

August 21, 2003

PTSC Meeting

1. PTSC Members will have comments for Finalized Minutes –*from the February PTSC meeting* -- by August 29. Carter will post to web site.
2. Sean Casey – Digital Angel.
 - a. Sean showed prototype single use needles, needle packaging and injectors.
 - i. DA suggests using ultra thin wall needle with short bevel.
 - ii. Members don't like the injector handle. Sean has a number of ideas for improving it and will look into modifications.
 - iii. Earl asked if spring is stainless steel. Sean will look into that.
 - iv. Earl suggested that the prototype needle be tried on adult fish. He has a concern that the needle is too short, or that the bevel is too long. I had no complaints about the needle length. I indicated that I thought the bevel of the needle was too short. I am afraid that tissue coring will occur because of the short bevel. In addition, I am concerned about how difficult the needle will be to insert into large fish because of the short bevel. We simply need to try the needles as suggested.
 - v. Ed disagreed with Earl's comment about adult fish since the single use injector would mainly be used for mass marking and adult marking is not mass marking.
 - vi. Sean needs to know if the needle will work out.
 - vii. Digital angel wants to get some (about 30,000?) of the single use needles used in order to get feedback. Doug has a large marking project this fall. Ann is assisting with an adult marking process this fall and wants to participate in the feedback process. Sean will try to get some needles to Ann to try on adult steelhead. Sean will also try to get needles to Earl, and Ed as well.
 - viii. Sean is interested in whether the needle wounds heal faster, if tagging is easier.
 - ix. Earl suggested that the injector handle may be too long, and that it should be sized more like a 5cc syringe. Ann agreed. She suggested the size of the handle should be reduced by about an inch. Earl wondered about why there was a flair or bulge at the base of the handle. Joe said that surgical instruments like scalpels have the flairs to prevent rotation of the tool. Note: It could be because of the manner in which I held the handle of the injector but the bulge at the end of the injector did not stabilize the injector but actually destabilized the instrument. The bulge also caused a pressure point in the palm of my hand. As was suggested an oblong shaped handle would help stabilize the instrument. It was also suggest that the needle removal system be modified. On the side I suggested to Sean that the push rod mechanism be modified to push the needle of the end of the injector.

~~*Committee members also suggested~~ ? End of sentence??

- b. Sean reported High-Q status.
 - i. October 9, 2003 is “Go / No-Go” decision meeting for antenna electronics.
 - ii. Work continues on phase 1: feasibility, proof of concept and evaluation of tag, antenna and reader ~~reader~~ components.
 - iii. Phase 2 field testing and evaluation. Construction of test facility should be completed by spring 2004.
 - iv. Phase 3 is installation in the channel.
 - v. Tag development concepts:
 - 1. Attempt to reduce or compress tag message. Could decrease read time by 24%. This would require reserving about 20+ million tag codes.
 - 2. Evaluate performance of microchip dies.
 - 3. Not evaluating ‘tag collision’ based upon data provided by Dennis Schwartz.
 - 4. Earl suggested that the glass used in the tag could be a human safety issue, and the DA should perform some test on shattering of glass. Sean said that this is covered in the test plan.
 - 5. DA investigating increasing dies, ferrites, wire gauges, glass and other tag components in order to optimize ability to read tags in high-q environment.
 - 6. Sean showed data from the anechoic chamber testing with 16’ x 18’ antenna, comparing readability of prototype ‘mass model’ tag (MM), standard (BE) tag with the super tag (ST). He illustrated signal to noise ratios for ST and BE tags. MM can be seen throughout. ST 3-4 feet from side of antenna.
 - 7. If the ST tag can be read 4’ from the antenna, then basically 70% of the volume for a 16’ x 18’ or 16’ x 20’ antenna would be covered. Since within 60% of the volume of the 20’ x 20’ production antenna. Regional Decision Makers require 60% detection on the High-Q Corner Collector flume at Bonneville, this might be sufficient. However, if the ST tag can only be read 3’ from the antenna, then a little less than 50% of the volume would be covered and that could make it difficult to reach the 60% detection level. Obviously, how successful the system will actually be depends greatly on where the fish are within the flume when they pass the antennas. The concern that the ST tag might not be sufficient is the major reason pushing the development of a new tag. Since there is probably not time to produce a tag for 2005, the hope is that an improved ST tag (based on what DA has learned from the MM testing)

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will be sufficient. Sean thinks with this improved ST tag, they'll get 5' from the edge then basically 81-82% of the volume would be covered.

vi. Antenna Development

1. Phase 1 involves collaboration with ACOE on antenna structural development concepts and feasibility study.
2. Sean showed an illustration of the 'driver' antenna / 'listening' antenna concept.
3. Sean showed illustrations of coil winding and mechanical tuning concepts.
4. Sean showed full scale test site that is set up in St. Paul MN. The site will be up for one year. The site is adjacent to power lines which should provide a good source of ambient EMI noise.

vii. Reader Development

1. Phase 1 includes analog driver and receiver improvements and use of digital signal processing (DSP).
2. Promising components will be placed on printed circuit board (PCB) allowing the optimization of performance and ease of system integration and evaluation to be used for phase 2.
3. Sean showed illustrations of power amplifier, precision oscillator, auto-nulling board, receiver board, DSP and analog to digital (A/D) boards.
4. Full scale integration will be performed in September and based upon test data, a Go / No-Go decision would be made October 9, 2003.

viii. Discussion about the regional decision making process and PTSC role.

1. PTSC needs to make decisions for the region about viability of changing the tag. They need to answer questions such as ~~What~~ what changes will have to be made to the juvenile system to deal with a more powerful tag, and ~~What~~ what ~~are~~ the system-wide impacts of the new tag ~~are~~.
2. PTSC needs to understand the reading potential of the new system so that it can make recommendations about equipment and tag recommendations for their agencies.
3. After the 'Go / No-Go' decision, PTSC can decide how to address performance of tags from other manufacturers.
4. BPA wants to have comments and a technical recommendation about the High-Q system from PTSC.

c. Generation 2 Reader Status

- i. G2 is three year program following a waterfall (~~what does this mean?~~) development model including requirements, design, prototype and production.

- ii. G2 will be capable of replacing current juvenile and adult stationary transceivers, providing data logging, multiplexing, and various features identified in the Requirements Specification. Updated requirements will be distributed soon to PTSC and the rest of the community.
 - iii. Core / basic DSP – A/D tag decoding aspect of G2 Reader is covered by the High-Q project development.
 - iv. Sean provided overview of hardware architecture.
 - v. G2 Reader software is moving forward. Sean reviewed G2 software requirements.
 - vi. Reader can decode and process tags in about 7 40 milliseconds (decoding takes ~30.5 msec).
 - vii. Earl asked whether or not the G2 reader was capable of writing to read write tags. Sean said that there is a line item in next year's project to investigate anti-collision, and through this task it would be feasible to investigate 'write' capability. Earl suggested that the ability to 'kill' a tag would be beneficial. Sean suggested that the 'write' capability could be used to do this. Sean pointed out that the 'write' capability and the 'anti-collision' capability are two separate requirements.
- d. Multiplexor Status
- i. Earl has been using a multiplexor for several months.
 - ii. Digital Angel will deploy 2 more ~~systems~~ multiplexors to the field within the next couple of weeks.
 - iii. The multiplexor data format is not compatible with ~~minimon~~ Minimon or ~~multimon~~ Multimon, so the data from the new multiplexors will not be provided to PTAGIS until a new MiniMon.Exe driver is developed.
 - iv. The development of the MiniMon.Exe driver will take about 100 hours.
3. PTAGIS Support for Three Mile Dam on the Umatilla and Rattlesnake Creek
- a. The Committee agreed that PTAGIS should support the RCX communications and TMD project planning and support project.
 - b. Carter will update the Operations and Maintenance support model.
 - c. After the Committee has approved the support model the Committee will provide FPAC an outline to assist basin wide planning for growth in PIT tagging projects.
4. Mary Moser on Pacific Lamprey
- a. There may be much more PIT tag marking of Pacific Lamprey especially if they become a listed species.
 - b. It was proposed that ~~for~~ next year, ~1000 lamprey could ~~will~~ be marked with 125 kHz using the FDX-A PIT tags. These tags can be read by the FS2001F-ISO readers that will be located on the bypass systems being evaluated.
 - c. The ~~C~~committee doesn't want lamprey tagged with 134 kHz B tags since they can take up residence at Bonneville Dam, [attach themselves to an](#)

orifice inside a PIT tag coil, and jam prevent any detection of returning adult salmonids. The 125_kHz tags will not interfere with the current ISO-based systems installed for salmonids. ~~attach to the orifices a PIT tag coil and jam prevent any detection of returning adult salmonids.~~

- d. Sean will attempt to turn on a 125 kHz FDX A tag using the FS1001A system. If this is successful, then it may be possible to make a field modification to the FS1001A to read both the 125 kHz FDX A tag and the 134.2 kHz B tag to allow detection of both lamprey and salmonid even if the lamprey that attach to the orifices take residence at a detection coil in a fish ladder.
- e. Ultimately, anti-collision technology may be a better solution for this problem.
- f. Note: I believe Sean also indicated that he would look at 134.2 kHz A tags as a solution but we all agreed that anti-collision would be potentially the best solution as you state.

5. Bonneville Vertical Slot

- a. The Corps and BPA once have agreed to move forward with installation of vertical slot antennas at the tops of the fish ladders at Bradford Island and Washington Shore at Bonneville Dam. The planned installation has been deferred by the Corps ~~has deferred the planned installation~~ until additional funding is available.
- b. The vertical slots at these two ladders are different sizes, but the Corps has analyzed the hydraulic flow and come up with two standard sizes.
- c. -Sean reported that Digital Angel and the Corps ~~are~~ are attempting to standardize a vertical slot size in order to reduce costs and improve operations and maintenance issues.

6. Adult Detection Analysis

- a. ~~Sandy~~ Sandy has analyzed the adult systems using the same three methods (relative bimonthly weir counts, reads per fish, and antenna current amperage) as used to analyze the antennas in 2002. Overall, performance is better this year.
- b. Sandy reported that there is no 'stair-stepping' performance degradation in antennas that are suspected of containing moisture and others.
- c. Some antennas that were performing poorly last year, are performing better now because of improvements made by PSMFC and Digital Angel during the dewatered periods and the more frequent tuning being done this season.
- d. The current amperages are much more stable this year. So far, none of the antennas that are suspected of containing moisture has shown the 'stair-stepping' pattern (though last year, the largest drops occurred in November). The number of antennas, whose median reads per fish are less than 5.0, is fewer this year than last year.
- e. -Sandy also reported on how well the downstream systems were detecting fish that were detected at Lower Granite and Wells Dams. All of the systems detected adults from Lower Granite Dam better than adults from Wells Dam (e.g., McNary Dam detected 99.2% compared to 95.1% and

Bonneville Dam detected 98.1% compared to 91.4%). Analyzing a subset of PIT and radio-tagged chinook salmon that were detected at Wells Dam, we were able to determine that of the ones missed by the PIT-tag systems at McNary Dam, all the fish that had radiotelemetry data had gone up the Washington Ladder.

- f. Like last year, orifice-based systems at Bonneville and McNary Dams did not detect jacks as well as adults because of behavioral reasons.
- g. ~~have~~ Had been poorly performing last year, are performing better now.
- h. Orifices appear to not detect jacks as well as adults.
- i. It appears that fish prefer to use the overfall weirs at the Washington Shore fish ladder at McNary dam so fewer fish get detected there.
- j. The Committee discussed potential new site identifiers for adding new vertical slot monitors. Earl mentioned researchers would want to know that a monitor could be one that can enumerate fish from separate parallel passage routes. Carter suggested that ~~the~~ he is preparing a project plan for requirements development, design, development and implementation of the Generation 2 PTAGIS data model.

7. Floy Tag Coding

- a. The Committee agreed to add Peterson Disk (PD), Streamer Tag (ST) and Spaghetti Tag (SP) flag code.
- b. The Committee agreed to change the wording of DB from Double Tagged to “Multiple PIT Tags”.
- c. Carter suggested that we address the input and output requirements for capturing external mark information in the Generation 2 data modeling effort.

8. Diversion System Coding

- a. Wayne Wilson (ODFW) has submitted a number of files using the collection code of DIVSYS which is defined as slide gate or diversion system. Wayne is using a Diversion System Trap, and is not working at a juvenile collection system.
- b. Ann Setter asked The Committee whether or not we should use a separate code that wouldn't be confused with gate system at a juvenile collection facility and suggested DIVTRP. Doug suggested DIVOTH to denote 'other diversion systems', since there may be more types of diversion systems other than a Diversion System Trap.
- c. In fact, the diversion system is a box trap, so one question is why not use BOXTRP?
- d. The committee agreed to update the definition of the DIVSYS by deleting the phrase 'slide gate or'.

9. Mandatory Migration Year

- a. According to the specifications document the Migratory Year is the earliest date of out-migration for juvenile fish, or the calendar year in the case of an adult fish.
- b. The committee acknowledges the weakness of the Migratory Year attribute especially as related to resident fish and other applications that

have grown over the years. Perhaps a new attribute called "Return Year" should be used for adults.

- c. Ann suggested that the issue be addressed in the G2 Data Model.
- d. Earl suggested that the user community be polled during the Workshop.
- e. The Committee agreed to expand the scope of this discussion to include all other Tag Header data attributes. Doug will prepare a survey for distribution to PTAGIS user community to get the user's perception of the accuracy of the item, whether it should be mandatory, or comments about how it should be used or interpreted.
- f. There was discussion of the fact the current system doesn't keep track of sub-species or hybrids.
- g. Earl suggested that The Committee keep in mind that DNA readers will be commercially available in couple of years. It may be possible that juvenile fish DNA could be scanned and then compared with the DNA of the adult fish when it returned.

10. Separation by Code Requirements

- a. Carter announced that PTAGIS has kicked off a project to construct a windows version of the MULTIMON.EXE program used to run the Separation by Code systems at Corps facilities.
- b. John reviewed the System Architecture and version 0.01 Requirements with The Committee.
- c. John is preparing a project plan for requirements, design, prototype development and deployment.

11. Testing Tag Packaging / Tag Coating

- a. Joe Z. presented a study design that could be used to evaluate the biological implications of using a new material for encapsulating tags. The change in encapsulation may be necessary to improve tag performance and to evaluate human and fish safety. The opportunity affords itself based upon some basic USFWS funding, a lucky graduate student and a loan of equipment to USFWS by Digital Angel Corp.
- b. Joe asked for feedback. Additional items for measurement were discussed. Joe described this as a small cost effective effort and some of the additional items were out of scope for the initial effort. He described this effort as an initial swath of an overall evaluation.
- c. Joe will look at histology in addition to survival, growth and retention.
- d. It was suggested that long term (years) tag retention be studied as well.

12. 23 mm PIT Tag Use above Bonneville Dam

- a. Joe presented an analysis of the risk of tag 'collisions'. He utilized data from peak passage days at the McNary Dam full flow bypass flume during 2002. He developed a model that can be used to assess the probability of a collision of a 23 mm tag with a 12 mm BE tag. His analysis used 'worst case' assumptions in terms of numbers of 23 mm -vs- 12 mm tags. Though Sean pointed out that the separation-gate antennas would actually be more likely to have collisions because the antennas are only inches apart instead of meters and so a tag on one coil would prevent tags from being detected on both coils in the shield box.

- b. His analysis concludes that the “use of tags with increased read range are likely to have an imperceptible effect on read efficiency.” “Collisions do occur, regardless of the tag being used and efforts to reduce these should be taken where convenient (e.g., “clamping” the field).
- c. Joe proposed that PTSC should make a clear statement (to FPAC?) that:

Use of , increased read range PIT tags, (including those being engineered for the High Q Bonneville Corner Collector and the 23 mm tags and supertags) should not be restricted in use throughout the basin.

”Qualified” means that tags have passed a PTSC approved belt test, and if necessary, a laboratory evaluation and, if necessary, live fish test.

- d. Generally, the PTSC agrees that we should:
 - i. Take measures to prevent collision (implement clamping);
 - ii. Support the use of different tags;
 - iii. Take measures to characterize the risk of using the enhanced tags.
- 13. PTSC directs PTAGIS to remove the 400 kHz detectors at Bonneville and Lower Granite. Replace three 400 kHz units with two 134.2 kHz units. This will happen during the in-water work period during the winter of 2003-2004.
- 14. Workshop
 - a. PTSC Key Issues (New Tags, Data Ethics, ?)
 - b. G2 Readers & New Tools (Sean)
 - c. High Q Bonneville Full Flow
 - d. High performance tag
 - e. Small Stream (phaedra) ??? word
 - f. e. Adult system performance
 - g. f. Saltwater Trawl
 - h. g. G2 Data Model & PTAGIS data survey results
 - i. h. PTAGIS web site / status and plans
 - j. i. Future tag options – active, etc. – Earl has agreed to talk about this
 - k. j. Look for users of other vendors’ vendors’ tags – e.g., Sokymat’s 8-mm tag

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