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.

Contributors for this issue include:

ROGER CLARK
rclark@psmfc.org

SCOTT LIVINGSTON
slivingston@psmfc.org

JENNIFER LUNDY
jlundy@psmfc.org

TIFFANI MARSH
tiffani.marsh@noaa.gov

NICOLE TANCRETO
ntancreto@psmfc.org

JOHN TENNEY
jtenney@psmfc.org

DON WARF
dlwarf@psmfc.org

DANIEL WILSON
dwilson@psmfc.org

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Update on the Removal of the FDX Ban for Lamprey Tagging

TIFFANI MARSH (PIT Tag Steering Committee)

At the 2015 annual PTSC meeting, BPA formally requested the ban on using FDX tags in lamprey research be lifted. This ban had been in place since lamprey researchers first approached the PIT Tag Steering Committee (PTSC) about using PIT tags (August 2003). The ban was imposed over concerns that an adult lamprey might attach itself close to, or on, one of the orifice antennas in a fish ladder. Such behavior could render the antenna unable to detect passing salmonids due to tag collisions (which occurs when two or more tags are in the field at the same time), and/or by filling the buffer of the transceiver with detections, making it unable to load salmonid detection data. Based on new information and technology, the ban was lifted. For a more detailed explanation of the history of PIT tag use with lamprey, and the discussion that resulted in the ban being lifted, please see the February 2015 PTAGIS newsletter article "Removal of FDX ban for lamprey tagging".

The February 2015 article requested the community provide feedback to the PTSC if there were concerns with the decision, and through April 2017 none was received. The purpose of this article is to discuss an interference event that occurred in May 2017.

What occurred

In May 2017, the PTAGIS O&M staff noticed a complete loss of timer tag detections at Prosser Dam's right (south) ladder. This ladder, similar to the other two ladders at Prosser Dam, is monitored by two antennas at the counting window. During their search for the cause of the loss, the O&M staff found that several FDX tags seemed to be stuck in the detection fields of both antennas. A search of the PTAGIS database revealed the tags were from a group of 150 adult lamprey the Yakama Nation had marked with FDX tags and released below the ladder as part of a passage study. It was theorized the lamprey had attached somewhere near the two antennas, possibly in an area from which they couldn't escape.

BOR operators, working with the Yakama Nation and PTAGIS discovered, and removed, four PIT-tagged lamprey attached to the underside of the counting window passage area. The fish had passed into the area behind the picketed leads and couldn't escape due to a debris blockage. Because of their proximity to the counting window antennas, the four fish were being continuously read, resulting in the failure to detect the timer tags and, potentially, any other fish marked with a FDX tag.

The O&M staff requested a meeting with the PTSC to discuss the event. During a 14 July conference call, the O&M staff detailed what happened, the effect, and what was being done, from an infrastructure standpoint, in an attempt to prevent a repeat of the situation.

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Update on the Removal of the FDX Ban for Lamprey Tagging

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Outcome of the conference call

Several possible actions were discussed. The most drastic action, re-instating of the ban on FDX tagging of lamprey, was mentioned but felt to be too drastic. Ultimately, three actions were discussed.

1. Treat this as an isolated incident and continue operations as they are. Publish a newsletter article to inform PTAGIS users of this possibility and again request feedback from data stewards concerned with possible negative interactions between their interrogation systems and FDX-tagged lamprey.
2. Block access to the underside of the counting window channels. This action was taken by the Yakama Nation using a plastic mesh product called Vexar, but it appears that it has not adhered well. Perforated sheet metal may be needed for a long term solution.

   If successful at Prosser Dam, this solution may be needed at other counting window antennas in the basin. The counting window antennas at several other dams (McNary Oregon shore ladder, Lower Monumental south ladder, and Little Goose ladder) are constructed in the same fashion as Prosser Dam's ladders, with an open frame support system rather than a concrete channel. To-date, no problems have been encountered at any of these other sites. If other antenna types are affected by unexpected lamprey attachments, this or other solutions will need to be found.
3. While there was no support for the re-instatement of the FDX ban, the PTSC felt it would be negligent not to test the dual FDX/HDX capabilities of the transceivers. The site chosen for this test was The Dalles Dam (both TD1 and TD2) during the 2017 fall Chinook return (after consulting with FPAC, dual-mode testing began on 29 August at TD1 and TD2 and is continuing).

Coordination

Multiple adult ladder sites have only two antennas and are very susceptible to being shut down if a single FDX tag gets lodged within range of the antennas. The tag could be a bare tag (shed or from a predator) or in a tagged fish. The behavior of some fish increases the likelihood of the fish spending more time within range of an antenna. The event at Prosser should be a reminder of the need for everyone to be aware of all possible effects of their research and to coordinate research activities to lessen impacts for all users. For example, the removal of debris (if possible) around the picketed leads, an area known to be used by lamprey, prior to release of a large number of lamprey may have prevented the interference event.

PTAGIS Interrogation File Formatter

DANIEL WILSON (PTAGIS PORTLAND OFFICE)

PTAGIS is pleased to announce the release of a new version of the PTAGIS Interrogation File Formatter (PIFF) utility. PIFF v2.2 can be used to export Observation data from one or more device data files into an M4 Interrogation File, as well as submit M4 Interrogation Files to PTAGIS.

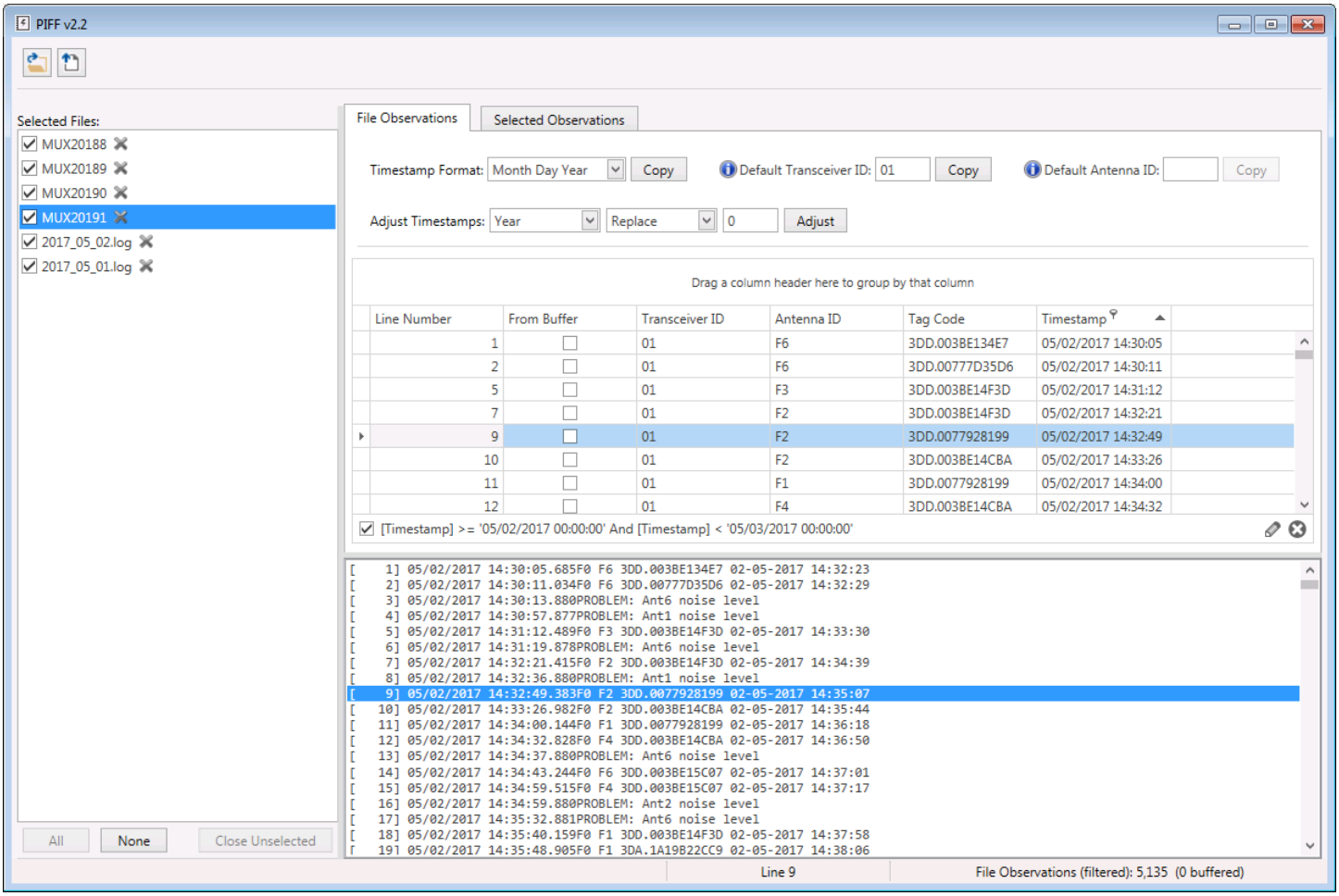

Figure 1. Display of observations and related content for selected file in PIFF

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PTAGIS Interrogation File Formatter

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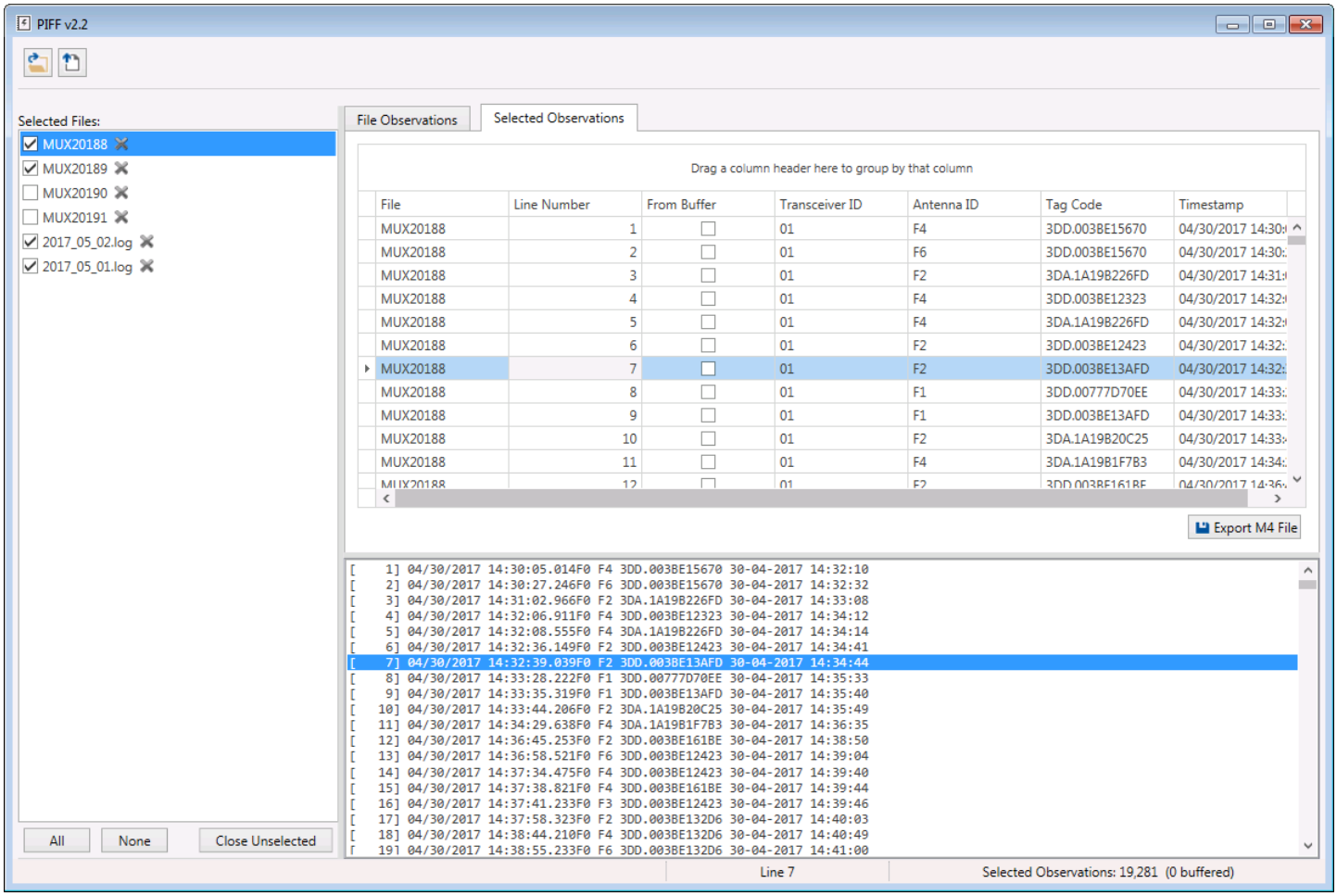

Figure 2. Selected observation records from files to be exported from PIFF

New features include:

- A streamlined user interface
  - The contents of raw data files are displayed along with the parsed Observation records
  - Selecting an Observation record will highlight where the data was found in the file
  - Observation records can be filtered per file, and files can be opened, closed and selected for export
  - No longer need to select the device type before opening files
- Easily adjust timestamps in a file and modify file parsing options
- Submit M4 Interrogation files to PTAGIS
- Automatic software updates

PIFF runs on the latest Windows PCs and can be downloaded from the PTAGIS website: https://www.ptagis.org/software/piff-2

Changes to Complete Tag History Reports

NICOLE TANCRETO (PTAGIS PORTLAND OFFICE)

Summary

As part of ongoing upgrades to PTAGIS related to the release of P4 and implementation of the MRR data model, the Complete Tag History Quick Report and Query Builder 2 Report changed how the Tag/Event values from P3/P4 files are mapped for the following attributes: *Event Date*, *Event Site* and *Event Site RKM*. The Release Site and Date values will be mapped to new attributes called *Event Release Date*, *Event Release Site* and *Event Release Site RKM.* These changes were implemented on September 7, 2017.

If you use Complete Tag History (either the Quick Report or the Query Builder 2 report) please review the information in this article about how *Event Date*, *Event Site*, and *Event Site RKM* used to be mapped to the tagging files, and how the mapping has now changed. These changes could change the results of Query Builder 2 reports where filtering is performed on those attributes.

Background

The Complete Tag History report was developed in 2012 and returns one row per data collection event per tag. For those events (Mark and Recapture) where it is possible to report two dates and two sites, we chose to use one date and one site that would best represent that event instead of reporting both the Tag Date and Release Date. We called these attributes *Event Date* and *Event Site* and mapped them to the *Release Date* and *Release Site* values from P3 files for several reasons:

1. Data contributors can use *Virtual Release Times* (VRTs) in P3 files to report multiple *Release Dates* in one file, but not multiple *Tag Dates*. In those files where VRTs are used, the *Release Date* is the most representative date for that event, and the *Tag Date* may not be accurate for all records in the file.
2. If the *Release Date* value is mapped to *Event Date* attribute in the Complete Tag History report, it made the most sense to also map *Release Site* and *Release RKM* values to the *Event Site* and *Event Site RKM* attributes respectively.

Issue

The more explicitly event-based MRR data model implemented with P4 replaced the *Tag Date* and *Tag Site* fields in P3 files with *Event Date* and *Event Site* fields to better reflect the different types of data collection events recorded in PTAGIS. However, these terms were already in use as attributes in the Complete Tag History report, and were mapped to Release information instead of Event information.

The *Event Date* and *Event Site* attributes mapped to Release information worked well for P3 files where both the *Tag Date* and *Tag Site* were the same as the *Release Date* and *Release Site*, or where VRTs were used. However, where the *Tag Date* and/or *Tag Site* were different from the *Release Date/Release Site* values, the single Event date and site was ambiguous and potentially confusing.

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Changes to Complete Tag History Reports

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To address both of these issues, the data source for Complete Tag History reporting (both the Quick Report and the Query Builder 2 report) was updated to display two possible dates and sites for each event record: *Event Date/Event Site* and *Event Release Date/Event Release Site*.

Details

On September 7, 2017, the Event Date and Site attributes were changed to report the Tag Date and Tag Site values from P3 files and the Event Date and Event Site values from P4 files. In addition, new attributes were added to report the Release Date and Site values from both files

Previous Event Attributes	P3 Field	P4 Field
Event Date/Time	Release Date (for Recovery events, Tag Date was used if Release Date was Null)	Release Date (for Recovery events, Event Date was used was Release Date is Null)
Event Site	Release Site	Release Site
Event Site RKM	Release Site RKM	RKM Mask of Release site + RKM Ext, if populated

Table 1. P3 and P4 source fields for Event Date and Event Site attributes before September 7, 2017.

New Event Attributes	P3 Field	P4 Field
Event Date/Time	Tag Date (for Recovery events, Release Date is used if it is populated)	Event Date
Event Site	Tag Site (for Recovery Events, Release Site is used if it is populated	Event Site
Event Site RKM	RKM Mask of the Tag Site (for Recovery events, Release RKM is used if populated)	RKM Mask of Event Site
Event Release Date/Time	Release Date (null for Recovery and Observation events)	Release Date (null for Recovery and Observation events)
Event Release Site	Release Site (null for Recovery and Observation events)	Release Site (null for Recovery and Observation events)
Event Release Site RKM	Release Site RKM	RKM Mask of Release site + RKM Ext, if populated

Table 2. P3 and P4 source fields for Event and Event Release attributes after September 7, 2017.

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Changes to Complete Tag History Reports

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This clip from a complete tag history query builder report shows events for tag code 3D9.1C2C814CE0. You can see the Event Date attribute now reports the Tag Date from the source P3 file, while the Event Release Date attributes reports the Release Date.

Event Type	Event Date	Event Site Code	Event Release Date	Event Release Site Code	Event File Metrics	CTH Count
Mark	2/26/2008	HAGE	5/5/2008	SAWTRP	BDL08057.H21	1
Observation	5/20/2008	LMJ			LMJ08141.101	8
Observation	5/20/2008	LMJ			LMJ08141.105	2
Recapture	4/1/2008	LMN	5/21/2008	LMNBYP	AFE08092.001	1
Recovery	9/22/2012	FOUNDI			APD12266.PTM	1

Table 3. Example from complete tag history report for tag code 3D9.1C2C814CE0.

These changes were made with careful consideration based upon feedback from researchers on how to make reporting of PIT-tag related events less ambiguous and more intuitive. Please contact us if you have questions or need help updating your reports.

P4 Tagging Software Update

JOHN TENNEY (PTAGIS Portland Office)

P4 includes powerful post-data collection management and QC features. A soon-to-be-released version of P4 (1.18) provides a simple enhancement to the date adjustment feature in *Record Management* allowing Event Date values to be updated with Release Date values for each record in a session. This is useful for converting recapture and passive recapture events recorded in P3 to take advantage of the new MRR (mark, recapture, recovery) data model described in the PTAGIS Newsletter Volume 14 Issue 2.

The legacy P3 tagging software and supporting data model was designed over 15 years ago as a data collection system primarily for mass marking. Up to 10,000 fish could be assigned a date and time when the fish were marked and released using two fields in the header of a tagging session. To assign multiple release dates to different records in a P3 files, variable release time (VRT) codes can be used. The VRT feature allows fish marked at the same time and released at different times to be in the same file. It also allows small volume mark/recapture operations and passive recaptures which occurred over multiple days to be reported in a single file. When VRTs are used to override the Release Date in the P3 header file, the Tag Date can still only have one value, which may not correspond with when the individual fish was captured or detected.

The VRT feature is not necessary in P4 because unlike P3, each record can have a specific value for an event and release date. If you want to update any P3 files that used VRT codes to assign the proper Event Date to each record, you can import those files into P4.

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P4 Tagging Software Update

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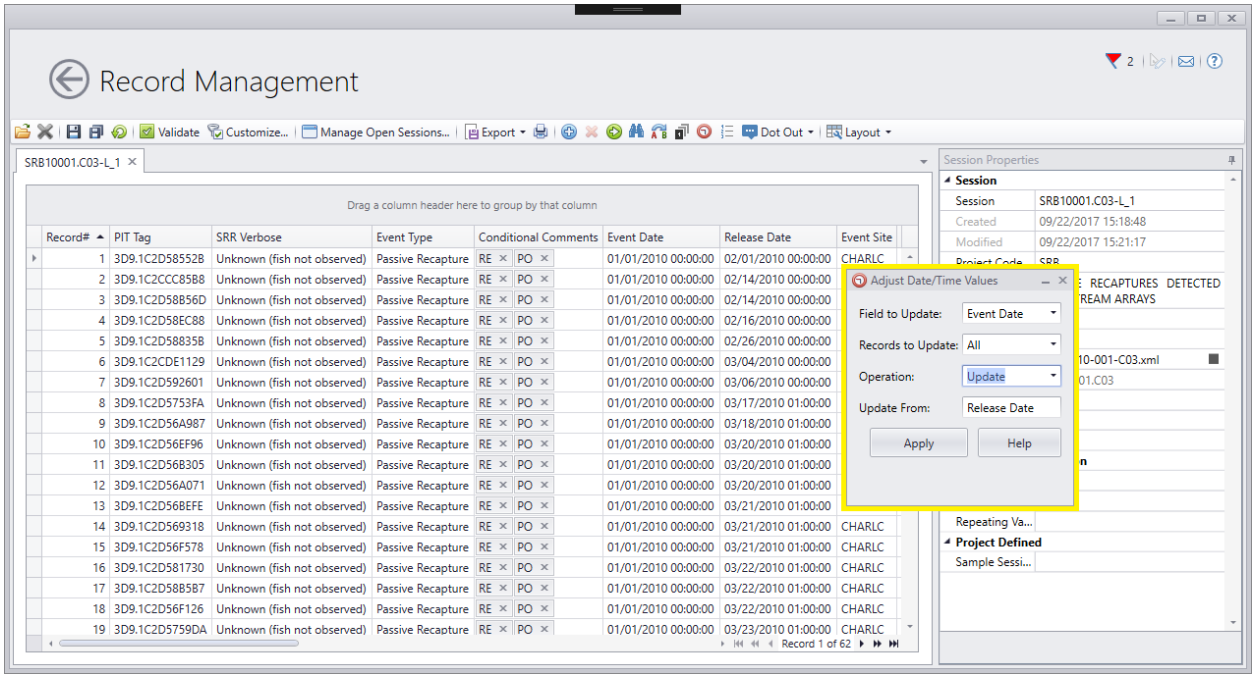
The release date will be assigned from the VRT value and a new feature in P4 v1.18 can be used to update the Event Date value for each record using the Release Date value. This will make reporting of these types of records more intuitive because of the changes to Complete Tag History described in this newsletter.

Please follow these instructions for updating event date from a P3 VRT value:

1. Export the target sessions from P3
2. Import the P3 files into P4
3. Open each imported session in **Record Management**
4. Press the **Adjust Date/Time Values** from the toolbar and a dialog will appear (shown as highlighted below)
5. In the **Field to Update**, select *Event Date* and set **Operation** to *Update*



6. After pressing ***Apply*,** all *Event Date* values will be updated from the corresponding *Release Date* value (P3 VRT value)
7. Press the **Reset** button to undo this modification if the result is not what you intended. Otherwise, press **Save** to update all of the records modified in the session.
8. Use the **Upload** feature in **Session Management** to resubmit the modified sessions as corrections (if previously uploaded).

NOTE: P3 files imported and uploaded from P4 cannot be uploaded from P3 as corrections again.

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P4 Tagging Software Update

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Version 1.18 will be the ninth release of P4 from a year ago. Based upon feedback from the community, the software has proven to be stable and efficient for those using it. The adoption of P4 within the community continues to grow as measured by the number of MRR data files processed by PTAGIS in the graph below.

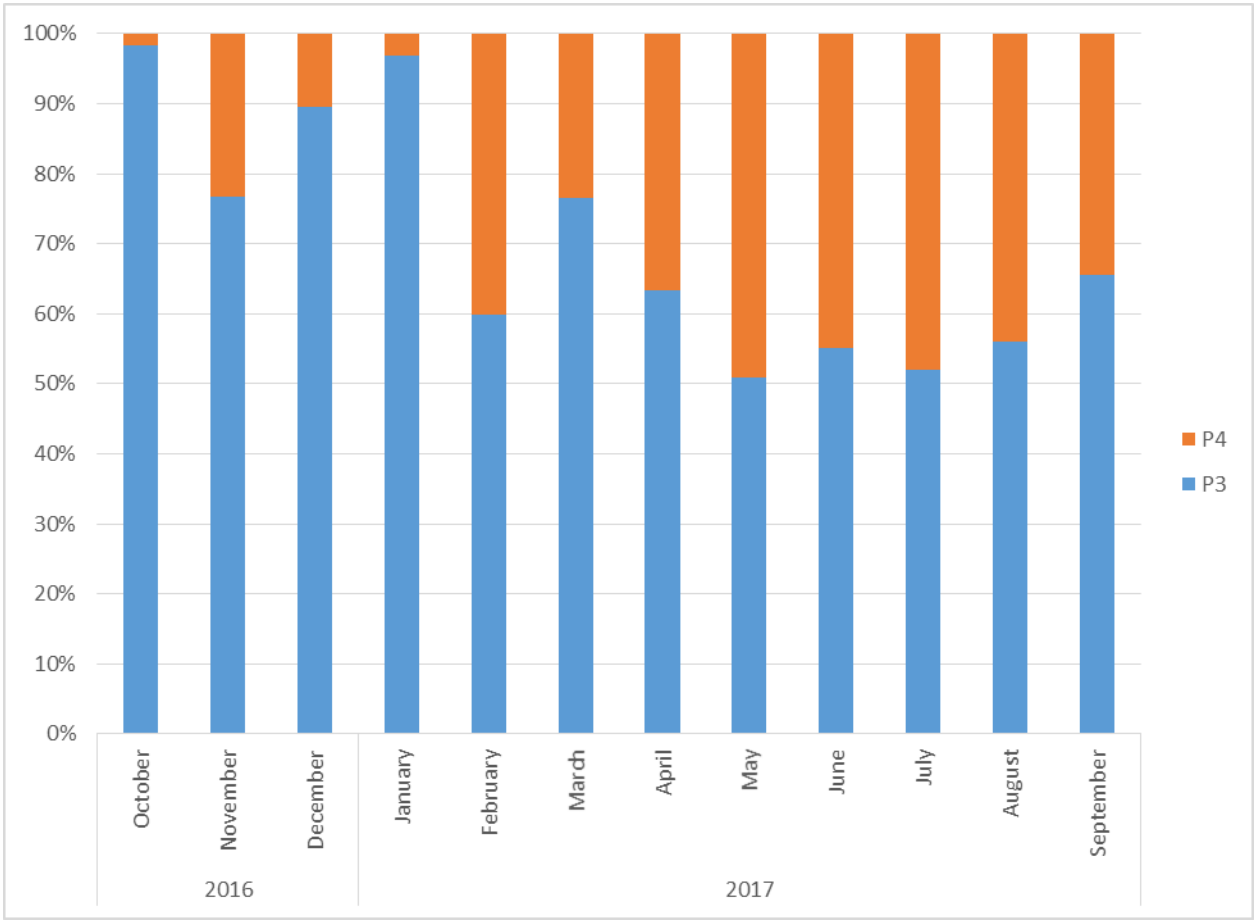

Figure 3. Distinct MRR data files submitted to PTAGIS by P3 vs. P4

Download new releases of P4 from here: https://www.ptagis.org/software/p4. A printable help file is also available from this link; however, context-sensitive help is already integrated throughout the application. Video tutorials are available (http://www.ptagis.org/support/tutorials) and a getting started guide published in the PTAGIS Newsletter Volume 14 Issue 2.

For those looking to generate and upload P4 files from their own software systems, we have a demo application with source code available upon request to help you do this. One agency has already leveraged this demo to submit production P4 data files to PTAGIS from their custom fisheries solution.

Upgrade to PTAGIS Reporting Software

NICOLE TANCRETO (PTAGIS PORTLAND OFFICE)

The reporting software used by PTAGIS for the advanced reporting system and quick reports will be upgraded on Wednesday, October 11, 2017. This upgrade requires that the PTAGIS website and reporting system be offline during the full business day, so please plan accordingly.

PTAGIS uses Microstrategy, a leading reporting tool, to power the advanced reporting and quick reports features on the website. There are two major releases of Microstrategy: 9.4.1, which is what is currently implemented at PTAGIS, and 10.4, which is the target version of this upgrade. The primary reason for upgrading is that version 10.x is actively being enhanced, while version 9.4 is being maintained with critical bug fixes only. Also, support for 9.4.1 will be phased out at the end of 2018.

This upgrade will not affect any of your saved reports or how you access them. However, only reports saved before 3:00pm PDT on October 10 will be available in the new system. The primary changes for users will be cosmetic, as version 10 has a more updated interface design, and the location of reports exported to file. These will now be available at ftp://ftp.ptagis.org/MicroStrategyExport/{user name}.

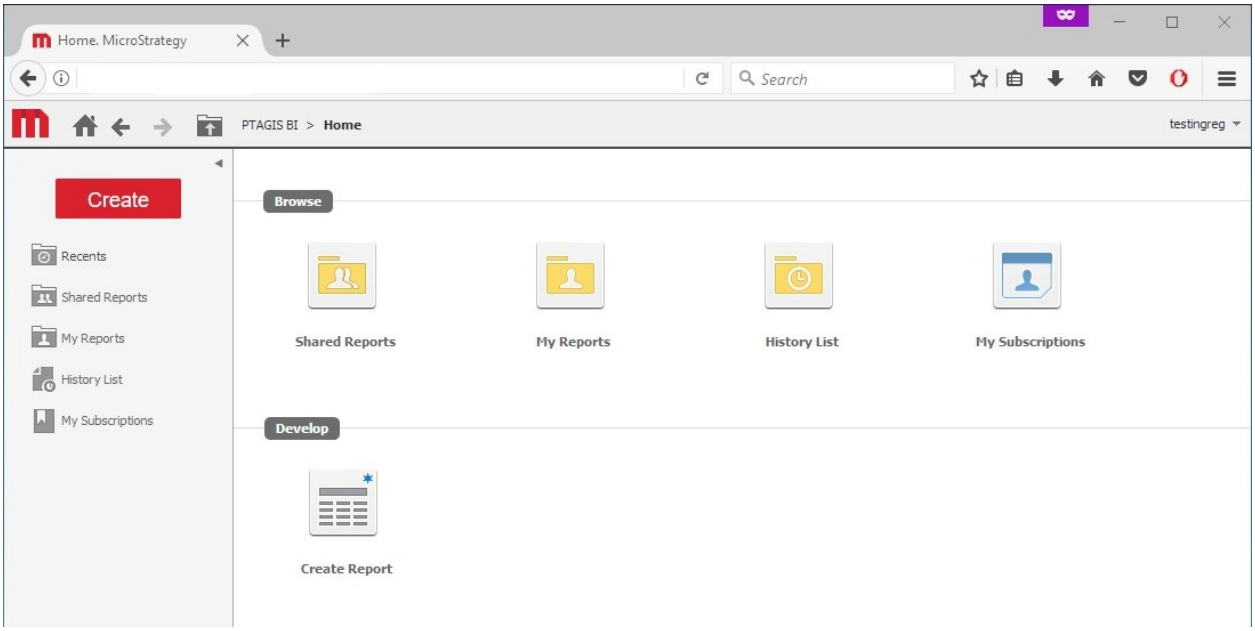

Figure 4. Advanced Reporting home page after upgrade to Microstrategy 10.

We are planning a major overhaul of the reporting system in the near future, however. This will include a redesign of the reporting database to take advantage of all we have learned since implementing it in 2012, as well as some new features that will be available in Microstrategy 10. Look for more to come on this once the upgrade to version 10 is completed.

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Upgrade to PTAGIS Reporting Software

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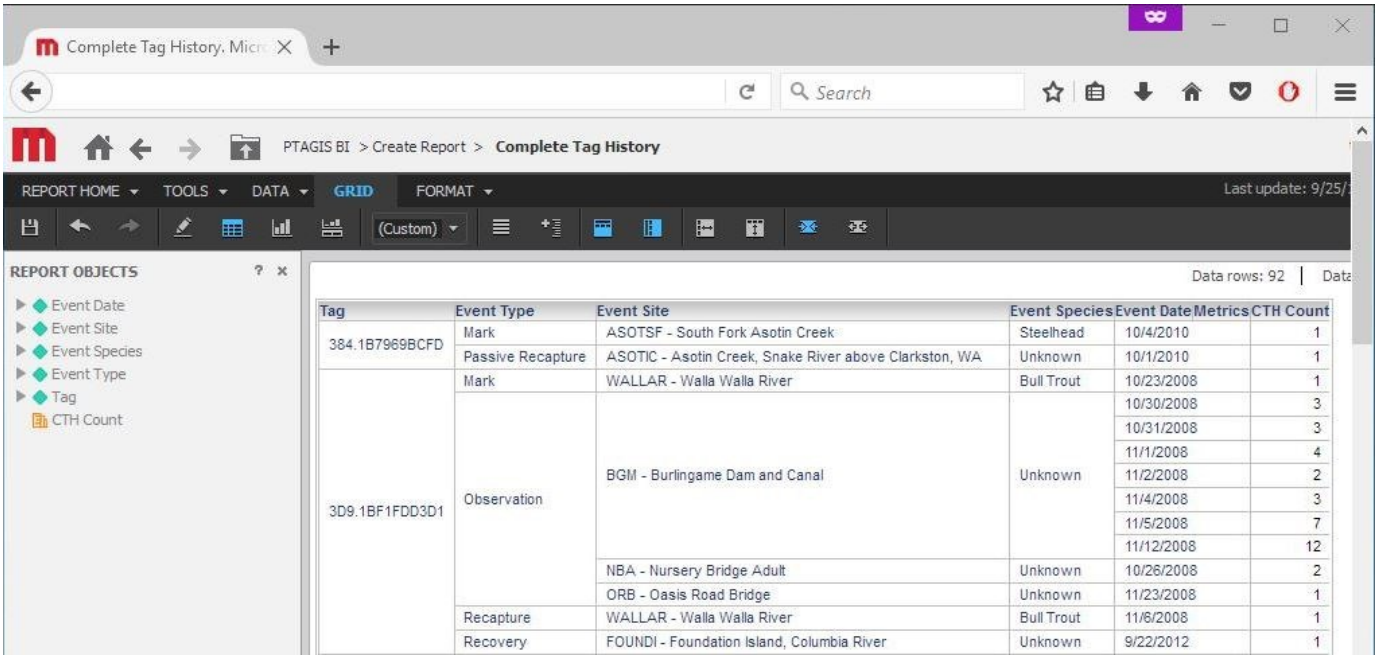

Tag	Event Type	Event Site	Event Species	Event Date	Metrics CTH Count
384.1B7969BCFD	Mark	ASOTSF - South Fork Asotin Creek	Steelhead	10/4/2010	1
	Passive Recapture	ASOTIC - Asotin Creek, Snake River above Clarkston, WA	Unknown	10/1/2010	1
3D9.1BF1FDD3D1	Mark	WALLAR - Walla Walla River	Bull Trout	10/23/2008	1
	Observation	BGM - Burlingame Dam and Canal	Unknown	10/30/2008	3
				10/31/2008	3
				11/1/2008	4
				11/2/2008	2
				11/4/2008	3
				11/5/2008	7
				11/12/2008	12
		NBA - Nursery Bridge Adult	Unknown	10/26/2008	2
		ORB - Oasis Road Bridge	Unknown	11/23/2008	1
	Recapture	WALLAR - Walla Walla River	Bull Trout	11/6/2008	1
	Recovery	FOUNDI - Foundation Island, Columbia River	Unknown	9/22/2012	1

Figure 5. Report grid interface after upgrade to Microstrategy 10.

What are RFID Tag Collisions?

ROGER CLARK (PTAGIS Kennewick Office)

Several fisheries biologists and researchers have brought up the question as to whether two or more PIT tagged fish will read in an interrogation system if they are travelling side by side. Due to RFID tag collision, the answer is, probably not.

What is RFID tag collision?

When more than one RFID PIT tags are energized by the RFID system at the same time, all the RFID PIT tags in the RFID antenna field will send their data at the same time. The RFID reader is not able to discriminate between the multiple RFID PIT tag signals and therefore no tags are read. However, if one of the RFID PIT tags enters the RFID antenna field before, or exits the field after the other RFID PIT tags by a period of one tag detection (FDXB tag detection time = 30.5 milliseconds), it can then be read. Also, it is possible that if one RFID PIT tag signal is significantly stronger that the other, it may possibly be read. RFID PIT tag signal strength can vary by size, manufacturer, orientation, and proximity to the RFID antenna field.

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What are RFID Tag Collisions?

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Can tag collision be mitigated?

The following methods can be used to decrease the likelihood of tag collision.

1. **Antenna design** – A smaller geometry antenna will provide less chance of fish travelling side by side. Low flow rates through the RFID antenna may provide resting spots for Salmon or Lamprey.
2. **Redundancy** – Multiple in-line RFID antennas will decrease the likelihood of fish travelling side by side for the entire path.
3. **Antenna location** – If resting pools are within the field of the RFID antenna, there is a higher probability of a PIT tagged fish resting in the antenna field.

PTAGIS Field Operations & Maintenance Summary for 2017

SCOTT LIVINGSTON AND NICOLE TANCRETO (PTAGIS KENNEWICK & PORTLAND OFFICES)

Figure 6. Lower Granite Spill Bay # 1. Proposed location for the OGEE antenna installation.

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PTAGIS Field Operations & Maintenance Summary for 2017

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O&M Summary

The PTAGIS Operations and Maintenance office in Kennewick is responsible for ensuring that the PIT tag detection systems in main stem juvenile fish bypass facilities and adult fish ladders are functioning at peak performance while those passage systems are in operation. The Kennewick office also monitors and cooperatively maintains Separation by Code (SbyC) hardware at six of those facilities, allowing researchers to selectively separate PIT tagged fish as they move through passage facilities. O&M staff also provide technical assistance for multiple other projects involving the installation or development of new detection systems, such as the new antennas at the John Day Dam adult fish ladders and the Lower Granite spillway detection project.

Juvenile fish bypass facilities on the Snake and Columbia Rivers began operating in March and April. Detection efficiency rates for 2017 are being kept at or above previous year's rates of greater than 99%. The single antenna in the Bonneville Corner Collector is the exception to this with an estimated efficiency rate in the seventies based on NOAA live fish testing using 12mm tags. Separation by Code diversion efficiency rates remain high for 2017 with all diversion gates running above 97%. Adult ladder detection efficiency also remains high. In dam-to-dam comparisons, all sites maintained an approximate 99% detection efficiency over a 12 month rolling report period. The only exception to this occurred at the Lower Monumental ladders where the efficiency dropped to approximately 97%. The picketed leads were raised after the counting season ended in 2016, which allowed tagged fish to move past the counting window antennas without being detected. To avoid missing these detections in the future, a decision was made at the May 2017 FPOM Meeting to leave the picketed leads in through November each year.

Other PTAGIS Field Office Projects for 2017

John Day Adult Ladder PIT Tag Project—South (JO1) and North (JO2) Ladders

In January 2017, the USACE began Phase 1 construction, which included installation of the orifice and overflow antennas in the north and south ladders. Each ladder was equipped with 8 antennas covering 2 weir walls. Each weir wall consists of 2 overflow antennas and 2 orifice antennas. Upon completion of the antenna installation, PTAGIS technicians installed the newer FS-2020's transceivers, antenna cables and connectors. At that time, each of the antennas were functionally tested to ensure proper operation and readiness prior to the ladder watering up.

Phase 2 of the project, currently underway, includes installation of power and communications wiring to the transceivers, construction of the PIT tag electronics room and installation of the data collection platforms. Until this phase is complete, sites JO1 and JO2 cannot be brought online as production interrogation sites. To take advantage of the functioning antennas and transceivers, John Day project personnel provided temporary power to one weir wall in each of the ladders, which allows detections to be collected and stored locally in the transceiver buffers. These detections are being downloaded on a weekly basis and submitted as passive recaptures, as described in the last newsletter.

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Figure 7. JO1 antennas before water up.

Figure 8. JO2 antennas after water up.

The transceivers in weir 181 in the south ladder were powered up and data collection began on 03 March 2017. These detections were reported as passive recaptures at MRR site JDALD1. The transceivers in weir 247 in the north ladder were powered up and data collection began on 19 January 2017. These detections are being reported as passive recaptures at MRR site JDALD2. The transceivers in the 2nd weir wall of each ladder (180 of the south ladder and 246 of the north ladder) will be powered up when phase 2 is completed, currently scheduled for fall 2017. When phase 2 is complete, interrogation sites JO1 and JO2 will come online and all future detections will be reported as observation records.

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PTAGIS Field Operations & Maintenance Summary for 2017

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Transceiver Repairs

The aging FS1001, FS1001A and the newer FS2020 transceivers are repaired in-house and are projected to last, at a minimum, another 5 to 10 years. In 2017 approximately 25 transceivers were repaired and put back into service. The yearly failure rate for these transceivers has not risen since they were initially installed in 2001.

Improved Site Monitoring Tools

Staff is developing a new centralized monitoring system to capture facility operations and diagnostic data from interrogation sites managed by PTAGIS . The goal is to increase operational efficiency and reduce travel. The new system is based on Supervisory Control and Data Acquisition (SCADA) technology and it will be featured in the next newsletter.

Lower Granite Spillway PIT Tag Project

The PTAGIS Kennewick office continues to coordinate with USACE and NOAA personnel as part of the design team for PIT tag detection system for spillways. Commonly referred to as the ogee project, several milestones were reached this year:

- Development of a split antenna prototype in an effort to overcome an unforeseen expansion joint in the ogee surface
- As requested by the USACE, PTAGIS personnel, in cooperation with the NOAA Pasco Field Office, performed preliminary acceptance testing of the proposed non-ferrous concrete aggregate and composition that will surround the antennas after being placed in the ogee surface. No adverse effects to the antennas magnetic field was observed during this test.

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PTAGIS Field Operations & Maintenance Summary for 2017

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Lower Granite Dam Juvenile Bypass System Remodel

The Juvenile Fish Facility was dewatered on August 2, 2017, for integration into the new juvenile bypass system.

PTAGIS O&M continues to provide technical assistance to the US Army Corps of Engineers Walla Walla District with regards to the construction and installation of three PIT tag antennas to be located on the new full flow transport flume. PTAGIS personnel will soon be performing onsite inspections of the antenna shields and associated components to ensure proper operation upon completion. The full flow PIT tag antennas are scheduled to be operational March 1st for the start of the 2018 out-migration.

Figure 9. Lower Granite Juvenile Bypass reconstruction.

Picture courtesy of U.S. Army Corps of Engineers

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PTAGIS Field Operations & Maintenance Summary for 2017

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Bonneville Dam Washington Shore Lamprey Passage System (LPS).

In mid-June 2017, PTAGIS technicians installed all necessary components for the newly completed LPS system. This included the wrapping of 12 antennas and installation of FS2020 transceivers and associated cabling. Two antennas were integrated into the PTAGIS BO4 data collection platform with antenna IDs of F1 and F2. These two antennas are monitored and maintained by PTAGIS field operations. All 12 transceivers are configured to read half and full duplex PIT tags.

Figure 10. Photo showing PTAGIS maintained lamprey monitor.