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MEMORANDUM

TO: Michele Dehart

FROM: Jack Tuomikoski

DATE: November 19, 2010

RE: Comparative Survival Study (CSS) Fall 2010 PIT-tagging Operations

This is a brief summary of our knowledge of recent PIT-tagging operations that you requested. Recently, Biomark sold 300,000 tags to LSRCP that may have been used for tagging of steelhead at Hagerman hatchery this fall for release next year. This is a PIT-tag release that has tags cooperatively provided by CSS and LSRCP. The portion of tags provided by the CSS for this release were manufactured by Destron Fearing. We do not know if there is a difference in performance or detectability between these two different types of tags. We do know that these tags have a different 3-digit prefix than the Destron Fearing tags ("384" instead of "3D9"). As noted in a PIT-tag steering committee (PTSC) conference call yesterday, because of this difference in prefixes, P3 and Mini-Mon software would have to be modified in order to be compatible with these tags.

We do not currently have any information regarding the performance of the Biomark tags in regards to detectability. However, several potential issues could arise, some of which were brought up at the PTSC conference call. If these tags perform differently than other tags used within the same study group (which may have potentially happened at Hagerman hatchery) this directly violates several assumptions of the CSS study design. First, routing by pre-assignment at Lower Granite, Little Goose, and Lower Monumental dams has to be possible and the same for all tags used in the study. Routing through random pre-assignment to Monitor-Mode and Return-to-River groups has been part of the CSS study design since 2006. Second, the Cormack-Jolly-Seber survival model, used to estimate juvenile survival and detectability throughout the basin and in the CSS, assumes that all fish have the same ability to be detected. Third, in order to compare various SARs (Smolt to Adult Return rates), adult success rates, and straying rates across study groups in the CSS requires that all returning adults in the hydrosystem and outside

the hydrosystem have an equal detectability. Fourth, comparison of SARs across different hatcheries, species, and rear-types requires that all groups have an equally representative tag. Additionally, information on last detection sites and straying rates generated in the CSS would be directly affected. These metrics and information require detectability at all available detection sites on PTAGIS including Middle and Upper Columbia and various in-stream detection sites. Efforts are being made to contact LSRCP and verify that these two different tag types were used at Hagerman and to gather information about any other potential hatcheries affected. Currently the CSS cooperates with LSRCP in tagging at the locations shown in Table 1 below.

Table 1.1. Snake River hatchery groups marked during 2010 that have all or part of their PIT-tags provided by the CSS. Many groups have tags cooperatively provided the CSS and other entities. The hatchery, species, tag funding sources and tag totals are shown for each. Through cooperative efforts pre-assignments are carried out by either the CSS or the other associated agencies.

Hatchery	Species	PIT-Tag Funding Source ¹						Total PIT-tags
		IDFG / LSRCP	CSS	IPC	ODFW / LSRCP	USFWS	WDFW / LSRCP	
Rapid River	Chinook		32,000	20,000				52,000
McCall's	Chinook	20,000	32,000					52,000
Clearwater	Chinook	51,000	21,800					72,800
Pahsimeroi	Chinook		6,400	15,000				21,400
Sawtooth	Chinook	15,000	6,400					21,400
Magic Valley	Steelhead	24,600	10,400					35,000
Hagerman	Steelhead	19,000	8,100					27,100
Niagara Springs	Steelhead		22,300	6,000				28,300
Clearwater	Steelhead	16,800	7,000					23,800
Lookingglass (Imnaha AP)	Chinook		21,000					21,000
Lookingglass (Catherine AP)	Chinook		21,000					21,000
Irrigon (Grande Ronde, Imnaha)	Steelhead		14,000		31,400			14,000
Dworshak	Chinook		52,000					52,000
Dworshak	Steelhead		9,000			19,900		9,000
Lyon's Ferry (Cottonwood AP)	Steelhead		2,000				6,000	2,000
Grand Total		146,400	265,400	41,000	31,400	19,900	6,000	452,800

¹ Agencies are Idaho Fish and Game (IDFG), Idaho Power Company (IPC), Oregon Department of Fish and Wildlife (ODFW), U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife (WDFW), and Lower Snake River Compensation Plan (LSRCP)

A second issue in this fall's tagging operations concerns the portion of tags provided by the CSS at Lookingglass hatchery for release at Imnaha Acclimation Pond and Catherine Creek Acclimation Pond (Table 1). We were informed by BPA that certain lots of PIT-tags were being recalled because of a failed quality assurance test (see last two pages of this memo). Unfortunately, 20,000 of the 42,000 tags provided by the CSS through BPA to Lookingglass hatchery were implanted in Chinook smolts before the recall was implemented. In a quality

assurance report to BPA, it is noted that these tags, “will still be detected excellently in all of the antennas except for the corner collector antenna”. If this is true this has the potential to affect the juvenile parameters estimated in the CSS study mentioned in the preceding paragraph. Although these tags were implanted, because of the quality assurance testing and subsequent recall several other study groups remain unaffected by this.

These events highlight the need for *new and existing* manufacturers’ PIT-tags to undergo some level of quality assurance before use in the basin. These tests need to cover the following potential areas:

- 1) All PIT-tags have to have equal detectability at all sites within the basin, if there is a potential difference this need to be quantified. This would include all mainstem hydrosystem, traps, and in-stream detection sites.
- 2) Any collision between types of manufactured PIT-tags would need to be tested. In other words, does type A affect type B’s detection rate?
- 3) Are there any other effects of PIT-tag type on the antennas used to detect all PIT-tags?
- 4) Is there a difference in survivability across types of PIT-tags throughout all life stages?
- 5) Is there a difference in tag loss across all life stages for different types of PIT-tags?

Background

Since the fisheries community within the Columbia River Basin switched to the ISO-based 134.2-kHz system in 2000, Destron Fearing (aka Digital Angel) has delivered four major tag models (BE, ST, SST, and SST-1). Initially, Pacific States Marine Fisheries Commission (PSMFC) and NOAA Fisheries approved new tag models for use by the fisheries community based on laboratory and field tests that evaluated the reading performance of a subset of the first production tags under different conditions.

In 2005, PSMFC designed a test apparatus, called the Automated PIT Tag Test System (APTTS), to measure some of the electrical parameters (i.e., resonant frequency, turn-on voltage, and 3-dB bandwidth) on the test tags. The APTTS has been used since 2008 as part of the evaluation of new tag models and for analyzing a limited number of tags used in a few fish tests to try to correlate which values for parameters were important for determining how well tags perform. We do not know the exact answer to that question yet, but we have determined that tags that have low turn-on values and whose resonant frequencies are +/- 2 kHz are tags that have performed well in our network of PIT-tag interrogation systems.

Quality Assurance Testing of Production Tags

PSMFC started a Quality Assurance (QA) program using the APTTS this month (October 2010). They determined that vials from most shipments have tags that have similar parameter ranges to the tags that were initially evaluated for approving the new tag model (SST-1). However, they found that vials from the October 2009 shipment contained a higher than expected number of tags whose resonant frequencies were outside the desired parameters. Depending upon the parameter, 10 to 30% do not meet the desired ranges for efficient detection at the Bonneville Dam Corner Collector.

It is important to note that we believe these SST-1 tags, which are outside of the +/- 2 kHz range, will still be detected excellently in all of the antennas except for the corner collector antenna. We think they will perform at least as well as the ST tag model that gets detected excellently in all other antennas, but we are uncertain how they will perform in the corner collector. For this reason, PSMFC and NOAA Fisheries has recommended to BPA that we replace the October 2009 shipment with tags that meet the normal range of values for the electrical parameters recorded for the SST-1 tag model. Destron Fearing readily agreed to replace the tags as well as investigate why the higher than acceptable resonant frequency tags were included in our shipment, to decrease the probability of such lower quality shipments in the future.

We do want to stress again that vials tested from subsequent shipments (e.g., November and December 2009) contained tags within the acceptable range of resonant frequencies. Furthermore, we have never seen this level of unacceptable tags in the ~5,000 production tags we have tested for several small fish tests over recent years. We also know that Destron Fearing takes pride in having the best tags currently available and in having been the sole provider of tags for fisheries research. Therefore, we hope that this was an aberration. Since the plan in the future is to run these QA tests when the tags are delivered, we will be able to identify any

problems months before the tags are shipped out to the researchers. Consequently, this situation will not be repeated.

Steps for Tag Replacement

Tag vials received from the October 2009 shipment:

BPA Project #	Tag Recipient	Date Shipped	Box Code	Beginning Vial	Ending Vial	Quantity
1996-020-00-04	Brian Jonasson	ODFW	S477704	CU77900	CU77999	10,000
1996-020-00-04	Brian Jonasson	ODFW	S477705	CU78000	CU78099	10,000

Within seven (7) days of receipt of this email, each contractor who received tags from the October 2009 shipment is requested to evaluate the circumstances of any experiment for which tagging has not been completed. Please reply by email to both BPA (Sharon Grant: sdgrant@bpa.gov) and PSMFC (Jennifer Nighbor: Jennifer.Nighbor@psmfc.org) describing which, if any, of the tags that originated from this shipment need to be exchanged. We can only take back tags that are still in the original vials (in sets of 100). Please note that even if you are not requesting any exchange, a response is still required.

Upon your response, PSMFC will immediately (within 24 hours of request) ship replacement tags once the number of tags is identified. October 2009 tags must be returned to PSMFC with 14 days or receipt of replacement tags to the following address:

Pacific States Marine Fisheries Commission
Attn: Jennifer Nighbor
7103 W. Clearwater, Suite H
Kennewick, WA 99336

We will create new orders for the replacement tags in the Tag Distribution System and will send them, along with new clip files, to the same locations previously designated unless you advise otherwise. If you must subsequently ship tags out to hatcheries, or elsewhere, we can accommodate this change if the delivery information (and quantity) is also included in your response.

If, for some reason, this information suggests you might need to increase the total number of fish tagged to adjust for fish already tagged with the October 2009 tags, please contact Sharon Grant (503-230-5215). Because we are asking for replacement of all tags from this shipment, we will be able to provide these to the projects at no cost, once we have concurrence from the vendor that we will receive replacements for tags that cannot be returned.