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Managing Water in the West

NMFS – Reclamation Stakeholder Conference Call

Shasta RPA Draft Proposed Amendment

September 21, 2017

U.S. Department of the Interior
Bureau of Reclamation

Conference Call Objectives

Provide status updates on:

1. Coordinated Modeling Update
2. Science Plan Update

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Science Plan

- Purpose of the Plan
  - Inform adaptive management related NMFS RPA Action Suite I.2
  - Identify monitoring, modeling, analysis, and synthesis needs to reduce uncertainty on how actions may achieve fish and water management goals
  - Coordinate activities from agencies, stakeholders, and other interested parties
- Purpose of Today
  - Solicit feedback on a proposed framework (What's missing?)
  - Request management questions (What are the interests?)

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Proposed Science Plan Outline

- Purpose
- Background
- Conceptual Models and Frameworks
- Management Questions
- “What We’re Doing Now”
- Technical Approach
  - Related Project and Program
  - Coordination Forums
  - Data Access and Availability
  - Methods and Study Design
- Activities
- References

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Conceptual Model Example: Winter-Run Chinook Salmon Management

(Windell et al 2017)

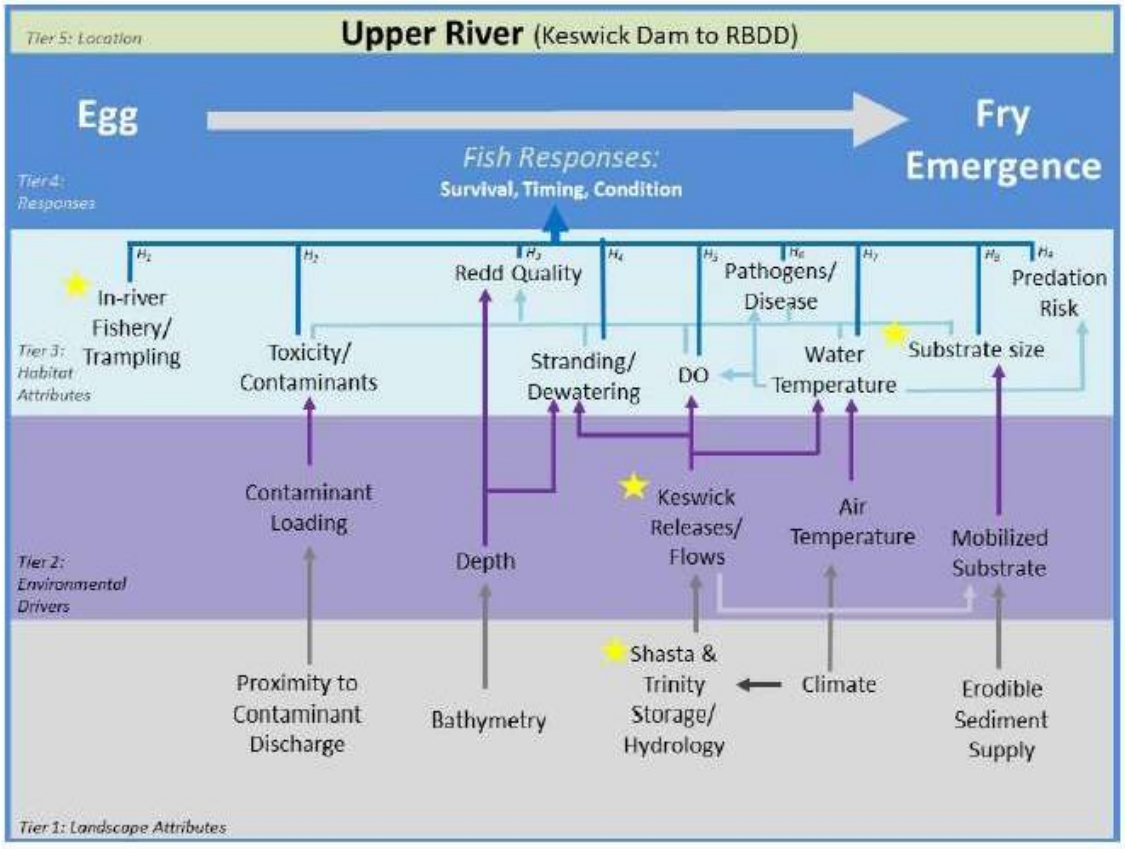

Figure 3. Conceptual model of drivers affecting the transition of SRWRC from egg to fry emergence in the Upper Sacramento River. Hypotheses referenced by the "H-number" are identified in the conceptual model 1 (CM1) narrative. Management actions are denoted by stars and are described in Table 1.

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Environmental Water Framework

- Sustain populations
- Activities stabilize the natural population

- Improve juvenile productivity
- Activities increase survival and carrying capacity through flow and non-flow actions

- Avoid extinction
- Activities are off-the-shelf contingencies due to predicted stressors

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Egg Mortality Conceptual Models

- Critical Temperature Curves
- Dissolved Oxygen Limits
- Background Mortality
- EPA 7 DADM

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Management Question Introduction

- Management questions provide a top down approach to direct resources to activities.
- A tiered approach can help organize questions.
- What do we do about fish?
  - What do we do about fish above Red Bluff Diversion Dam?
    - What do we do about temperature management?
- Think about the actions we may take.
- Think about why we might take them.
- Try to trace those back to a fundamental need for fish or a water supply operation.

Example Draft Tiered Questions #1

- What are the bounds of feasibility (storage, climate, etc.) driving availability of cold water volumes?
  - What are reasonable biological objectives for temperature dependent mortality?
    - To sustain a population in drier years?
    - To restore a population in wetter years?
  - How do we prioritize storage and the available cold water pool?
    - What are the appropriate egg to fry biological mechanisms to model?
      - Are there thresholds that optimize temperature dependent mortality?
      - Do we manage for dissolved oxygen demand?
        - » Are the fish oxygen deprived?
        - » What else can we do to meet oxygen?
      - Have we appropriately characterized background mortality?
    - What facility improvements might improve volumes of cold water?
  - How might additional populations above Shasta or in Battle Creek change requirements below Keswick Dam?

Example Draft Tiered Questions #2

- Are there unanticipated effects to fish from temperature management?
  - Do we encourage spawning in higher risk locations?
  - Does colder incubation impact survival after emergence?
- What are the non-temperature factors that may relieve pressures on cold water management?
  - Does improving spawning habitat reduce sensitivity to temperatures?
  - Can improving rearing and migration habitat improve survival enough to reduce pressures on egg to emergence?
  - Does trading cold water for out-migration cues provide a benefit to populations?
  - Are there disease or predation factors?

Example Draft Tiered Questions #3

- What operations tools are required for cold water management?
  - What models are required to represent water temperatures?
  - Do we adequately count fish at Red Bluff Diversion Dam?
  - How do we account for potential air temperatures?
  - What metrics and targets are meaningful for operating to achieving biological objectives?
    - Are there spring metrics that can estimate stratification?
    - What is the relationship between carryover storage and cold water availability in a subsequent year?

Example Activities

- Updating Temperature Modeling Tools
- Red Bluff Rotary Screw Trap Monitoring
- Genetic Signatures of Drought Conditions and Disease in Central Valley Salmonids

Management Questions Next Steps

- Email Management Questions to:
  - Josh: JAIsrael@usbr.gov; and
  - Garwin: Garwin.Yip@noaa.gov
- Reclamation and NMFS can compile and organize management questions into tiers.
- Please feel free to setup a time for discussion.

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Science Plan Next Steps

Steps to Success	Target Dates
Collect input on management questions and Science Plan	September-October 2017
Final version of Science Plan	November-December 2017
Study prioritization and planning	January- June 2018-2020
Study funding and implementation	October 2018- September 2021
Study Status Reporting	Semiannually WY 2019-2021
Monitoring Status Reporting	Open data approach
Biological Review Panel (Independent review of final findings and monitoring)	September 2019, 2021, 2023