what data would be recorded in that field.

You may also contact a member of the steering committee to suggest changes or additions to the MRR data model, but we encourage you to use the forums as much as possible.

This initial comment period will be open until August 1, 2014. After which the PTSC will review and evaluate the suggestions and propose a first version evolution of the data model. 

New Bonneville Corner Collector (BCC) FS3001 Transceiver Hits Mark at Live Fish Test

DARREN CHASE (PTAGIS Kennewick Office)

The newly developed FS3001 transceiver exceeds the acceptance criteria during a live fish test performed in May of 2014.

The new transceiver was developed to replace the existing transceivers that were developed by Digital Angel in 2006. These transceivers have operated well over the years but began to show signs of deterioration, with that and advancements to detection technology the quest for a new transceiver began in 2012.

From 2012 until early 2014, Biomark developed the FS3001 transceiver.

Biomark had already begun development on a transceiver that was to be used for a possible OGEE PIT tag detection system. Some of that technology was used in development of the new FS3001. Through this development process several hurdles were overcome and milestones were achieved.

In February of 2014, the new transceiver was installed at BCC. The system was monitored through several web based tools, developed by PTAGIS, while the channel was not in operation. The Automated Read Range Tester (ARRT) tag was used to evaluate the detection performance during the period when there was no water flowing through the channel. Once the channel began operation PTAGIS was able to evaluate the run of the river PIT tags that were passing through the transceiver as well as ARRT. These two things indicated that the transceiver was performing well above the existing system and was ready to be tested using a live fish test.

NOAA fisheries performed a live fish test in May of 2014. This test was performed in a similar manner as the previous year's testing and lasted for a period of two days. Initial results showed an increase in detection efficiency that not only met but exceeded the acceptance criteria. NOAA fisheries will be providing a detailed report of the results at a later date.

The transceiver has continued to show great stability throughout the season and the changing environment while maintaining high detections per tag on the run of the river PIT tags that continue to migrate down the channel. PSMFC is currently awaiting the arrival of the second transceiver so we can begin lab testing in Kennewick. 🌀



Thin Body PIT Tag Antennas Successfully Deployed at Lower Goose Dam (GOA) and Lower Monumental Dam (LMA)

SCOTT LIVINGSTON (PTAGIS Kennewick Office)

The Little Goose adult ladder and Lower Monumental Ladders north and south are now equipped with thin body ferrite tile PIT tag antennas. These antennas are located within the confines of the ladder counting windows. They are effectively of the same antenna style and concept that was successfully installed at The Dalles Dam in 2013. The goal of these antennas is a detection rate of near 100% and an uptime of 100%. All antenna systems were fully operational prior to the ladders water up date.

The success of both projects was due to a cooperative effort between the U.S. Army Corps of Engineers (USACE) Walla Walla District, Pacific States Marine Fisheries Commission (PSMFC) PTAGIS O&M and Biomark Inc. Biomark Inc. was contracted by the USACE to design, build and install the antennas in three counting window locations.

Little Goose (GOA) “Year to Date” Detection Efficiencies

As indicated, the newly installed PIT tag antennas are performing as expected with overall detection efficiencies of 99.85%.

GOA Project Installation Summary

Funding for this project was sufficient enough to contract out all electrical infrastructure, fiber optic communications cables and terminations. PTAGIS O&M technicians provided quality assurance assistance throughout

the antenna installation along with QA inspections during the electrical and communication installation phase. PTAGIS technicians were also tasked with the installation of the transceivers, final testing and establishing communications to the PIT tag data collection platform.

The photo below shows the upstream and downstream counting window antennas, final product just prior to water up. The installation was somewhat unique. Due to structural complications and other factors, a fiberglass box, or receiver was constructed, then inserted into the counting window area. The antennas were then inserted into each end and fastened into place.

PIT Tag Detection Efficiency at Little Goose				
99.85% Little Goose Dam has detected 2,017 of the 2,020 PIT tags detected at both Ice Harbor & Lower Granite Dams.				
Data Detail				
PIT Tag Detections in the Fish Ladders since March 28, 2014				
This data was last updated May 30, 2014				
ROW	Individual Dam Numbers	Ice Harbor Ladders & Juveniles ICH	Little Goose Ladders (GOA)	Lower Granite Ladders (GRA)
1		Unique PIT Tags Detected: 28,531	Unique PIT Tags Detected: 2,279	Unique PIT Tags Detected: 4,648
2	Two Dam Comparisons	Unique PIT Tags detected at both Ice Harbor & Little Goose Dams: 2,169		Unique PIT Tags detected at both Little Goose & Lower Granite Dams: 2,088
		Unique PIT Tags detected at both Ice Harbor & Lower Granite Dams: 2,020		
3	Three Dam Comparison	Unique PIT Tags detected at all three dams: Ice Harbor, Little Goose & Lower Granite Dams: 2,017		

Thin Body PIT Tag Antennas Successfully Deployed at Lower Goose Dam (GOA) and Lower Monumental Dam (LMA)

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GOA Projects current operational status

The GOA detection site has been collecting data since the ladder watered up in late February of 2014. This data is being transmitted “real time” from the transceivers to the data collection platform and then uploaded to PTAGIS at a pre-determined upload interval. This allows PTAGIS personnel to monitor the health of the system and respond without delay to technical issues that may arise. The system is complete and fully operational with no outstanding technical issues.



Downstream ladder antenna. ID. 02



Upstream ladder antenna. ID. 01

(LMA) North and South Ladder “Year to Date” Detection Efficiencies

As indicated below, the newly installed PIT tag antennas are performing as expected with overall detection efficiencies of 99.46 %.

LMA Project Installation Summary

Biomark Inc. was contracted by the USACE to design, build and install the antennas in both north and south locations. PTAGIS technicians provided quality assurance assistance throughout both installations. PTAGIS technicians were also tasked with the installation of electrical conduits, transceiver enclosures, transceiver installation and final testing.

PIT Tag Detection Efficiency at Lower Monumental				
99.46%				
LoMo Dam has detected 2,009 of the 2,020 PIT tags detected at both Ice Harbor & Lower Granite Dams.				
Data Detail				
PIT Tag Detections in the Fish Ladders since March 28, 2014				
This data was last updated May 30, 2014				
ROW	Individual Dam Numbers	Ice Harbor Ladders & Juveniles (ICH)	Lower Monumental Ladders (LMA)	Lower Granite Ladder (GRA)
1		Unique PIT Tags Detected: 28,531	Unique PIT Tags Detected: 2,290	Unique PIT Tags Detected: 4,648
2	Two Dam Comparisons	Unique PIT Tags detected at both Ice Harbor & Lower Monumental Dams: 2,202		Unique PIT Tags detected at both Lower Monumental & Lower Granite Dams: 2,036
		Unique PIT Tags detected at both Ice Harbor & Lower Granite Dams: 2,020		
3	Three Dam Comparison	Unique PIT Tags detected at Ice Harbor, Lower Monumental & Lower Granite Dams: 2,009		

Thin Body PIT Tag Antennas Successfully Deployed at Lower Goose Dam (GOA) and Lower Monumental Dam (LMA)

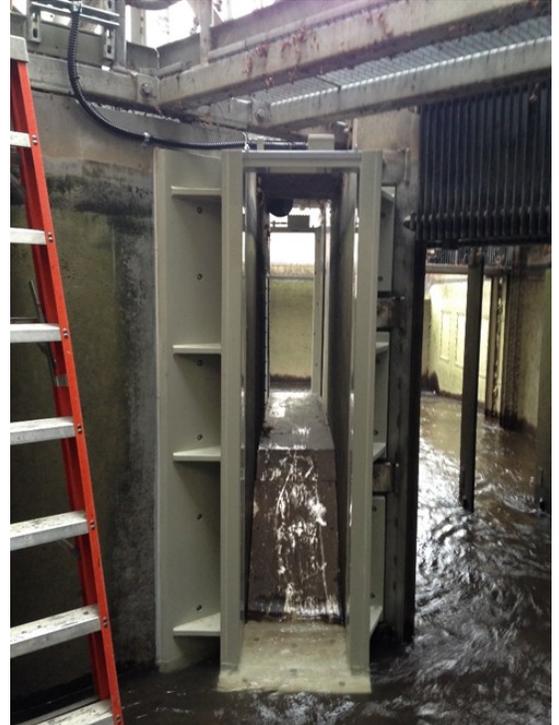
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North ladder installation

The photos show the north ladder final product just prior to water up. Note: one antenna is placed upstream of the counting window and one downstream of the counting window.



North Ladder downstream antenna. ID.



North Ladder Upstream antenna. ID. 03

South ladder installation

The photos show the south ladder final product just prior to water up. Note: Both antennas are placed downstream of the counting window, unlike the north installation. The modification of the existing infrastructure upstream of the counting window was deemed be cost prohibitive to install an antenna in that location.



South Ladder downstream antenna. ID. 02



South Ladder Upstream antenna. ID. 01

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Thin Body PIT Tag Antennas Successfully Deployed at Lower Goose Dam (GOA) and Lower Monumental Dam (LMA)

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LMA Projects current operational status

Currently, the PIT tag detection systems north and south are operational and collecting data. Unfortunately at this time, the communications infrastructure, (e.g., fiber optic cable) has not been installed at either the north or south detection points that would allow “real time” automated data processing to occur. This data can only be stored locally to the transceivers internal memory. Collection of the stored data is manually retrieved once per week by PTAGIS technicians during their routine maintenance checks of the facility. This data is then manually submitted to the PTAGIS database for processing.

It should be noted that each of the transceivers clocks drift over time. Each transceiver drifts at a different rate. Due to the antennas proximity to each other, fish can ascend the ladder very quickly. The clock drift can create timestamps for interrogations that erroneously show the fish appearing to have been descending rather than ascending the ladder. The transceiver clocks are set to within one second of atomic time during buffer downloading.

The lack of “real time” processing also precludes PTAGIS Field Operations technicians from being able to monitor the health of the system between buffer downloads.

Per the USACE project managers, funding for the installation of the fiber optic cable has not been secured. Hopefully the funding will become available in late summer of 2014 at which time PTAGIS personnel will facilitate the final connection back to the PIT tag room located within the Juvenile Fish Facility.

PTAGIS personnel will continue current operations until this issue has been resolved. ☺

Tag Mask Validation History and Changes

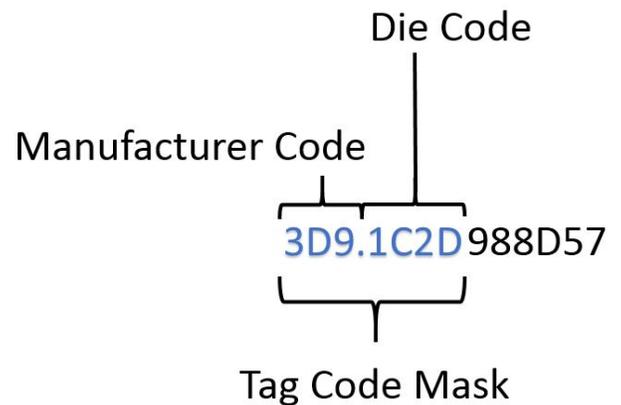
NICOLE TANCRETO (PTAGIS Portland Office)

Tag mask validation will be implemented during the summer of 2014 which will affect existing mark, recapture and mortality records in PTAGIS, as well as, future data submissions. An email was sent to all tag data coordinators with existing data that will be affected by this change. If you missed the email, or would like to see if any existing data will be affected, please view the [Summary of Mark Records with Unknown Tag Masks report](#).

Many of these records appear to be the result of misreads or transcription errors. If any records for which you are responsible are the result of real tag codes, please contact Nicole Tancreto by June 30, 2014.

History of Tag Code Validation

Tag code validation was originally handled in the PTAGIS field software programs P3 and Minimon. Both of these programs checked each tag code against a list of known manufacturer codes – the first 3 characters of a PIT tag code. If the manufacturer's code of the tag code being read did not match the list, it was rejected. In P3, the rejection was signaled by a pop-up error that would not allow the PIT tag to be entered into a detail record. In Minimon the rejection was silent and the detection of the non-matching tag went into the log file instead of the data file.



When the Bonneville corner collector interrogation site (BCC) came online, the size of the antenna and complexity of the transceiver caused spurious tag readings to be generated. In order to prevent these phantom tags from going into PTAGIS, a special version of Minimon was created that validated tags detected at BCC against a known list of tag code masks. These masks included the manufacturer code and the die code – the first four characters after the period.

Current PIT Tag Code Mask Validation

The validation on tag code mask was removed from both P3 and Minimon in 2012 because of the following factors:

- More efficient to maintain list of known tag masks on server and perform validation there
- PTSC did not want to prevent data from being collected even if unknown tags were being used

When PTAGIS moved its primary interrogation platform from Minimon to M4, tag code mask validation was implemented on the server for *all interrogation data*. This validation process compares all PIT tag codes submitted via M4 or Minimon files against three lists: registered test tags, registered timer tags, and known tag code masks.

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Tag Mask Validation History and Changes

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If the PIT tag is a registered test tag or timer tag, that detection record is categorized appropriately. If the tag code does not match the known tag code mask list, that detection record is loaded into the database and categorized as an unknown tag record type. If a tag code does match the tag code mask, it is categorized as a real time tag. Only observation records with real time tags are available through the reporting system. See *Figure 1* for a simplified flow chart of PIT tag code mask validation steps.

If you do not receive tags through the BPA Fish and Wildlife program, you should check that your tags are included in the tag mask validation codes: [List of known tag code masks](#). If they are not on the list, you will need to request a new tag mask validation code through the PIT Tag Steering Committee.

Once a tag code mask is approved by the PTSC and added to the validation codes master list, any tags with that mask that may have already been uploaded will be moved from the Unknown tag category and will become available in Query Builder 2.

Future Tag Code Mask Validation

During the summer of 2014 tag code mask validation will be implemented for all mark, recapture and recovery data submitted to PTAGIS. PIT tag codes will be compared against the [list of known tag code masks](#) and marked Unknown if they do not match. Tags that are categorized as Unknown will not be available through the Quick Reports, Query Builder 2, or most Standard Reports. There will be a QA/QC report available for data contributors to review data submitted with unknown tags.

The list of known tag masks will be managed by PTAGIS and the PTSC like all of the other validation codes that PTAGIS uses. To add a new tag mask validation code, users will need to work with a member of the steering committee to request that it be added. We are working on creating a web application to streamline this process. 

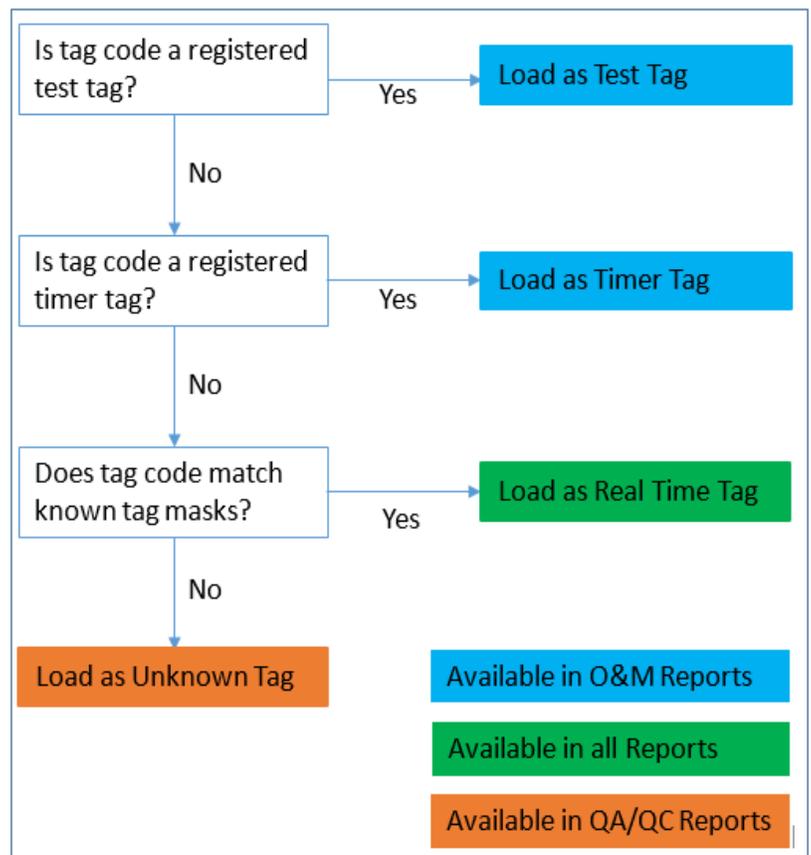


Figure 1. Flowchart for validating PIT tag codes in data submitted to PTAGIS.

Annual PTSC Meeting

NICOLE TANCRETO (PTAGIS Portland Office)

Annual PTSC Meeting

The annual PIT Tag Steering Committee meeting was held on January 16, 2014. Topics of discussion included:

- Overview of PTAGIS accomplishments in 2013
- Mainstem interrogation transceiver redundancy
- Development of P4 and review of mark data model
- Tag mask validation
- [Data use policy](#)
- 2015 PIT Tag Workshop planning
- Marking Procedures Manual revision

Meeting notes are available here: <http://www.ptagis.org/docs/default-source/meeting-notes/2014-january-ptsc-meeting.pdf?sfvrsn=6>

The revised Marking Procedures Manual can be downloaded here: <http://www.ptagis.org/docs/default-source/ptagis-program-documents/2014-mark-procedures-manual.pdf?sfvrsn=2> 

PTAGIS Data Processing and Reporting Enhancements

CRAIG WHITE (PTAGIS Portland Office)

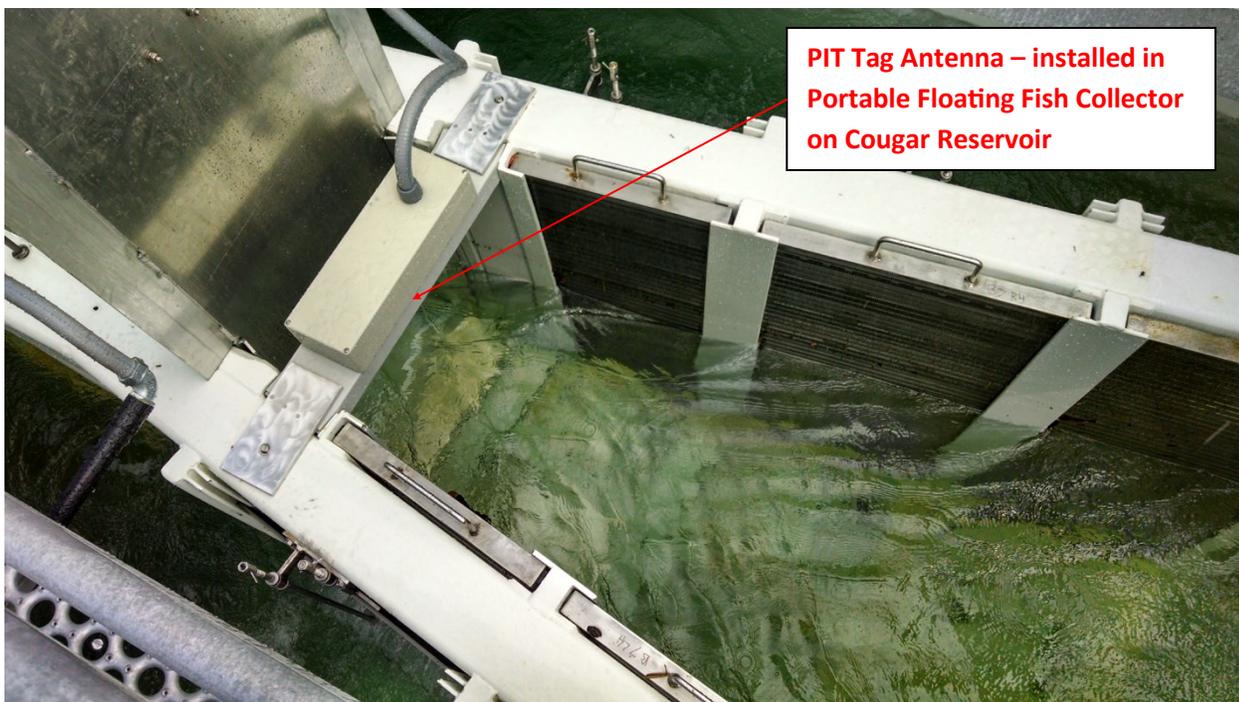
PTAGIS has enhanced the processes used to validate and load both Tagging and Interrogation files. These processes will provide data submitters more detailed information to help identify any detected errors or anomalies encountered while loading the data into the PTAGIS Database. These processes also provide more detailed logging information that is available in the QA/QC reports.

PTAGIS has also added new event time attributes to most of the Query Builder2 reports. These new attributes provide the date and time of MRR (mark/recapture/recovery) events to the second and were requested by many researchers. Look for attributes with the word 'Time' in the name (e.g. Mark Time, Release Time). 

PIT Tag Antenna Installed at Cougar Reservoir Portable Floating Fish Collector (PFFC)

N. PHIL PETERSON AND KYLE MEIER (West Fork Environmental)
DAVID GRIFFITH, Fish Biologist (US Army Corps of Engineers, Portland District)

The U.S Army Corps of Engineers, Portland District, began operating a new experimental fish collector at Cougar Reservoir in May 2014 with the goal of attracting and collecting juvenile salmon as part of a research program investigating downstream passage issues at the dam. Past observations by biologists determined juvenile fish had difficulty passing the temperature tower because it was not designed for fish passage. The PFFC was designed by engineering firm HDR to be positioned near the temperature tower with an adjustable attraction flow of 50 ->100 ft³/sec. Careful attention to the mooring and anchoring of the structure in a reservoir where the water can fluctuate up to 180-feet annually was required. A PIT tag antenna was designed and installed by West Fork Environmental with the goal of monitoring the collection of fish and provide information on the timing of collection. Groups of tagged fish will be released to estimate the combination of reservoir survival and trap collection efficiency. The PIT tag study is one of several related research efforts to evaluate surface passage at Cougar Dam.



Design and construction of the thin-bodied ferrite shielded antenna, constructed of high density polyurethane, was technical due to complex geometry of the steel walls of the PIT tag antenna slot located at the tail end of the collector portion of the structure. West Fork designed and installed the antenna, coordinated with HDR engineers, and adapted the design of the antenna as the collection facility plans progressed. The PIT tag antenna was designed to fit into a slot with opposing and uneven angles and that was constructed entirely of mild steel. The final antenna spans measured 2-inches thick by 6-inches wide and included specifications for sloped sides with several notches engineered into the antenna housing so that it could remain fully recessed within the available slot dimensions without disrupting hydraulics of the collector throat.

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PIT Tag Antenna Installed at Cougar Reservoir Portable Floating Fish Collector (PFFC)

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The antenna is powered by a IS1001-ACN controlled through an IS1001-MC. The high noise environment generated from the operation of pumps presented another challenge in designing this particular antenna and was in part addressed with ferrite shielding on three sides of the coil. Data acquired from the PIT tag system on the Cougar Reservoir will be manually downloaded.



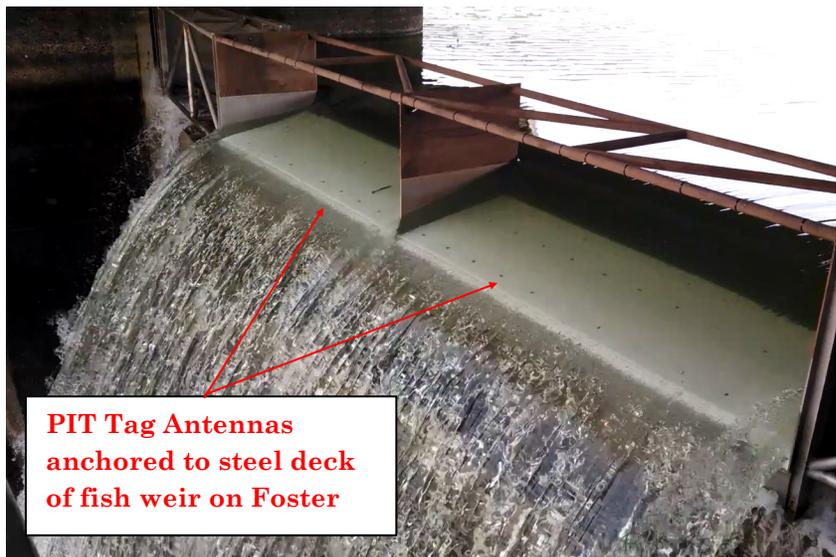
The PIT tag antenna, designed to easily remove from its slot, can be used to detect the effectiveness of the structure at collecting juvenile salmonids at other sites. The complex geometry presented in this particular setting, and the capacity to design and install a thin-bodied ferrite shielded antenna to these specifications shows that a good deal of flexibility is possible in fitting these kinds of antennas to various engineered structures. www.westforkenv.com 

New Foster Dam PIT Tag Antenna Complete

**N. PHIL PETERSON AND KYLE MEIER (West Fork Environmental)
FENTON KHAN, Fish Biologist (US Army Corps of Engineers, Portland District)**

Foster Dam on the South Fork Santiam River was outfitted 30 years ago with a spillway weir as a surface outlet for downstream migrating fish passage. The weir sits on top of stop logs inserted into a spill bay gate opening. The stop logs are used to regulate pool elevation and the weir provides a surface passage alternative for fish that has more benign hydraulic conditions than passage through either the turbines or open undershot spillway gates. The modified fish weir opening measures 22-feet in total width, 11-feet on either side of the center wall. Velocities across the weir increase from 11 fps on the leading edge to 37 fps at the trailing edge. In 2013 the USACE, Portland District, documented out migrating juvenile fish moved through the modified fish weir throughout the year. However, until recently there has been no way to characterize movement patterns and provide detailed movement data of PIT tagged fish over the weir. In May 2014, a new PIT tag antenna, designed and installed by West Fork Environmental, began detecting PIT tagged fish moving over the weir. For the first time in 30 years fisheries managers are now able to collect detailed data to characterize the timing, number and life stage of winter steelhead, rainbow trout, and spring Chinook salmon moving downstream over the Foster Dam fish weir.

The all mild steel structure of the weir and stop logs and the need to maintain the existing hydraulic conditions over the weir constrained design and construction options. Material choice was constrained by the requirement for a smooth, abrasion resistant weldable thermoplastic readily available in thick large sheets. Two 11-foot by 42-inch antennas were constructed using a jacket of Ultra-high-molecular-weight polyethylene (UHMW-PE) with a core material holding both the ferrite shielding and



Litz wire coils. The overall thickness of the antennas was limited to 2.5-inches. Each antenna weighs in at over 520 pounds. The antennas were positioned on the fish weir after it had been removed from the spillway by a crane and moved to a nearby work site. The antennas are each anchored to the mild steel weir deck by multiple stainless steel fasteners. Each component of the installation is mounted within the outside dimensions of the weir limiting the potential for damage to the components during reservoir elevation changes when the crane is used to reposition the weir and stop logs. The antennas are driven by IS1001-ACN's and controlled by an IS1001-MC MTS. The installation and initial tests of this PIT tag antenna at Foster Dam proves there is great promise for thin body ferrite shielded antennas even at sites with technical challenges that include entirely mild steel structural components and high noise levels. Initial tests showed that tags are consistently being detected in 24-inch deep water moving at 11-37 ft. /sec. 🌀

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A General Community Forum for PIT Technology

JOHN TENNEY (PTAGIS Portland Office)

A new forum titled *PIT TECHNOLOGY AND APPLICATIONS* (<http://www.ptagis.org/community/forums>) was recently added to the PTAGIS website to allow vendors and researchers to share general information such as:

- Availability of new technology and firmware upgrades for use in the Basin
- Clarification or comparison of technologies
- Discussions related to antenna design
- Innovation and lessons learned from field installations

The new forum has the typical requirements of the other forums in that a PTAGIS account is required to post but anyone can read the threads. Postings can have attachments such as PDFs and images and include hyperlinks to additional information on other websites. Account holders can subscribe to a thread to be notified by email when new posts are added.

A few disclaimers regarding this forum:

- Please contact a vendor directly for any technical support requests
- The discussion of any new or existing technology should not imply it is endorsed or supported by PTAGIS or PSMFC
- The forum is created on a trial basis for the benefit of our community and we will do our best to monitor it for misuse
- All content, information and opinions presented in this or any other PTAGIS forum are those of the authors of the posts and not necessarily PTAGIS/PSMFC staff
- We reserve the right to delete any posts considered inflammatory or inappropriate (play nice people)
- We may consolidate, partition or eliminate some forums in the future based upon usage and applicability to the community ☺