DRAFT REVISED SUBSTITUTE ENVIRONMENTAL DOCUMENT IN SUPPORT OF POTENTIAL CHANGES TO THE WATER QUALITY CONTROL PLAN FOR THE BAY-DELTA: SAN JOAQUIN RIVER FLOWS AND SOUTHERN DELTA WATER QUALITY

Recommendations for Refinements Through the Application of Science Based Objectives

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Key Points

In order to achieve fish population recovery (CVPIA), **proposed flows must support the conditions required by fish populations:**

1. **Proposed flows should be evaluated against quantitative, science-based objectives** for the habitat conditions required by salmon and other imperiled fish species

2. **Quantitative objectives have already been developed**

3. **Existing objectives should be applied** to ensure flow prescriptions are sufficient, to guide the development of non-flow measures, to constrain flow management, and to serve as triggers for adaptive management or additional actions in the case where objectives are not achieved.

Proposed flows should support conditions required by fish populations

- **Fish habitat is composed of multiple interacting components** including water (quality/ quantity), soil/ substrate, vegetation, and invertebrate prey availability

- **In order for a fish population to be successful, habitat conditions must be met** for each individual life stage, across all the habitat components necessary for that life stage
  - Flow is only relevant in relation to life-stage specific thresholds for flow mediated habitat attributes

Proposed flows should be evaluated against science-based objectives

- **Objectives quantify, establish targets for, and provide a basis for monitoring progress** towards
  - **habitat conditions** necessary to achieve the desired fish population response
  - cohort **and population characteristics** indicative or supportive of that population response

- **Quantitative Objectives for habitat condition**
  - **Maximize benefits** associated with any flow prescription to address the specific needs of a species
  - **Enable an evaluation of the biological opportunities and trade-offs** across different flow management scenarios
  - **Highlight habitat needs not achievable with flow in isolation** as well as the potential to achieve equal benefit with less flow through the addition of other habitat improvements

Additionally…

- **Objectives serve as a framework to link actions** from multiple contexts (e.g. SWRCB, FERC, CVFPP, CVPIA, NMFS) towards a common result (e.g. Salmon recovery)

- Because no one process or planning effort can achieve recovery on its own, **recovery is doomed to failure in the absence of a common set of objectives**

Fortunately….

Quantitative objectives have already been developed

- **Science Evaluation Panel (SEP)** - Recently completed objectives for the Stanislaus River (SWRCB workshop – Feb 2017)

- **Central Valley Flood Protection Plan** (Appendix H) provides a detailed analysis of floodplain habitat needs in order to support CVPIA salmon targets for all CV rivers within the State Plan of flood control

- **NMFS Recovery Plan** for Central Valley Chinook Salmon and Steelhead (WR, SR)

- **Temperature objectives for different life history stages** (DFW, EPA) have been established and are applicable to evaluate flow proposals

Note: above objectives are not conflicting

Existing objectives should be applied to ensure prescriptions are sufficient,

Apply objectives:

- **to evaluate sufficiency of habitat extent and quality** achieved under flow prescriptions (e.g. Rosenfield Slides)
    - Wetted Acre days are not meaningful unless related to objectives (fish need)
    - Wetted acre alone does not constitute suitable habitat (duration, depth, temp, velocity, cover, etc.) – significant overestimate

- **to guide the development of non-flow measures** or, to ensure that when combined with non-flow measures from other processes objectives can be achieved with prescribed flows
    - E.g. increasing habitat with changes to topography and veg

- **to constrain flow management** to actions that improve the likelihood of achieving desired conditions
    - prioritizing those life history stages that are most impacted

- **to serve as triggers for adaptive management** or additional actions in the case where objectives are not achieved.

What the Process should look like

SEED Date

- **Objectives**: to quantify what is needed
- **Flow Prescription Development**: to achieve objectives/ make up for deficit (quantitatively)
- **Flow analysis against objectives**: to quantify performance relative to need and deficit/ surplus
- **Flow refinement and non-flow measure development**: to achieve objectives make up for deficit (quantitatively)

Adap. Man.

- **Implementation:** of flow and non-flow measures with the expectation (hypothesis) of progress towards objectives
- **Monitoring:** to track progress against the objectives using objective based metrics
- **Adaptive Management**: to implement additional actions a) when habitat objectives not being met or b) when biological response is not occurring

Specific Requests/ Recommendations

Develop flow prescriptions that specifically support CVPIA Targets:

- **Include analysis of flows against existing objectives in the SED** including: CVFPP (Floodplain habitat needs), EPA (Temperature), SEP (Habitat conditions and extent for Egg incubation, spawning, holding)
  - **Refine existing wetted acre analysis to include measures of habitat quality**
- **Demonstrate that flow prescriptions are capable of achieving objectives**
- **Quantify and Specify Non-flow measures in the SED**:
  - In the (likely) case where flow alone is not sufficient to achieve habitat objectives
- **Identify objective based flow management constraints in the SED**
  - Ensuring that flow management within the bounds or prescriptions is maximized for biological benefit