

Upper Sacramento Scheduling Team

Spring Management of Spawning Locations Subteam

Friday, September 10, 2021 | 11:30 a.m. – 1:00 p.m.

MEETING SUMMARY

Participants

Agency	Attendees
CDFW	Crystal Rigby, Doug Killam
DWR	Kevin Reece
Kearns & West	Alyson Scurlock, Terra Alpaugh
NMFS	Eric Danner, Rachel Johnson, Stephen Maurano
Reclamation	Elissa Buttermore, Josh Israel
USFWS	Kevin Niemela

Action Items

- **All** to provide input/add ideas to existing and proposed tools spreadsheet for discussion at next meeting on Wednesday, 9/22.
 - Include model suggestions, experimental tests, etc.
- **Elissa** to continue drafting sections in the study plan.
 - Add table to document ideas for experiments; columns could include timing components, questions the experiment would help answer, and identifying where there is synergy with associated efforts.
- **Eric** to look if have example figures that could be plugged into the conceptual model placeholder in the study plan.
- **Eric** to distribute link to the existing and proposed tools spreadsheet.
 - Include link to Dudley et. al 2021 manuscript in the spreadsheet.

Key Discussion Topics with Summary of Perspectives, Outcomes, and Agreements

Meeting Objectives

1. Review draft study plan, solicit drafting volunteers, and confirm schedule
2. Review the list of existing tools; begin evaluating whether they can be used to answer the most pressing questions around spawning location and timing needed to inform operations

Scope and Funding Recap

Kearns & West recapped updates on the study plan scope and funding since the last meeting in July.

- **Scope**
 - Includes topics that 1) help gain an understanding of how water temperature affects winter-run Chinook spawning distribution (i.e., timing and location) and 2) are relevant to Reclamation's operations (e.g., temperature management).

- **Funding**

- This Spring Management of Spawning Locations group is not a forum to develop funding agreements or make any decisions about funding efforts. The group should discuss the needs to meet the proposed action. At this time, there is no additional funding for studies. If the group identifies efforts that are within the scope, then it is possible that funding opportunities may be possible in the future. The process takes a while (several months to a year or longer). Funding opportunities will be competitive (i.e., not sole source). Elissa does not have the authority to obligate Reclamation to fund any efforts and will not provide any more details on their funding process to avoid violating the Antideficiency Act.

Draft Spring Management of Spawning Locations Study Plan Review

Reclamation reviewed the draft Spring Management of Spawning Locations Study Plan and asked for feedback from subteam members.

Perspectives and questions shared by subteam members included:

- **Objective Section**

- NMFS – Suggestion to incorporate spawn phenology, location, and fish conditions into the study plan objective. This seems like the right group to address these tradeoffs if they are within the boundaries of the Charter.
 - Reclamation – Is pre-spawn mortality a big issue for winter-run Chinook?
 - NMFS – This year, river temperatures increased rapidly with the temperature bypass and a significant number of winter-run Chinook were observed to have died before spawning. Concern that manipulating water temperatures can also influence normal cueing and disorientation. There are additional components related to conditions that should be considered for temperature management aside from spawn timing.
 - CDFW – Pre-spawn mortality is typically not a problem for winter-run Chinook during normal years. This year, a decent percentage of fish were observed to experience pre-spawn mortality in May/June.
 - NMFS – Because these actions are most important in drought years when cold water is limited, this year is likely very important to think about modifying water temperatures to preserve cold water. Managing spawn timing is related to the cold water pool resource. Pre-spawn mortality might be as common as a drought. Important to include in tradeoff landscape.
 - Reclamation – Study plan talks about evaluating how to improve temperature management and reproductive success of winter-run Chinook. Have not seen high pre-spawn mortality during recent droughts (1-2%). Temperature bypass this year is a management action that should be reconsidered if the focus is on pre-spawn mortality as the main factor of reproductive success of the population. Can look at thermal effects on adults and eggs and impacts to reproductive success. Thermal effects on fry will not fit into the study plan; can do write-up of how successful this year was to have information to evaluate as a potential action in the future.

- NMFS – Suggestion to articulate the role of water temperature in pre-spawn mortality and egg survival as it relates to reproductive success; specify that the adult life stage is included.
 - NMFS is currently working with CDFW to modify their approach to calculating temperature-dependent mortality (TDM) and to better capture CDFW's carcass survey data into their analyses. NMFS to look if have example figures that could be plugged into the conceptual model placeholder in the study plan.
- **Potential Experiments**
 - NMFS – What do people have in mind for experiments beyond CDFW's current redds and carcasses monitoring program? Could try different temperature management approaches for a year.
 - NMFS – If within scope, could go to the hatchery and test some amount of thermal intolerance of adults. We are limited to what can happen in the relationships that were found in initial publication that kicked off interest of this group. Would require more direct experimentation but may not be envisioned in initial scope of this study plan.
 - NMFS – Would water operations be considered as experiments? Could manipulate water temperatures one way or another as a test such as putting warmer or colder water during the springtime in years not constrained by cold water.
 - Reclamation – Did discuss that during the development of the Charter. Wanted to first focus on understanding the information that was already available.
 - NMFS – Potential idea: analyze juveniles that are captured dead at Red Bluff Diversion Dam (RBDD). Can look at otoliths to back-calculate hatchery distribution (high precision of +/- 1-2 days) and analyze reproductive benefits. Could reconstruct spawn date landscape. There are take considerations associated with this.
 - CDFW – Might require a lot of juveniles being sacrificed at RBDD to really get an annual trend. Many winter-run Chinook are not killed naturally at RBDD.
 - NMFS – Rotary screw traps at RBDD have good trap efficiencies. Could maybe take 2 winter-run Chinook per day and expand appropriately. Think the number of fish being sacrificed would be in the hundreds. Would need to determine smallest sample size, would need to be temporally stratified, and would have to have permits. This could also be done for fall-run since we are expecting temperature issues for them early in the season.
 - CDFW – Saw a lot of juvenile mortality after 2014/2015 event. Three years later, the distribution of fish significantly shifted upstream to the upper most section of the river. Might need to be teased out in the redd distribution data. Spawning is not always driven by current water temperatures; might be driven by water temperatures 3-6 years prior.
 - USFWS – Potential idea: could use hatchery and assign early arrival chinook to 2 treatment groups (one colder water and one warmer water). Hold for a couple months and look for differences in spawning.

- **Documentation of Ideas in Study Plan**
 - NMFS – Is the study plan a place to document and memorialize ideas even though proposals/funding need to come through other processes?
 - Reclamation – Concerned about committing Reclamation to studies that might not be funded, but helpful to talk about ideas. There may be synergy with other efforts that are already being planned through other teams.
 - Kearns & West – Suggestion for including a table in the study plan to document ideas for experiments; columns could include timing components, questions the experiment would help answer, and identifying where there is synergy with associated efforts. The group can then go through the list of ideas and identify items that are immediately implementable.
- **Project Schedule Section**
 - NMFS – How will implementation of the study plan work/where is it included in the timeline?
 - Reclamation – The study plan will be implemented at various timepoints in the schedule.
 - Kearns & West – The study plan currently has a few concrete milestones sketched out in the project schedule section. Suggestion to describe how/when each milestone informs operations.
 - Reclamation – Will add more details as continue to develop the study plan.

Existing Tools Discussion

NMFS reviewed an initial spreadsheet of existing and proposed tools and suggested workflow that can help inform spawn timing and location.

Perspectives and questions shared by subteam members included:

- NMFS – Suggestion to add column called “Monitoring or Experiment” to consider how monitoring can be used to test modeling predictions. Information about model inputs and/or any expected population responses can be included in this column.
- NMFS to include link to Dudley et. al 2021 manuscript in Google Doc and share Google Doc link for subteam members to provide input/ideas.
- NMFS – Suggestion to include SacPAS since it has been updated to incorporate spawn timing. How would spawn timing and/or spawn timing and location inform TDM egg models?
 - NMFS – Workflow may not be realistic. First, river habitat conditions would be forecasted and then the number of spawners would be forecasted. Next, analyze the reproductive success of adults and spawn timing and location. Once water temperatures and where spawning occurs are known, can address reproductive success of eggs.
- NMFS – Thinking about 2022, can any tools feed into the possibility of having a wider range of spawn timing or larger spawn location distribution even at the cost of TDM? During a wetter year, spawning will maximize further downstream or across weeks. Is there anything to help inform management between years?

- NMFS – Super important and complex issue. Expanding the range of spawning habitat downstream is what is needed for recovery. Tradeoff: during a drought, downstream redds are in danger. It will require a holistic approach for what the maximum downstream extent of cold water is that you can sustain over multiple years to sustain a larger spawning habitat geographically. Could address with Life Cycle Model or a linked model flow.

Next Steps

- Reclamation will continue to draft the study plan and will send out a revised copy to the group for feedback. Kearns & West will assist with consolidating comments.
- Subteam members will add to the list of existing tools to determine what tools are missing and what tools to be worked on.

Next Meeting: Wednesday, September 22, 11:30 a.m.-1:00 p.m.