

Lower Sutter Bypass Fish Subteam Meeting #3

September 30, 2021

Zoom recording:

https://kearnswest.zoom.us/rec/share/nNNT4UYqIIUHBWTcaigejYKICtaSsZYJOzCADdyZfg155bTL_Wd_QrYvy2CufI0Q.Ai47Cfh83_coAQz?startTime=1633017748000

Attendance

- Chris Campbell, cbec
- Maya Kepner, Dos Rios Norte
- Morgan Kilgour, CDFW
- Bruce DiGennaro, Essex Partnership
- Mark Henderson, USGS
- Rene Henery, Trout Unlimited
- Sharon Hu, Kearns & West
- Greg Kamman, cbec
- Jacob Katz, Cal Trout
- Bjarni Serup, CDFW
- Helen Swagerty, River Partners
- Steve Zeug, Cramer Fish Sciences

Outcomes from 9/20 Meeting [Timestamp 00:04:33]

- Project Objectives
 - Fundamental Objective was updated to incorporate “maintaining” agricultural viability and “flood conveyance” in a single sentence.
 - Jacob – To be clear, opportunities for improvements in ag viability, flood, ecological benefits does not mean there are not tradeoffs/compromises.
 - Means Objectives still need to be finalized.
- Modeling Discussion Outcomes
 - Conceptual models and including important variables in the models
 - Migration timing
 - Steve – CDFW has provided Butte Creek data. I still need to request DWR Feather River rotary screwtrap data.
 - Jacob will connect Steve and Jason.
 - Entrainment
 - Define triggers and thresholds for entry (function of inundation)
 - Feather entry needs to be looked at differently (velocities, flow splits)
 - Rearing – Can be represented in salmon ben model if it is universally applied in all alts.
 - Growth – Need to circle back.
 - Floodplain survival – Can rely on hydro regime.
 - Ocean survival – Need to circle back.
 - Rene - Steve, Jacob, Rene have met to discuss the fish model. Applicable to both floodplain and ocean survival.
 - Need to look at differences in **alternatives**.
 - HQT can measure alts in amount of habitat acres provided; uses a single window for salmon rearing.
 - How are different alternative acre-days meshing with movement of fish in the system (window is not appropriate for all flow scenarios).

- **Access** is key. Access is more complicated than fish acre days.
 - **Growth** in model is good metric to summarize effect of access x floodplain fish habitat.
 - **Distribution of timing for leaving the floodplain** is also a metric that combines growth, number, spread over time.
 - **Ocean survival** does not matter for this model. It uses outputs from other components of the model.
 - **Alternatives → how does this impact growth, number of fish in floodplain, distribution of time to ocean.**
- Bjarni – Re: not needing to know what happens in the river – Management actions in the bypass can change the fish when they leave.
 - Rene – Q for Steve – I assumed that fish were doing into river or to bypass, then they experience growth rate or survival rate within those two places. **Does management change hydrology and subsequent growth/survival in the river? If it doesn't change, then it doesn't matter to the model.**
 - Bjarni – I agree. To be more specific. We are releasing fish into river system with diff hydrology than if water enters/leaves floodplain with river hydrology. Does that impact immigration survival or enhance growth? Does this mitigate/reduce flows in river and associated survival?
 - Rene – Follow up question – **Conceptually, does holding back water on the floodplain change potential for survival in the river? If there is water on the floodplain, then amount of water is not in the river, independent of residence time of water. If more residence time, then more water going through the river (magnitude x duration). You have more water and more food on the floodplain. Should get into this later when we discuss conceptual model.**
 - Steve – Response to Rene – **Growth is based on temp, survival is based on flow.** Ops in the bypass will impact river fish via impact on in-river temps. Or flow at the station.
 - Bjarni – I am not concerned about water flowing into the river. I am concerned if management action will extend inundation in the bypass.
 - Steve – I see. It can if it effects water temps/river flow. Impact could be on the parameters of the model, not outcomes. If you hold back a lot of water, and dump water when temps are high, can affect survival. We don't have temp-survival relationship on these fish.
 - Jacob – We do not have these types of actions in the bypass. Volume of water in the shallow floodplain is inconsequential volume.
 - Bjarni – When I say “holding back water” I am referring to water amount as a proxy for fish. i.e. if there is a management action to hold fish back in the bypass, then the difference in hydrology that they experience when leaving the bypass is an issue. We know there is impact of high river flow on survival in ocean.
 - Jacob – Does elongating rearing period come with tradeoff with outmigration to river survival?
 - Bjarni – Response to Jacob – Management action to create flood habitat without flow is a different **management action** than creating floodplain habitat using river hydrology through a notch, etc. to inundate the bypass.
 - Rene – We know fish grow faster when there is food on the floodplain and that they outmigrate later when they grow slowly. We are holding water to create

fertile habitat, and fish might stay to rear. Or fish might rear in the Delta. We should design so that in different scenarios there are fish back in the river by a certain date, so that they do not encounter hostile conditions. Should be easy to see when conditions are lethal for fish if model has temp-survival relationship or a flow-survival relationship.

- Steve – Complex dynamics. Tradeoff is represented by two general triggers: 1) When temps are above 22 degrees, then fish of all sizes leave and move to the ocean; 2) When fish on floodplain grow faster, they leave faster.
- Jacob – Management actions, time of migration, fish size should all be input for how long hatchery fish are raised/released in April/May. Size is most relevant to marine survival.

Conceptual Model [Timestamp 00:30:30]

Bruce reviewed conceptual model and main components discussed:

1. Entry – When and where, triggers and thresholds. [00:48:45]
 - a. Bruce - Triggers and thresholds in the alternatives - needs more work.
 - b. Jacob – To summarize
 - i. Fish coming upper sac – timing of their migration is in RST data/Knights Landing data.
 - ii. DFW has data for Steve to parameterize Butte Creek.
 - iii. DWR rotary screwtrap Feather River data is on the way.
 - iv. Need parameter for how fish move into backwater conditions. Fish moving up from the bottom to take advantage of habitat, of their own volition.
 - c. Steve – Re: backwater conditions – If we know threshold flow level for backwater conditions/conditions that create this connectivity. When x starts, the proportion of fish increases at y rate as stage height goes up. We look at percentage of fish coming down. It can start at 5 percent, then go up 5 percent for ever cubic foot per second, for example. To create more access. Something like this?
 - d. Jacob – Effect of extent of habitat available, less on access. They have access/hydrologic connective into Lower Butte Creek all the time. Lower Sac Slough – where West Borrow pit of Butte Creek turns into Sac Slough. **Habitat quality** changes when surface water elevation increases, and inundates. Access is not primary driver.
 - e. Maya – Questions – 1) Data from CDFW and DWR, but will we also look at Carson et al data? 2) are we looking at just what is existing? Or regional concepts for what is happening that can change timing and water access for property.
 - f. Bruce – Response to Maya – Yes to both. 1) We are trying to get access to Carson’s data. 2) Re: alternatives, this team is looking at alternatives and need tools to compare alternatives.
2. Rearing – Habitat quality, growth and survival.
3. Exit – Where and when.
 - a. Rene – **Q to Bjarni [0:41:25]** – What should be threshold for cutting off when fish go back into river? If different than what is already in the model. We can just look at alternatives that satisfy sending more fish back prior to threshold.
 - b. Steve – I have spoken with Bjarni to discuss Cyril and Rachel recent publication – Observed acoustic data of predators in the Delta; a 22 C degree predation intensity. **We should circle back with Bjarni on his concern.**
 - c. [00:43:39] Jacob – 1) There is not a lot of water, so fish respond more to temp, seasonality more. 2) Fish are not cut off in any other Yolo discussions. There is volitional

movement so that they can respond to biophysical conditions and leave when it makes sense. 2) Window of ops – March 15, you start having higher solar angles. We usually start talking about cutting off here. If we are picking a date, usually it is early in winter when it is cold. 3) Where and when is taken care of in the model. Don't need to address.

- d. Rene – If there is a particular set of conditions that CDFW would like to set up as threshold, let's optimize alts to release fish by then. Fish will grow faster, outmigrate sooner on floodplain in the model.
4. Downstream survival – Delta and ocean.
- a. Bruce - Maybe we do not need this to compare alternatives