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PTAGIS newsletter

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Separation by Code Registration

Both Lower Granite and Little Goose Dams have been outfitted with equipment to accommodate using the computer program MULTIMON to separate out specific fish from the rest of the PIT Tagged fish going through the dams. During 1996, five projects used the separation by code capability of MULTIMON to help complete their research.

If you are a potential user of the Separation by Code (SBC) capability of MULTIMON in 1997, or you are interested in learning more about it, please contact Dr. Sandra L. Downing (NMFS) at 206-842-4289.

All users of the SBC are required to attend a pre-season training session that will be held in March, 1997. Please contact Dr. Downing as soon as possible to register your project for Separation by Code during the 1997 out-migration.

Interrogation Data Anomalies: Mis-Reads

The interrogation of PIT Tags at Snake and Columbia river dams provides excellent information for research. However, the present system is not 100% perfect.

The following describes the anomaly known as a 'mis-read', how one is identified and what a data analyst can do to improve confidence in the data set. Actions that are being taken to reduce the problem are also discussed.

What is a Mis-Read?

The term 'mis-read' refers to an instance when an individual PIT Tag is incorrectly decoded by a PIT Tag reading device. This phenomonon is sometimes blamed on the tag (the tag is said to have a 'split personality'). For example, the tag code is programmed to be FFFFFF0123, but sometimes, the reading equipment reports the code as FFFFFF1123. In this example, the fourth character from the right has been transposed from a zero to a one. There have been instances of a single tag generating up to three distinct codes.

Factors that can cause a mis-read are:

1. The energizing field for the tag is weak.

2. The tag code is read upon initial entry into the energizing field.

3. The tag code is read upon exit from the energizing field.

4. The tag itself is "weak".

The mis-read can happen:

1. At the time the fish is tagged;

2. At the time the fish is interrogated at a dam;

3. At the time the fish is handled during a recapture event.

Bit-Shift

The term 'bit-shift' has also been used to describe the mis-read phenomenon. Bit-shift refers to the fact that a character can change its value when one or more of the four bits that make up one of the characters of the code is mis-interpreted or shifted (a bit will have either of two values, zero or one). In the above example, the character in the fourth position from the right, zero, changed to one.

Mis-Read Case Study Example

An Interrogation Summary report (A: By Obs Site, Tag Site, FileID) is run using McNary Juvenile Fish Bypass Facility (MCJ) Tagging File "CSM94056.A4A" as keys into the data. The output of the report shows a negative travel time (-7.8 Days) for PIT Tag code "7F7F51450F" (See Figure 1).

Figure 1

To investigate the negative travel time, the tag code is used as a key to gather information on the Old One Fish History screen using PTAGIS Tables option. Figure 2 shows that this tag code was seen at Lower Granite Juvenile (GRJ) on May 7, 1994 and also at McNary Juvenile (MCJ) on April 14, 1994. It also shows the release date of April 22, 1994. Notice that there are multiple coil detections and multiple records for the interrogation event at GRJ. There is only one coil detection for the MCJ interrogation event. Notice also that the MCJ event occurs before the GRJ interrogation event.

Figure 2

The evidence accumulates that this interrogation record is a mis-read. We have a negative travel time (the tag code has an interrogation date before the release date) and we have a "lower dam first" interrogation event (GRJ interrogation events should occur before MCJ interrogation events). In addition, we have a single coil detection for the MCJ interrogation event.

Finally, using the same key values, we can generate an Interrogation Summary report (G: Coil Details by Site, Contr) and view the raw interrogation data at McNary Juvenile during the time period that the suspected mis-read occured (14-apr-1994 17:52). This report is shown in Figure 3. Note that the suspected mis-read is followed by multiple interrogation records for tag code "7F7F514500". These records also contain interrogations on multiple coils and the time stamps on these records are all the same. All of this information points to a mis-read of tag code "7F7F514500" as tag code "7F7F51450F".

Figure 3

What Has Been Done?

Mis-reads that occur at the time that fish are marked have been reduced by incorporating a "double read" firmware modification to Destron/Fearing portable readers.

Destron/Fearing, Inc., the company that manufactures the interrogation system currently used at the Snake and Columbia river Juvenile Bypass Facilities, has improved the tag that is currently in use. The tag now contains an internal consistency check similar to (but not as robust as) the cyclic redundancy check used in various data communication systems.

In addition, enhanced tag reader firmware is now being used at the interrogation sites. This enhanced firmware was installed prior to the start-up of the Juvenile Fish Bypass Systems at the dams in the Spring of 1996. Laboratory tests of this firmware found that it reduced the chances of mis-reads by around 90%.

Plans are being developed to modify our current system to be based upon the new ISO standards, 11784 and 11785. The cyclic redundancy check (CRC-CCITT) error detection standard is specified in the new ISO draft standard. This error correction scheme should provide even lower probabilities of mis-reads than we have experienced with our current system. It is estimated that the read error rate will not exceed 1 in 1 million.

Researcher Responsiblity

PTAGIS recommends that the research community perform appropriate analysis of their PTAGIS data. It is recommended that researchers eliminate mis-read interrogation data (as described here) from their data set.

The PIT Tag Steering Committee may make recommendations about how the PTAGIS system should analyze and/or mark potential mis-reads. One approach taken by some organizations is to eliminate any interrogation of a tag code that contains only one coil. This or any other approach is strictly the decision of the investigator or research organization using the data.

Summary

If you encounter data that you suspect to be a mis-read tag code, try following these steps to isolate the problem:

1. Run Interrogation Summary report (A: By Obs Site, Tag Site, FileID). Is a negative travel time indicated?

2. Run the Old One Fish History Screen. Is the interrogation event from a lower dam first?

3. Run Interrogation Summary report (G: Coil Details by Site, Contr). By reviewing the raw data contained in this report, you should be able to verify the mis-read tag code.

4. Make a decision to either include or exclude the data.

5. Call the PTOC if you have any further questions.

ISO Transition Planning

On October 28, 1996, the first inter-agency meeting was held to develop a comprehensive plan for the transition of our 400 kHz system to the ISO standard.

Result of the meeting:

1. Agreement to develop a comprehensive transition plan with the interagency team.
2. Agreement to develop a plan for a field test of stationary transceiver prototypes for 1997.
3. Agreement to investigate procurement of tags less than 12 mm in length.
4. The Transition Planning Team will next meet the week of January 13, 1997.

Announcements

New BPA COTR

Bonneville Power Administration has assigned a new Contract Officer's Technical Representative (COTR) for the PIT Tag project -- John Rowan. Mr. Rowan officially started on the PIT Tag project on October 15, 1996. Mr. Rowan can be reached at (503) 230-4238, or via e-mail at jhrowan@bpa.gov. We welcome him and look forward to working closely with him in the future!

Just A Note...

Remember, this newsletter is for YOU! If there are any issues or questions concerning the PTAGIS community that you would like us to cover in subsequent issues of the PTAGIS Newletter, please drop us a line or give us a call and we will look into them!

How to Reach Us...

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Calendar

1996

Nov. 1-11 By Pass Facilities De-Watered

Nov. 15 PIT Tag Forecasts Finalized and Locked into Inventory System

1997

Jan. 13 Changes to PIT Tag Specification Document

March Separation by Code Workshop (Date and Location TBD)