

SALMON BENEFITS AD HOC GROUP MEETING SUMMARY

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| MEETING DATE AND TIME | November 14, 2022, 10 am – 12 pm |
| MEETING LOCATION | Virtual Meeting, Zoom platform |
| MEETING OBJECTIVES | <ul style="list-style-type: none">• Recap from the previous Salmon Benefits Ad Hoc Group (May 2022)• Provide updates on the Salmon Benefits Model• Discuss and review revised salmon rearing habitat suitability criteria |
| ACTION ITEMS | <ul style="list-style-type: none">• Project team to discuss additional AHG meetings• SFEI to meet internally to discuss the necessity of an upper limit |

Key Confirmations

The following agreements are not final.

- Overall, participants noted that access (connectivity) is more important than habitat quality for juvenile salmon in this area. Participants also noted that potential adult stranding risk needs to be evaluated.
- Duration – The 14-day threshold is a reasonable compromise.
- Inundation Frequency – General consensus to remove this metric. There is no agreement on how first versus subsequent inundation events be weighted, and this will be captured by the productivity suitability criteria currently under development.
- Depth
 - *Lower Depth Bound* - .6 feet is acceptable, but should not receive full credit
 - *Upper Depth Bound* – There was disagreement over the value of including an upper depth bound.
- Velocity – There was general consensus that this metric is acceptable.
- Connectivity – This topic would benefit from further discussion. Consensus that connectivity is extremely important, and that any disconnection represents potential harm to fish. Timing of disconnection was noted as highly important. Value in performing sensitivity testing to better understand how connectivity is represented in the model.
- Land Cover. There was disagreement on value of this metric. Turbidity may be more important than vegetation for providing cover for juvenile salmon.

FLOODPLAINS REIMAGINED

- Floodplain Conditions – This metric was seen as redundant with connectivity criteria and may not be necessary to include in the suitability assessment.

Welcome and Introductions

Kayla Kelly-Slatten (Kelly-Slatten), Senior Associate at Kearns & West, welcomed all attendees, reviewed the meeting agenda, and objectives.

| Ad Hoc Group Attendees | Affiliation |
|------------------------|---|
| Andy Duffey | RD 70/1660, Butte Slough/Tisdale Irrigation |
| Baker Holden | U.S. Fish & Wildlife Services (USFWS) |
| Bjarni Serup | California Department of Fish & Wildlife (CDFW) |
| Brian Ellrott | National Marine Fisheries Service (NMFS) |
| Carson Jeffres | UC Davis |
| Craig Isola | U.S. Fish & Wildlife Services (USFWS) National Wildlife Refuge Complexes (NWRC) |
| Jim Earley | U.S. Fish & Wildlife Services (USFWS) |
| Justin Fredrickson | California Farm Bureau Federation (CFBF) |
| Laverne Bill | Yocha Dehe Wintun Nation |
| Mark Tompkins | FlowWest |
| Michael Paccassi | CDFW |
| Paul Buttner | California Rice Commission |
| Rod Wittler | U.S. Bureau of Reclamation (USBR) |
| Steve Rothert | Department of Water Resources (DWR) |
| Torey Byington | River Partners |
| Virginia Getz | Ducks Unlimited |

The following Program and Technical Team members attended:

| Program or Technical Team Member | Affiliation |
|----------------------------------|---|
| Alison Whipple | SFEI |
| Bronwen Stanford | SFEI |
| Chris Campbell | cbec |
| Eric Holmes | Kearns & West |
| Holly Dawley | KSN |
| Jenna Duffin | cbec |
| Jesse Rowles | cbec |
| John Stofleth | cbec |
| Kayla Kelly-Slatten | Kearns & West |
| Keith Marine | Aquatic Resources Consulting Scientists |
| Steve Zeug | Cramer Fish Sciences |

Recap and Update from May Salmon Model AHG

Chris Campbell (Campbell), cbec, reviewed the model and content from the last Salmon Model Ad Hoc meeting.

Group members provided the following comments/questions:

- Steve Zeug (Zeug), Cramer Fish Sciences – Noted that a series of model descriptions was distributed in response to technical questions received after the last meeting.
- Keith Marine (Marine), Aquatic Resources Consulting Scientists – Emphasized the importance of explicitly stating the parameters which are uncertain.

Salmon Rearing Habitat Suitability Approach

Allison Whipple (Whipple) and Bronwen Stanford (Stanford), SFEI, presented an overview of the current work with the Salmon Rearing Habitat Suitability Approach.

Overview of the Approach

Group members provided comments/questions on the following presentation topics:

Duration

- Brian Ellrott (Ellrott), NMFS – Inquired what happens with land that is not inundated or may have a value of zero, and is 14-days an acceptable duration?

- Response: Stanford, SFEI – Clarified that if depth criteria is not met, then it is not counted towards duration.
- Response: Carson Jeffres (Jeffres), UC Davis – Clarified that it usually takes three weeks to detect benefits with a first flood and about two weeks for secondary floods.
- The Salmon Ad Hoc Group discussed the importance of inundation and specifically noted:
 - Marine, Aquatic Resources Consulting Scientists – Commented on food type availability with one peaking during the spring with the initial phases of inundation followed by a peak in microcrustacean productivity.
 - Bjarni Serup (Serup), CDFW – Emphasized the need consider when a fish can access a floodplain and the importance of connectivity in addition to duration.
 - Jeffres, UC Davis – Expanded upon the importance that fish be out of the rivers where the water is warmer, food is more abundant, and there are fewer predators.

Inundation Frequency

- Campbell, cbec – Noted that there is a lot of pre-wetted land in the region that is managed for winter birds, and it will be important to capture those management regimes in the model.
- Marine, Aquatic Resources Consulting Scientists – Inquired why the first inundation event and subsequent inundation events have differing weighted values.
 - Bronwen, SFEI – Responded that if land has not been pre-flooded then it takes longer for productivity to ramp up.
 - Jeffres, UC Davis – Clarified that a pre-wetted system has food a lot faster than a first flush system.
 - Serup, CDFW – Commented that different inundation events will likely benefit different fish in which case it may make the most sense to weigh all inundation events evenly.
- Ellrott, NMFS – Suggested that frequently inundated cells be highlighted in in some way.
 - Whipple, SFEI – Responded that the productivity metric may act as a reasonable proxy for such a feature.

Depth & Velocity

Depth – Lower Bound

- Serup, CDFW – Commented that seven inches as a lower bound seems too low, but what matters most is if fish will utilize the habitat at that depth. However, it is not reasonable to support a management action to hold fish in habitat at that depth. Curious how accurate the data is for depth and velocity.
 - Jesse Rowles (Rowles), cbec – Clarified that the model output is at a fine scale, but the accuracy of the output is imperfect. In the past data has been rounded to .1 or .01 feet.
- Whipple, SFEI – Noted that the management depth is 10-inches or just three inches over the lower bound.
 - Marine, Aquatic Resources Consulting Scientists – Noted that a foot deep as a minimum seems reasonable to address the broad variety of landscapes that will be inundated.
- Paul Buttner (Buttner), CA Rice Commission – Requested clarification on the statement “for rice the criteria is 10 inches”.

- Jenna Duffin (Duffin), cbec – Clarified that 10-inches is an average condition that will be maintained for the season through pumping actions unless overwhelmed by a flood.
- Campbell, cbec – Cautioned that the needle be delicately threaded between what is imposed management across land types and the criteria/scenarios that need to be evaluated.
- Virginia Getz (Getz), Ducks Unlimited – Expressed concern over the broad depth range. The Bird Ad Hoc Group is proposing a depth range of 6 to 12 inches which would accommodate fish as well. Additionally, current proposals suggest rice be managed at 10-inches. In which case there may not be a need to develop a new range for fish given how other management scenarios dovetail with fish priorities. Ultimately, the key issue is connectivity.
- Kelly-Slatten, K&W – Polled the Salmon Ad Hoc participants and determined that the group is okay advancing with the lower bound of seven inches.
- Marine, Aquatic Resources Consulting Scientists – Cautioned that the use of the minimum depth metric may inaccurately represent the habitat. If one parcel of land is consistently .6 feet deep and another is averaged to six inches but has depth variability the latter is better but will be counted as the same in the model.

Depth – Upper Bound

- Serup, CDFW – Questioned if there is a need for an upper depth bound. At a depth above 6.6 feet there is an abundance of habitat and productivity.
 - Jeffres, UC Davis – Agreed with Serup. After above average water years there is usually a spike in the population, so the need for an upper limit may not be practical.

Velocity

- Marine, Aquatic Resources Consulting Scientists – Endorsed the use of binary metrics and the importance of identifying moving water.
- Zeug, Cramer Fish Sciences – Supported the inclusion of a velocity metric.
- Jeffres, UC Davis – Noted that the project area encompasses a mosaic of habitats, and if the depth or velocity in one cell flips off or on, then that likely indicates another cell will have an opposite reaction. That is why it is important to consider the large picture and not just the small scale.
 - Whipple, SFEI – Clarified that by applying criteria at a cell-by-cell basis it will support a larger floodplain wide analysis by looking at how cells turn off and on over time. Cells that are connected will be counted and this emphasizes the importance of the connectivity criteria.
- Zeug, Cramer Fish Science – Noted the discrepancy between the scale at which data is collected and the scale at which fish operate.
 - Jeffres, UC Davis – Clarified that there are many unknowns involved in the program, but decisions need to be made with the data that is available.
- Kelly-Slatten, K&W – Noted that the velocity metric is generally supported and should be included in the model.

Connectivity

Whipple posed the following question: How many days of disconnection should be allowed before reconnection?

- Whipple, SFEI – Clarified that seven days is typically used in the Central Valley Habitat Exchange. The modeling for that project does not deal with infiltration and evaporation, so it was a way to bracket that influence. Beyond a month would likely be too long.
- Serup, CDFW – Questioned why there is interest in counting inundated fish habitat that is disconnected from the fish population or may result in fish strandings.
 - Whipple, SFEI – Questioned if an individual cell is disconnected for a short period of time does it make sense to discount it if it may reconnect in the near future?
 - Marine, Aquatic Resources Consulting Scientists – Cited section 59.30 of the Fish and Game Code, noting that fish passage is a regulatory concern and that the time of disconnection is important because the implications are different between early migration and late migration disconnections.
- Kelly-Slatten, K&W – Suggested that the connectivity metric be postponed for further consideration.

Land Cover & Floodplain Conditions

- Jeffres, UC Davis – Questioned the need for the Land Cover & Floodplain Conditions categorization. There is little difference between land cover types from a food, cover, and predation perspective. Context is more important such as wet vs dry water years.
 - Getz, DU – Agreed with Jeffres as far as unmanaged vs managed wetlands. The central valley is predominantly managed, and managed wetlands possibly have greater productivity than unmanaged. The greater issue may be infrastructure as it relates to connectivity issues.
 - Campbell, cbec – Agreed that the Floodplain Condition criteria could be seen as redundant given how comprehensive the connectivity criteria is. The model will most likely consider ingress/egress, through structures, disconnection events, and more.

Adjourn

Kelly-Slatten thanked attendees and adjourned the meeting.