Meeting Summary

# FISH WORK GROUP

Tuesday November 13, 2018

USFWS Office, Arcata, CA

## Tuesday, November 13, 2018: 9:30 AM

**Participants**

Core members: Kyle De Juilio (YTFP), Amelia Fleitz (USFS), Ken Lindke (CDFW, coordinator), Seth Naman (NMFS)

Other participants: Justin Alvarez (HVTFP), Mike Dixon (TRRP/BOR, via phone), Vina Frye (USFWS), Aaron Martin (YTFP, via phone), Eric Peterson (TRRP/BOR), Bill Pinnix (USFWS), Nick Som (USFWS), Shane Quinn (YTFP), Daryl Van Dyke (USFWS)

## Action Items Derived During the Meeting

Action Item 1: Seth Naman will send to the group a document compiled by Joe Polos that describes the history and origins of targets.

Action Item 2: Kyle DeJuilio will engage Nick Som and the habitat team to explore the possibility of running SSS simulations using the TRRP escapement goal of 62,000 natural-origin fall Chinook Salmon spawners.

Action Item 3: Seth Naman will talk to Wes Smith about objectives/targets for pool habitat that are under consideration by the physical work group, then report back to the fish work group to inform our conversation about adult holding habitat.

Action Item 4: Ken Lindke will discuss with Wes Smith the utility of holding a joint fish/physical work group meeting to discuss physical objectives/targets that may inform fish habitat objectives/targets.

## Action Items Outstanding from Previous Meetings

Action Item 1: Seth N. reported the following criteria for recovery and rebuilding of salmonids:

> A SONCC coho salmon population is considered recovered when “the geometric mean of wild adults over 12 years meets or exceeds the ‘low risk threshold’ of spawners for each core population”

A stock is considered overfished if the 3-year geometric mean of annual spawning escapements falls below the Minimum Stock Size Threshold, which is generally defined as $0.5*S_{MSY}$ or $0.75*S_{MSY}$. $S_{MSY}$ is the stock size of maximum sustainable yield. There are some exceptions to the definition of the Minimum Stock Size Threshold.

A stock is considered rebuilt when: the default criterion for determining that an overfished stock is rebuilt is when the 3-year geometric mean spawning escapement exceeds $S_{MSY}$.

Action Item 2: Ken L. reported that he recently spoke with Andy Hill regarding the mark-recapture data for reaches 1-2. Andy had completed data summaries back to 2005, but was unsure whether data prior to 2005 contained the information needed to complete the mark-recapture estimates and estimate the proportion of females. Ken will continue to pursue this with Andy.

## Summary of Meeting by Agenda Item

### Welcome and Introductions

The usual suspects were in attendance, with a few exceptions. Notably, the group welcomed new attendees Vina Fry and Daryl Van Dyke from USFWS.

### Agenda Review

Bill P. requested that we add updates on synthesis reports to the end of the agenda.

### Objectives refinements guidelines from IDT

All attendees indicated that they had read the new guidance memo provided by IDT in October. Consequently, we did not review the contents of the memo. Kyle D. proposed the idea of developing interim targets for objectives that may not be achievable in the short term, or within the realistic lifetime of the Program. He provided the example of mature cottonwood recruitment, which may not be achievable for 100+ years. The group agreed this may be worthy of consideration and did not conflict with the guidelines provided by IDT. It will be considered on a case-by-case basis.

Bill P. asked whether targets such as 62,000 adult natural-origin fall Chinook Salmon escapement are open for reconsideration. The discussion that followed appeared to revolve around the more general question of targets that are codified in TRRP foundational documents such as the ROD. Reconsideration of such targets is certainly within the scope of the guidance provided by IDT, so yes, those targets could be reconsidered. Per the new guidance any change

to targets will need to have a solid base of supporting scientific literature. In addition, it was pointed out that revising targets that are quantified in the ROD/EIS would require reconsultation, and there is also resistance within the Program to changing such targets. Bill pointed out that this could be a good opportunity to develop interim targets.

**25 June meeting minutes: metrics definitions**

Ken explained to the group what he believed to be an error in the definitions of methods (aka data sources) used to quantify adult escapement for salmon and steelhead that were agreed upon by the fish work group in their 25 June meeting. The group seemed to agree with his assessment, and he will email revised definitions to the group for editing prior to finalizing the 25 June meeting summary.

**Presentation on juvenile salmonid habitat modeling methods: WUA and Capacity**

Nick Som gave a presentation describing traditional habitat suitability models, such as Weighted Useable Area (WUA), and a new method using modern hierarchical modeling, referred to simply as Capacity. In short, traditional methods employ some form of univariate curves to describe relationships between habitat suitability and physical variables of choice, such as depth, velocity and distance to cover. Indexes are then derived as a combination of these univariate relationships, and, as is the case for WUA, weighted and summed across some geographic space. Nick presented some criticisms of these methods, which are summarized well in Railsback (2016) (citation below). One notable criticism is the fact that field observations used to develop habitat suitability curves often do not account for imperfect detection of fish, which is a particular concern when the factors that affect presence or abundance also affect detection.

The Capacity model is a stand-alone habitat model, but it was constructed specifically to be used as the habitat model for the Stream Salmonid Simulator (S3) model and was parameterized using data collected within the restoration reach of the Trinity River. This model simultaneously accounts for abundance and detection. Via a model selection exercise and interpretation of parameter estimates, Som et al. (2017) found that abundance was associated with interactive effects among the physical variables of depth, velocity, and distance to cover, and the model also accounted for variation that naturally arises via spatial and seasonal changes via random effects. The abundance model is further translated into habitat capacity by computing the 95th percentile in predicted abundance given values of the physical variables and variation over space and time, and can be calculated over 2D hydro model cells and summed over cells within a mesohabitat unit for population dynamics model applications. Further details and some beneifits provided by Capacity, as compared to WUA, are presented in Som et al. (2017).

Railsback, S. F. 2016. Why is it time to put PHABSIM out to pasture? Fisheries, 41:12, 720-725.

Som, N. A., R. W. Perry, E. C. Jones, K. De Juilio, P. Petros, W. D. Pinnix, and D. L. Rupert. 2017. N-mix for fish: estimating riverine salmonid habitat selection via N-mixture models. Can. J. Fish. Aquati. Sci. 75: 1048-1058.

**Discussion on means objectives, targets, and methods for juvenile salmonid habitat**

The specific objective at hand was: *Increase/maintain salmonid fry and juvenile rearing habitat*. The group quickly agreed that "maintain" should be removed from the objective because it seemed inconsistent with the objective of increasing habitat. Why, after all, would you want to maintain the inadequate amount of rearing habitat? The discussion then turned to the various components of habitat, highlighting the differences and relationships between physical habitat like depth, velocity, and distance to cover, and other components such as temperature and food. People agreed that all of these are important to juvenile salmonids, but that it may be difficult to develop a single target that could capture everything. Kyle advocated for continuing with a single objective, but developing more than one target that could address major components of habitat. For example, one target could address physical habitat while a second target could address food availability.

Kyle proposed the idea that targets could, or perhaps should, be defined in terms of changes to flow-habitat relationships rather than a numeric value. For example, we may wish to remove the "habitat dip" observed in the flow-WUA relationship in many parts of the river. The group discussed whether a change in the shape of a relationship alone would necessarily indicate an improvement in habitat. Could the shape change in a desirable way (e.g., eliminating the dip), but still represent an overall decrease in habitat (flow-habitat reduces overall)? Could habitat be improved without any change in the shape of a flow-habitat relationship (e.g., the dip remains, but the entire curve shifts up)? At the end of this discussion the group agreed that an increase in area-under-the-curve, compared to pre-restoration, should generally indicate an increase in habitat.

Ken pointed out that it would be ideal to evaluate habitat gains as compared to pre-TRRP restoration (i.e., prior to 2004) because that was the baseline considered by the authors of the ROD/EIS. The group discussed the challenges of achieving such a baseline, largely due to changes in the methods used to develop bathymetry and hydrodynamic models. Nick raised concern with defining a habitat target that depends on SRH-2D because the terrain model is updated only every five years. Is this an appropriate time interval to evaluate changes in habitat given that we alter the channel annually during restoration? Eric noted that the 5-year terrain model can be updated annually with as-built surfaces, if desired.

In the end, we did not reach consensus on the juvenile habitat objective and target(s). However, we did agree to remove from further consideration the 400% gain that has been the target for

many years. This interim target was developed for determining changes needed to detect a statistically significant increase in outmigrant abundance, and was not specifically related to changes needed to meet fundamental objectives. In addition, we agreed on preliminary changes to the objective and target as follows:
*Objective: Increase salmonid fry and juvenile rearing habitat by increasing area under the curve for habitat-flow relationship up to ordinary high water*
*Target: Increase area under the curve for habitat-flow relationship up to ordinary high water by X%.*

We are yet to identify the habitat index or model to use for the habitat-flow relationship or the percent increase that would be needed to achieve fundamental objectives. However, some discussion was had on ways to define juvenile habitat targets. S3 was proposed as a means to evaluate the increase in habitat that would be needed to meet some pre-specified increase in juvenile production. Gaming S3 with adult abundance inputs corresponding to TRRP escapement targets for fall Chinook could indicate whether habitat could support the resulting offspring. Kyle mentioned that an S3 scenario project was funded for FY2018, which may be used for this purpose. In addition, the group recognized that the TRRP habitat team should be involved in future discussions on the percent increase of area under the curve that may be appropriate to set as a target.

Kyle agreed to discuss gaming S3 for maximum numbers of spawners with Nick Som and the habitat team, and determine whether this scenario could be covered by the FY2018-funded project.

Aaron Martin expressed concern that the TRRP habitat team was not explicitly invited to the fish work group meeting considering their expertise in the subject matter at hand. Ken apologized and agreed to do so for future discussions on juvenile habitat. Justin mentioned that the habitat team intends to have new results and a meeting in early January. A fish work group meeting will be scheduled shortly thereafter, and the habitat team will be invited to present findings and participate in our ongoing discussion.

**Discussion on other means objectives and targets as the group sees fit**

*Objective: increase naturally produced green sturgeon adult production to the extend necessary to meet or exceed escapement objectives and facilitate expanded harvest opportunity*
The group agreed that protecting and enhancing the green sturgeon population in the Trinity River should remain an objective of the TRRP, but it is unnecessary for the Program to monitor the population or habitat, or infer Program success based on a quantifiable target. This is consistent with the guidance provided by the IDT.

*Objective: increase naturally produced Pacific lamprey adult production to the extend necessary to meet or exceed escapement objectives and facilitiate expanded harvest opportunity*
The group reached the same conclusion for lamprey as they did for green sturgeon.

*Objective: limit redd superimposition by increasing suitable spawning habitat areas*
This objective was recommended for removal. It is redundant with the objective to increase/maintain spawning habitat quantity and quality, and the group was unable to identify a management action that could directly affect redd superimposition (aside from increasing spawning habitat). In addition, we know that existing suitable spawning habitat is often unused even when superimposition occurs, and even in high abundance years.

*Objective: increase proportion of Natural Influence (pNI) used as a surrogate for genetic interactions, i.e., missing of hatchery and natural fish*
This objective was recommended for removal. The group was unable to identify management actions that would directly affect this objective, and they did not believe that TRRP had management authority over hatchery/wild interactions. In addition, pNI is only explicitly prescribed for Coho Salmon through the ESA, and CDFW and BOR are responsible agencies for management through the Trinity River Hatchery Genetic Management Plan.

*Objective: minimize fry stranding*
This objective was recommended for removal. This objective was considered redundant with flow ramp down rate targets, but the channel configuration conditions (e.g., riparian berms) that were the impetus for this objective have largely been resolved. This topic was discussed in more detail during the 19 January 2017 fish work group meeting, and further justification can be found in the last paragraph of those meeting notes.

**Updates on synthesis reports (added agenda item)**

In addition to the updates below, Bill reminded the group that Jenny N. requested written updates on synthesis reports to be provided to TMC at their December meeting.

*Cohort reconstruction*
Ken reported that very little work had been done on the project in the past few months. The project is largely on hold until sharing agreements can be worked out for the Klamath Ocean Harvest Model's cohort reconstruction sub model and coded wire tag data needed to run the model.

*Adult synthesis report*
Bill noted that he is waiting for Andy Hill (CDFW) to provide historic carcass mark-recapture data from reaches 1 and 2. Ken agreed to follow up with Andy on this data request. Kyle

reported that Chris Laskodi is working on an analysis comparing temperature to pre-spawn mortality and a separate analysis of a percieved shift in spawning distribution.

*Juvenile synthesis report*
Bill reported that not much work had been done in the past few months. He is waiting on data from Andy Hill, though the delay was more due to shifting workload priorities. USFWS is exploring a new method for some of the juvenile abundance estimates, and estimates will be recalculated depending on the results. No details on those methods were provided.

**4:00 PM Adjourn**