Memorandum

To: Lindsay Correa

From: Chris Earle, Rick Wilder, Marin Greenwood (ICF), and Chandra Chilmakuri (CH2M)

Date: November 18, 2016

Re: Response to Independent Review Panel Request for Information Regarding Longfin Smelt Analysis Changes

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The Independent Review Panel requested more information about what changes were made or not in the Biological Assessment and 2081 permit application based on their Phase 1 review of the longfin smelt analyses.

In response, there were no recommendations made by the Panel specific to Longfin Smelt. There were, however, two general recommendations that apply to Longfin Smelt that we respond to here:

1. Recommendation 11 ("That boxplot and exceedance plot figure legends state that the plots exclude model uncertainty, unless that uncertainty can be incorporated.")
    - Response: See 2081 Permit Application Appendix 4.A, *Longfin Smelt Quantitative Analyses,* Sections 4.A.1.2 and 4.A.1.6 (specifically Figures 4.A-2, 4.A-3, 4.A-31, and 4.A-32).
2. Recommendation 13 ("That time series plots such as Figure 4.A-7 omit the solid lines depicting the point predictions from the fish response model, because the point predictions are unlikely to be the actual future outcomes.")
    - Response: See 2081 Permit Application Appendix 4.A, *Longfin Smelt Quantitative Analyses,* Sections 4.A.1.2 and 4.A.1.6 (specifically Figures 4.A-4 and 4.A-33).

In addition, Section 2.4, *Effects on Longfin Smelt*, of the Panel's Report notes several sources of uncertainty in the evaluation of Longfin Smelt that can limit the ability to draw conclusions with confidence. The section leads to the following conclusion:

> "Given the persistent uncertainties about the risk and vulnerability of Longfin Smelt to the PA, the Panel reinforces the BA's emphasis on real-time management and monitoring to minimize entrainment effects under the PA." (p. 5)

- Response: All five agencies, as well as other stakeholders, are committed to the Adaptive Management Program and monitoring. This is reflected in the July 2016 Final Biological Assessment Section 3.1.5, *Real-Time Operations Upstream of the Delta*, and Section 3.3.3, *Real-Time Operational (RTO) Decision-Making Process*, by bolstering descriptions of real-time operations and decisions-making.

Section 2.4.1, *Particle Tracking Model (PTM) issues for Longfin Smelt*, also warrants a response:

"Because the DSM2 model is a one-dimensional model, the open water regions of Franks Tract and Mildred Island are each represented as a continuously stirred tank reactor (CSTR). The DSM2 model has been calibrated such that the input/output from the CSTR can represent salinity intrusion into the Delta system. The use of the CSTR was not intended to represent the actual circulation patterns in these open water regions. Therefore, if particles are getting "stuck" in the CSTRs, this is likely a limitation of the model representation of circulation in these regions. All the CDFW suggestions on page 4 (draft AALS) to improve the PTM results assume that the underlying transport physics are well represented. Unfortunately, this is likely not the case" (pp. 48-49).

- Response: Open water areas in the Delta are typically represented by a "reservoir" in DSM2. As noted in the comment, DSM2 treats the reservoir as a completely mixed tank. DSM2 does not capture hydrodynamics and salinity within the open water body. It tries to mimic the observed flow exchange between the surrounding channels and the open water body.

  In a PTM simulation, if particles end up in a reservoir, PTM determines the number of particles leaving the reservoir in any timestep based on the following output from the HYDRO module for that timestep:

  - Volume of water in a reservoir
  - Flow through the outlet(s) of the reservoir

  For each particle in the reservoir, the probability that it exits through any one outlet is determined by the ratio of flow through an outlet and the volume of the reservoir.