

Fish Tagging Forum

Northwest Power and Conservation Council

Wednesday August 29, 2012

Introductions/Meeting Objectives/Recap of Last Meeting

- Kevin Kytola discussed work done to-date and what remains to be done, such as assessing whether any of the [2009 ISAB/ISRP report](#) comments require revisiting.
- The group discussed that the radio tag technology has not yet been presented and it may be informative to learn about current uses, such as:
 - o Bull trout studies that have used and are using radio tags to track movement;
 - o WDFW has conducted studies on summer/fall Chinook using radio tags;
 - o Leah Sullivan mentioned that in the past Grant County PUD has used them, but is not currently using radio tags; and
 - o Lamprey studies have also used radio tags, and Douglas County PUD may be using radio tags for a lamprey study within the next few years.

Report Back from Management Question Subcommittee

- Pat Frazier summarized the work done by the Management Subcommittee during its last conference call meeting on August 27. Of the 7 tasks assigned from the FTF Committee to the Subcommittee (See previous meeting notes), the Subcommittee focused on refining the direct responsibilities task. Specifically, the subcommittee:
- Defined 3 new categories to refine the 'direct responsibility' and refined the definition for the 'interest' categories. These new definitions are:
 - o Required: required by a forum to be done
 - o Funds: entity that funds the work needed (not necessarily carries out the work/implements)
 - o Implements: entity that implements or carries out the action that collects the information.
 - o Interest-Uses: forum that uses the information gathered on a regular basis, but is not required to use/fund/implement the work.
- Populated the content for the refined direct responsibility and interest categories for two tabs, Hydro and Harvest. The subcommittee populated the new categories by assigning:
 - o forums to the direct-responsibility –required category
 - o entities to the direct-responsibility –funds category
 - o entities direct-responsibility –implements category
 - o forums to the 'interest'-actual uses on a regular basis category

Pat stated that it took the subcommittee about 2 hours to complete each tab, for a total of 4 hours. The 2 tabs we completed were the Hydro and Harvest tabs, with a lot of discussion to explain the rationale for assigning a forum or entity to one of the new categories. The subcommittee decided that they needed participation from BPA, NOAA, and/or USFWS to assist with completing the remaining tabs.

Group Discussion

- Discussed the most efficient way to finish the remaining tables. It was agreed that a lead would be defined for each tab and supporting people identified to develop a first draft to be shared with the subcommittee (see next steps below).
- Discussed how the PUD's hatchery data (abundance and spawning ground composition to assess whether hatchery fish impact wild) would fit in the hatchery tab given the rationale for collecting that data and how it may also fit in the population and status recovery tab due to the data also being used by NOAA to assess population status and recovery.
- Discussed how to make sure that the information placed in the tabs doesn't lead to higher expectation on some entities/forum than is realistic, especially related to PUDs responses to the population status and recovery tab.
- Discussed whether we can we really expect to be successful for assigning a priority to the various questions within the tabs. The group indicates it should be feasible but may be very difficult to achieve. Likely would have different priorities depending on the entity/forum. We might need to determine which question 'must' be answered..
- Discussed whether prioritizing the questions is necessary given that the Council may be more interested if the right tag and work is being done than the prioritization assigned by the group to the questions.

Next Steps

- The full subcommittee will meet to address how best to modify the population status recovery tab so the PUDs aren't responding to the tabs in a manner that may misrepresents their responsibilities ([see management question spreadsheet](#)).
- The lead person or small group for each of the remaining tabs -- hatchery, habitat, predation, and population status recovery will schedule a couple of hours to complete the yellow section for the new categories of direct responsibility and interest only. The management questions and associated indicators are considered complete. The lead person (or persons) will complete these cells prior to sharing with the subcommittee. The leads for each of the remaining tabs are:
 - Hatchery: **Pete Hassemer**, as well as others identified by Pete Hassemer, Pat Frazier and Tom Rien will complete this tab. They will also consider inviting someone from NOAA to assist.
 - Habitat: **Council staff** will take the lead in completing this tab (Nancy L, Laura R, and Patty O).
 - Once completed, staff will seek input from BPA (Jason Sweet); perhaps someone from the states (Pat F will try to identify someone from

WASRFB, perhaps Jeff Breckel); and someone from NOAA that Tony Grover will identify, perhaps Scott Rumsey, Lynne Krasnow.

- Predation: **Jim Ruff** (Council staff) will take the lead in completing this tab.
- Population Status and Recovery: **Nancy L.** (Council Staff) will lead the task of completing this tab with assistance from Peter Hassemer and Pat Frazier. Nancy will also attempt to get input from other council staff, and someone from NOAA, perhaps Elizabeth Gaar and Scott Rumsey and/or Lynn C.
- Once the tabs are initially drafted, the subcommittee will meet to review the work accomplished by the lead(s).
- The goal is to have completed assigning forums / entities to the new categories of Direct Responsibility and Interest (Yellow) in time to report back to the FTF during the October 11, 2012, meeting.
- During the October 11, 2012, FTF meeting, the full committee will review the components of the draft management questions spreadsheet completed by the subcommittee. The full committee will be responsible for identifying which tags are or can be used for each management question.

Discussion of Otolith Marks and Microchemistry .

Lance Campbell, WDFW, presented on Strontium Chloride otolith marking in Columbia River salmon (mainly natural origin Chinook and chum) populations. PowerPoint currently unavailable due to copyright restriction, please contact speaker for more information.

- Lance described that, by using this technology, it is possible to determine a) what size the fish are when they enter salt water in the lower Columbia River estuary when the natural SrCl is picked up in the otolith; and b) residency time of juvenile salmon in the freshwater component of the estuary using the artificially SrCl marked fish since they can assess time between fish release and picking up the natural SrCl from the salt water component of the estuary. Outmigrating juveniles or adults can be captured for sample collection. Sample collection is lethal.
- Lance also provided a summary of the findings of studies completed to-date including evidence of residency in tidal freshwater portion of estuary and overwintering in tidal freshwater zone.

Group Discussion and Questions

- Why did you prefer to use otolith mark instead of something else? Because Chum are too small to mark with something else, they migrate at a small size that doesn't allow other types of marking technology.
- Are there any side effects to marking fish this way? Nothing really detected. Studies, in general, have determined that batch marking of otoliths didn't really have negative impacts on the fish.

- What is the turnaround time and process for this marking technique, what is the potential to use this mark in real time? It would be tight to get a sample in October and provide the results by February that is large enough for run forecasting.
- How many fish can be analyzed in a day? With the current system we can do about 100 samples per day per person. Right now don't have a fully automated way to process otoliths yet, but may be possible in the future.
- Information on recovery rates was not available but could be attained through conversations with Todd and Bryce.
- Costs for analysis
 - o \$100 to \$120 per sample for full life history analysis
 - o \$20 to \$30 per sample for mark identification
 - o There is not a long production history to have a solid cost benchmark
- SrCl marking is preferable to thermal marking in situations where marking in the field is required and can be beneficial to use since batch marking with SrCl bath can be performed outside the laboratory.

Jeff Grimm, WDFW, presented on otolith thermal marking. [See PowerPoint.](#)

- Jeff described the air-water temperature change marking technique – which is a desiccation method commonly used in Russia that works based on the egg experiencing about a 10 degree change (drop) between water temperature and air temperature, but this is more labor intensive since must spread out the eggs so they all warm to room air temperature. While marking can be achieved by increasing or decreasing temperatures, temperature drops are the preferred method.
- Jeff stated that about 6,800,000 fish per year are marked at the WDFW Kendall Creek Hatchery, with the number marked depending on species and river (800,000, 1 million, 5 million fish marked of different species and rivers). Jeff mentioned that about 12 to 15 million juvenile fish in the CRB are thermally marked and released. A total of about 30 million for all sockeye, pink, chum, Chinook and coho are marked in the states of OR, WA, ID, NV. In addition, WA, NV, and ID also mark kokanee, cutthroat trout, Atlantic salmon and steelhead.
- Jeff stated that the North Pacific Anadromous Fish Commission (NPAFC) designates the unique thermal mark patterns. Jeff mentioned that WA assists in coordinating the marking in WA (private and public) and in OR. They have the ability to fix errors that may occur during marking process (including accidents like missing the time to switch water temperature) to ensure we still maintain a unique pattern for the NPAFC. We do verify by taking a subsample once fish are marked to ensure we got the proper mark.
- Can do real time otolith reading, for spawning needs, by capturing spawning adults and their eggs and can read otolith and determine if the fish is marked or not, which determines if we should allow eggs to mature or not. Time to process to know whether

- a fish is marked or not marked takes 60 seconds on a good day. But it is a physical task so it is limited by human ability to process a certain total number of otoliths per day.
- Start up price may be high given the capital cost of the chilling equipment, but the equipment lasts about 20 years and can mark lots of fish. Average costs are:
 - o \$4 per juvenile/fry fish, try to read 5 fish per batch to ensure properly marked
 - o \$12 per adult fish to read and section otolith
 - o \$15 per Chinook adult fish to read and section otolith
 - One important consideration is using chiller vendors with an understanding of aquaculture to ensure that construction materials (e.g., copper) can have adverse effects on fish.
 - One person can section 500 to 1000 fry otoliths and determine NOR and HOR per hour. Can analyze 500 Chinook otoliths in 8 hours per day for in-season fishery management. From fish head to data in less than 1 min per fish.
 - Thermal marking has worked on wild fish in the field, but it is more effective for marking hatchery fish.
 - Pre-hatch marking takes about 2 weeks to implement the prescribed pattern
 - Post-hatch marking takes about 3 to 4 weeks to implement the prescribed pattern.

Group Discussion and Questions

- There is a finite number of mark patterns available for all the fish being marked, so when will you hit that upper limit of mark being available? We haven't hit that limit yet and don't know if or when we would. We do recycle our marks every 5 years. We are more concerned about avoiding duplication of marks.

Russell Langshaw, Grant County PUD

- See PowerPoint presentation on "[Comparison of Results from Otolith and CWT Marking at Priest Rapids \(PRD\) Hatchery.](#)"
- Russell stated that otolith marking of upriver bright fall Chinook at Priest Rapid Dam (PRD) Hatchery started in 2007 (with about 6.7 M fish marked). The goal of this work is to see if otolith marks can effectively be used to manage hatchery broodstock.
- Otolith marking allows discrimination of hatcheries and stocks which is not possible with just fin clipping.
- Russell mentioned that they had fairly low recoveries for CWTs, both at PRD hatchery and on spawning grounds. Whereas, otoliths account for about 95% of hatchery recoveries, while CWT expansions account for ~60-70% of recoveries. Otoliths, however, account for less than 10% of all carcass recoveries (through age 4).

Group Discussion

- Discussed both existing and potential future studies using otolith marks for fall Chinook; Tony Grover observed the wide range of possible studies that could use otolith marking, including:
 - o using Otoliths to conduct contaminant studies in Hanford Reach.
 - o how the relative chemical composition of scales can be used to determine the river of origin of fish. Lance Campbell suggested flipping the scale on its side to help do these analyses.
- Russell stated that otolith marking is preferred method for Grant PUD to identify PRD Hatchery fish; it is a cost-effective method to analyze at \$15 per fish. When asked why wouldn't Parental Based Tagging (PBT) work just as well? Russell responded that PBT would work, but it's much more expensive (approximately \$40 per fish).

Discussion of Fin Clipping and Mass Marking

George Nandor, PSFMC, showed a video called "[The Edge of Technology](#)" about mass marking trailers, with a goal of automating fin clipping and coded-wire tag (CWT) insertion for 25% of all hatchery production in the Central Valley of California. Each juvenile fish can be clipped and marked within 2-3 seconds.

- George stated that this is not a new technology and it has been around since the 1900s. The purpose of fin clipping is to identify particular stocks of fish, such as hatchery-origin fish, as recommended by ISRP. Fin clipping is also used for brood stock management to identify hatchery-origin fish component in the hatchery and on the spawning grounds. There was a regional data base developed in 1960s and 1970s to differentiate between various fin clips on stocks.
- For infrastructure, basically need to have a marking trailer. Mass marking trailers can have both automated and manual mark lines.
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- Costs vary, but usually run between \$30-40 per thousand fish marked.
- This technology is used to mark Chinook, coho and steelhead.
- Marking provides the benefit of maximizing the use of hatchery production since they are easily identifiable.
- automation uses a standardized marking procedure compared to manual marking and is therefore more consistent and effective.
- Limitations are labor time and large capital cost involved to purchase mass marking trailers.

Group Discussion and Questions

- How many trailers are there in basin? David Knutsen of Northwest Marine Technologies (NMT) said there are a total of 32 marking trailers on west coast; The trailers concept/design was funded through BPA programs about 14 years ago.

- A 1995 Washington State law and 2003 US Department of Interior law required visual marking of hatchery fish.
- What about effects of mass marking? Pete Hassemer said it is likely the most benign mark available, but there is a paper about the utility of the adipose fin for smaller sized fish for navigating turbulent waters. Likely only 2-3% mortality of mass marked fish.
- Randy said CA is proposing to CWT all hatchery production at \$.09 per fish (with 25% also getting adipose fin clipped). That allows for wading in tributaries and tubing in hatcheries to determine which are the hatchery fish.
- Marianne McClure also presented her 2003r [summary memo of mass marking](#) and selective fisheries issues.
- Tony asked why tribes are opposed to mass marking. Marianne said it is likely because of the handling effects and mutilation of a fin.
- Pete Hassemer pointed out that without ad clipping hatchery fish, there could be no opportunity for a sport fishery in Idaho; integrated brood stock management uses CWT only.
- Pat Frazier said WA stated mass marking is an effective and useful tool for brood stock management. Good example is in the lower Cowlitz River.
- Randy Fisher reminded the group we wouldn't need to conduct mass marking of hatchery fish if mitigation for the dams in CRB wasn't required. Randy suggests that this be a consideration in future discussions of "fair share" obligation for BPA.

Begin Discussing Approach to Cost-Effectiveness Evaluation Criteria with IEAB Representative

Bill Jaeger, IEAB and OSU, presented initial thoughts on how the IEAB may be able to assist the FTF with the cost effectiveness assessment task related to fish tagging. [See PowerPoint presentation.](#)

Group Discussion and Questions

IEAB Tag Cost Model

- Marianne M. said there are 3 components to tagging technology that need to be considered: tagging, sampling and data analysis, which makes it complicated. Bill J. responded by saying the IEAB is merely providing an economic tool that could be used to help the FTF understand cost effectiveness, give data inputs and assumptions coming from the FTF subject matter experts.
- It was noted that there are tradeoffs between extent of tagging and extent of sampling. If you tag less, you will likely have to sample more to achieve a similar level of confidence.
- How would this matrix model handle different jurisdictions, funders or implementers? Bill J. said this economic approach would focus on cost effectiveness first and address those differences later.

- Randy F. asked what does the IEAB think of the management question spreadsheet developed by FTF to date? Bill J. responded the management question spreadsheet is a good start for defining the “outcomes” necessary to anchor a cost effectiveness evaluation. Plus it’s difficult to address the cost effectiveness issue without getting into the details. Also, the Table 1 in the ISAB’s Tagging Technologies report (ISAB/ISRP 2009-1) is a useful product for this purpose.
- Tony G. reminded folks that the region is on the cusp of budget shortages now. BPA customers want the “biggest bang for the buck” to address critical management questions. If these questions are addressed in a cost effective manner, then the customers should support the gathering of necessary data. IEAB could help FTF in taking a cost effective approach.

BPA Budget Modifications

- Randy F. said BPA told PSMFC that its FY13 CWT program needs to get pared back by 35% by the end of October. That level of reduction will drastically affect the states’ CWT programs. Randy suggested that the FTF should be able to complete its work first to better inform these funding decisions.
- Pat F. concurred with Randy’s concern and said the tagging programs are needed to provide essential data for stock status and run reconstructions. NOAA Fisheries needs this type of data, too, and should weigh in on this issue. Tony G. said this group’s efforts are needed to try to reach substantial consensus, which will be important in influencing both the Council and BPA.
- Kevin asked whether the FTF should keep driving on our schedule given the parallel budget reduction exercise.
- Tony G. suggested providing a FTF presentation on the status of its work and schedule to the full Council at its October 9-10 meeting. This group needs to develop a solid work product.
- How will the Council respond to BPA regarding this budget reduction exercise? Tony replied that the Council requested BPA policy representatives, plus states, tribes and customer groups attend the September Council meeting to become more informed on this issue.
- FTF will try to have a conference call to discuss the FTF update to the Council before the September 27 packet day for the October Council meeting. Target September 17.

Timing of FTF Recommendations

- . The outcome of the FTF will likely influence regional policy decisions. It was recognized that the timing is off with the FTF work product and the current BPA budget reduction exercise. Therese H suggested that we should focus our efforts on some of the more important management questions, at least at first. Pat F. agreed that FTF should work on the highest priority management questions first.

Recap and Plan Next Meeting

- September 17th from 11am to 1pm
 - o a 2-hour conference call prior to the Council's October meeting to discuss and prepare for the FTF update to the Council.
- Subcommittee meeting to be held prior to October 11th meeting to review the work completed by the small groups on populating the remaining management question tabs (see item above for details).
- October 11th Fish Tagging Forum meeting agenda topics:
 - o Status report of completed work by the Management Question subcommittee and subgroups
 - o Discuss how best to prioritize the management questions
 - o Have a presentation(s) on radio tags