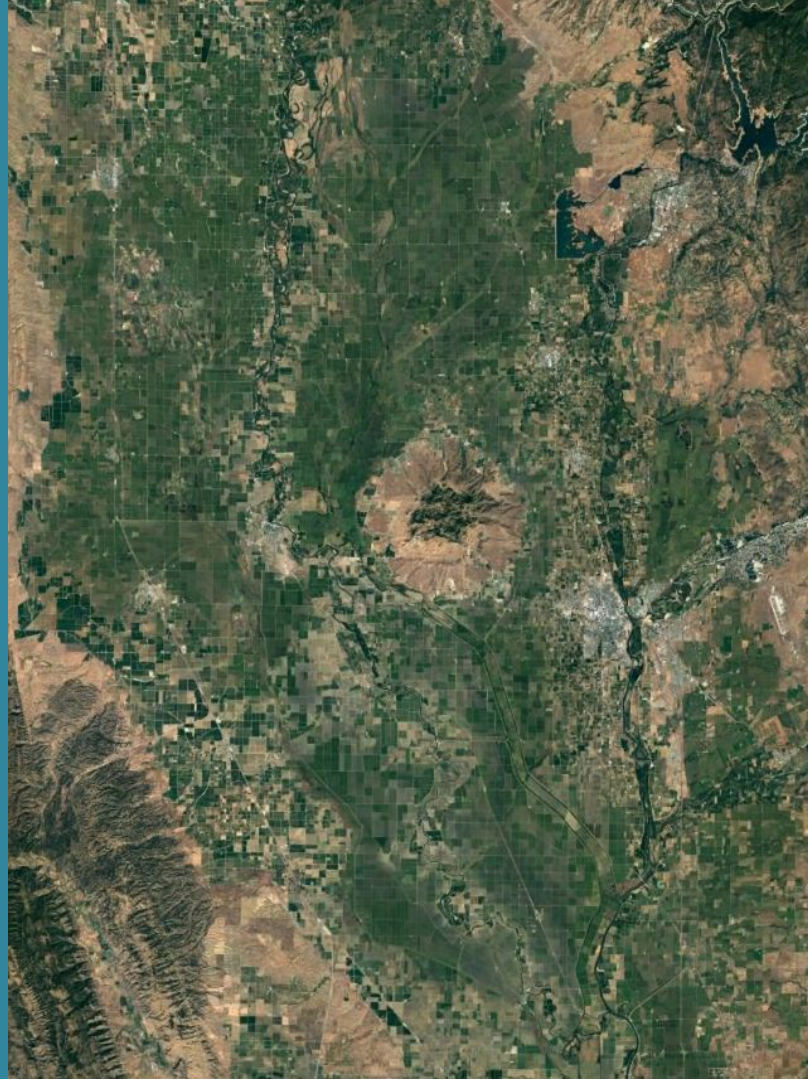
FLOODPLAINS REIMAGINED

Juvenile salmon floodplain habitat suitability criteria

March 22, 2023



Criteria development process

- Reviewed existing criteria from similar projects
- Three ad hoc group meetings
  - Meeting 1 (May): Introduction to overall approach
  - Meeting 2 (November): Review of initial criteria
  - Meeting 3 (February): Review of revised criteria
- Sensitivity testing of criteria using the Sutter model (results shared with ad hoc group and available upon request)
- 3 levels of suitability
  - Good condition = 1
  - Sub-optimal = 0.66
  - Poor/unsuitable = 0

Proposed juvenile salmon floodplain rearing habitat suitability criteria

Criteria	Source	Range	Value
Timing	CVHE	November 1 – June 30	1
Duration	SHCM	≥ 14 days	1
		< 14 days	0.66
Depth	CVPIA SIT/ VA/ Yolo 2012 RPA	> 0.9 ft	1
		0.6 - 0.9 ft	0.66
Velocity	CVHE	≤ 1.5 ft/s	1
Connectivity	Based on AHG feedback	Naturally inundated areas are connected if hydraulically connected to each other and upstream/downstream waterways	1
		For managed fields: A connectivity event starts when a field perimeter berm overtops and ends when the field becomes disconnected via all structures or depth drops below 0.6 ft. There are two types of potential connectivity within a connectivity event:	
		Field berm overtopping (initiates connectivity event)	1
		(proposed management action) Within a connectivity event with flow over the outlet weir or through the leaky outlet structure, where field depth is at least 0.6 ft. Assumes that boards are pulled at 0.6 ft depth to allow egress.	0.66
		Outside of a connectivity event	0
Land Cover	based on AHG feedback	Riparian / Wetlands / Open Water	1
		Rice / Other Ag	0.66

Assumptions

Following discussion with the AHG, the following assumptions were made. Each of these topics is an area of uncertainty and can be explored more as the analysis progresses.

- **Cover:** Assumed that areas with natural vegetation provide better habitat, due to variable depth, cover, and easier access.
- **Depth:** Assumed that there is no negative effect on juvenile salmon of increasing depth.
- **Connectivity:**
  - Assumed that juvenile fish will have suboptimal (0.66) volitional egress through outlet structures.
  - *[If we include this scenario]* Assumed that juvenile fish will have suboptimal (0.66) volitional egress through leaky boards, and those boards will be pulled to prevent stranding.
  - Assumed that juvenile fish will be entrained onto fields during berm overtopping events.
- Assumed that access to increased suitable habitat area will be beneficial for juvenile fish.

Feedback from meeting # 2	Response
Inundation frequency - not required, particularly given the plan for a separate productivity assessment	Inundation frequency criteria removed.
Depth - 0.6 ft min depth should not receive full credit. Remove the upper depth threshold.	Removed upper depth threshold to simplify interpretation. Assigned partial credit to depths 0.6-0.9 ft.
Connectivity - extensive discussion, and need for more illustration and sensitivity testing. Uncertainty whether any length of disconnection is allowable.	Criteria revised. Created diagrams to illustrate revised criteria, and performed sensitivity testing for review today. No longer allowing any days of disconnection and reconnection to count as "connected."
Land cover - uncertain whether this is valuable, given that turbidity is often the most relevant type of cover for fish	Tech team recommends retaining land cover to represent the value of more variable depths and more likely refugia in natural land cover.
Floodplain conditions - redundant with connectivity criteria. Consider removing.	Floodplain conditions absorbed by connectivity criteria. Removed as standalone criteria.
Approved by group at November meeting: criteria for timing, duration, velocity	

Feedback from meeting # 3	Response
Depth - Discussion over whether depths >6ft are still optimal habitat. Observation that these deep depths represent a huge volume of habitat, and our HSI are all from stream systems	Decision to provide full credit to all depths >0.9 ft. Will note this uncertainty.
Connectivity - Need to clearly distinguish connectivity that allows both ingress and egress from connectivity (e.g., through outlet weir) that only provides egress. Need to be realistic that movement through weir and other structures will be challenging. Stranding potential must be evaluated.	Will perform an assessment of stranding potential. Will experiment with visualizations distinguishing types of connectivity more clearly. Agree that simply including connectivity as one of the criteria is not adequate. Will continue to engage the SC and AC on this topic.
Land cover - Uncertainty how much additional value natural cover provides compared to crop fields. Likely value from variable depth (refugia), cover, and ease of movement.	Tech team recommends retaining land cover to represent the value of more variable depths and more likely refugia in natural land cover.
Other comments - Important to consider adult passage. Important to remember that this is modeled suitability, not actual fish benefits. Should consider each of these criteria separately to properly evaluate patterns.	These important points have been documented and will be carried forward into results interpretation and visualization.

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