

San Joaquin Spring-run Chinook Technical Memorandum Group Meeting
Thursday, May 22, 2014, 2014
10:00 am – 12:00 pm

DRAFT Meeting Summary

Participants:

Barbara Byrne, NMFS	Jeff Stuart, NMFS
Elif Fehm-Sullivan, NMFS	Sierra Franks, NMFS
Jonathan Schram, NMFS	John Netto, USFWS
Monica Gutierrez, NMFS	Naseem Alston, NMFS
Rhonda Reed, NMFS	Jolie-Anne Ainsley
Garwin Yip, NMFS	Paul Cadrett, USFWS
Rob Nielsen, NMFS	Becky Victorine
Gary Sprague, NMFS	Pat Ferguson
Josh Israel, BOR	Mike Ford, DWR
Pat Brandes, USFWS	Sheila Greene, Westlands Water District
Chuck Hanson, Hanson Environmental	Susan Broderick, BOR

Meeting Purpose:

Mini-workshop and discussion about the use of surrogate and/or sentinel fish to track naturally produced juvenile Chinook salmon for achieving the intent of the 4(d) exception Rule, and the applicability for the tracking and accounting of reintroduced spring-run Chinook salmon to the San Joaquin River.

Jeff Stuart, NMFS Fishery Biologist – Presentation (15 minutes)

“Use of surrogate tagged salmonids in monitoring efforts”

Presentation Summary:

Jeff discussed two examples using surrogates currently being used in the Central Valley, California.

Example 1: Using hatchery produced, coded wire tagged, late-fall Chinook salmon as “trackable” surrogates for yearling spring-run Chinook salmon in the Sacramento River system. The assumptions for using surrogates are that similar-size wild spring-run Chinook will also be present in the system where and when surrogates are released and that they would behave and migrate similar to the surrogates.

Benefits: Can tag and hold surrogates until ready to release (within reason) and time releases to precipitation events that are expected to trigger wild fish to move. We can estimate a

population level of “take” under the ESA for a surrogate population and then extrapolate to the target population.

Disadvantage: Need to have estimates of survival throughout the system in order to estimate the level of take.

Example 2: Using hatchery winter-run Chinook salmon as surrogates for wild winter-run Chinook salmon in the Sacramento River

Winter-run are produced at the Livingston Stone National Fish Hatchery, adipose fin clipped and CWT'd for identification. In addition to tracking wild winter-run, hatchery winter-run overlapping sizes with naturally produced late-fall run and yearling spring-run means tracking hatchery produced winter-run fish could tell us about the movement and take of late-fall run and yearling spring-run that are present in the system at the same time.

Benefits: CWT's can provide us a lot of additional data about each individual fish, in addition to what we would also learn from the spring-run yearling example.

Disadvantages: When trying to calculate mortality of hatchery winter-run Chinook at both the Tracy Fish Collection (TFCF) and Skinner Fish Protective Facilities (SFPS), a lot of assumptions need to be made. For example: 1) Currently we assume that the Clifton Court Forebay survival rate is only 25%, but recent studies have shown that this number is actually an overestimate; 2) Currently we assume that the primary channel predation survival rate at SFPS is 100%, but this is most likely an overestimate; 3) Currently we assume that the primary channel predation survival rate at TFCF is 85%, but this is mostly likely an overestimate; 4) Currently we assume that the secondary channel predation survival rate is 100%, but this is likely also an overestimate since loss from facility maintenance and cleaning isn't accounted for; 5) Currently we assume that $(E_{PL}E_{SL})$ = Total louver efficiency, but this is likely not 100% correct.

Furthermore, since encountering a tagged surrogate at either facility is considered a rare event, and only ~25% of salvaged fish are handled and counted, what does a count of “0” surrogates actually mean when trying to solve a probability calculation (*i.e.* are there really no surrogates present, or were surrogates salvaged but not counted?)

Is the release population for surrogate spring-run appropriate? Typically late-fall run is far more prevalent than spring-run surrogates at either of the previously mentioned facilities, and it's possible that predators are keying in on spring-run that are being released into the system en masse.

Surrogate Discussion:

Gary: Have the facilities considered doing a CWT tube detection system?

Unfortunately, no. The physical infrastructure at Clifton Court isn't set up in such a way that it would be feasible to install such a system. Since so much water/debris/other fish/etc., passes through Clifton Court, it would be difficult to successfully and efficiently utilize a CWT tube detection system in this case. One possibility to better monitor surrogates is to implement PIT TAGs, and install PIT TAG antenna arrays at the entrances of the Bypass structures. Kodiak trawling for PIT TAG fish another potential option.

Josh: SJRRP benefit – facilities have gotten a lot better at reading CWT's daily and onsite. So trawling is a useful method when using CWT but you may have same surrogate issues. The problem with using CWT's is that it is a lethal detection method, i.e. you have to kill the fish to get the tag. Might not be a good idea for a program where you're trying to build a viable wild population of spring-run (SJRRP).

Barbara Byrne, NMFS Fishery Biologist – Presentation (15 minutes)

“Sentinels” in the 2012 Stipulation Study

Presentation Summary:

Barb covered the use of sentinels in the 2012 Stipulation Study, which used acoustically-tagged steelhead as a trigger for management of Old and Middle River Flows (export and inflows) in real time. Josh and Sheila were also involved in the development of this study in 2012.

The inflow:export ratio (I:E ratio) in the NMFS Biological Opinion on SWP/CVP operations is intended to improve outmigration conditions for San Joaquin basin steelhead by “protecting” some of the SJR water hitting the delta from being exported. At a given inflow, increasing the I:E ratio corresponds to greater mainstem San Joaquin River flows and less negative Old and Middle River flows. The I:E ratio action is in effect during April and May, the peak steelhead emigration timing as observed in the Mossdale Trawl data. In 2012, an experimental approach to OMR management was implemented in lieu of this I:E ratio action.

If a specified number of sentinel steelhead (steelhead from the Mokelumne River Fish Hatchery that were acoustically tagged) released near Stockton entered Railroad Cut (between Bacon and Woodward Island in the Delta), a region in which negative Old and Middle River flows are believed to affect outmigration, exports would be reduced in order to make Old and Middle River flows less negative.

The study assumed that sentinel fish were representative of “wild fish” in timing and behavior.

In the context of potential applications for the SJRRP, even if the sentinels are representative of the wild target population, the sentinels are likely to be a small fraction of the SJRRP spring-run and may be salvaged only sporadically. Therefore, using sentinels to estimate and subtract SJRRP fish from the daily loss densities will likely be more challenging than using them to estimate and subtract SJRRP fish from the annual take.

Only a few receivers could be downloaded for data processing daily. Quick turn-around time on analysis of acoustic data is difficult and limited in most cases. Another uncertainty with using sentinels is that it's often unclear whether acoustic tag detection represents a live sentinel fish, an eaten sentinel fish, or an excreted tag. This might not be an issue if tags are read in salvaged fish, however this could be an issue if tags are read upon entry into the Central Valley Project facilities (such as the Clifton Court radial gates or the CVP trash boom), since predation is known to occur inside the facilities. "Tag collision" caused by multiple tags in close proximity could occur if predators lingering in certain areas excrete multiple tags closely together.

Acoustic tags can be expensive.

VEMCO tags = ~\$300.

JSAT tags = ~\$200.

VEMCO receivers = ~\$1000, maybe more?

Benefits for using acoustic tags:

Great for spatial information and the receivers will detect tags in their vicinity 24/7. The more automated the process gets for analyzing acoustic data, the faster the data turnaround time gets (automated data cleanup and analysis speeds up the total analysis time).

Surrogate Discussion:

Sheila: How might we be able to structure the sentinel method into the SJRRP release of spring-run?

Could use release of fish in the first 3 years of the Reintroduction effort to test the sentinel method in monitoring.

Jeff: Fish caught at Mossdale seem to be larger, and might not fall in the winter-run size range, maybe more like spring run yearling size fish.

Chuck: Need to have a good idea of the wild:sentinel ratio, and doesn't like how much guessing there currently is using our most recent statistical models and equations.

Rhonda: Might not be as hard to determine the (wild:sentinel) ratio in the case of the San Joaquin, as there would be only one population of spring run in the river (sentinels) being released at the same time as wild fish are out migrating (wild, similarly sized spring-run).

Josh: Tag life varies, need to work w/supplier on this, and money should not be a barrier as previously discussed if we can help it. The SJRRP is currently using telemetry methods of monitoring. Need to align the questions we want answer with the technology available to maximize economic efficiency.

Susan: Green River Sentinel study might be a good comparison for what we might want to do in the San Joaquin. Will look into this further for the rest of the group.

Josh: Regarding the use of surrogates to assess relative loss. Rather than making decisions at the pumps based on daily loss estimates, we could look at seasonal management of exports based on seasonal loss as well. This might give us the full picture of loss of outmigrating salmonids on an annual basis.

Josh: Surrogates alone would not address the measuring of spring-run contribution to the SJRRP Reintroduction effort, and perhaps should be coupled with Juvenile Population Estimates (JPE's).

Will address the potential use of JPE's for the SJRRP in the next tech meeting (6/26/2014).

Action Items:

- Susan will research the Green River sentinel study and notify the group with what she finds when she can.
- The Use of JPE's for the SJRRP in combination with sentinels, will be a topic for discussion in the next tech meeting (6/26/2014).