**COMMENT FORM**

**FOR SUBMITTING PROPOSED CHANGES TO THE**

**CENTRAL VALLEY PROJECT IMPROVEMENT ACT**

**CHINOOK SALMON COARSE RESOLUTION MODEL**

Please provide one form per issue

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**Submodel of Concern**: Juvenile Survival Submodel

**Submodel Parameter of Concern**: Flow vs. survival relationship for Sacramento River

**Issue of Concern (provide a concise narrative describing the issue of concern)**: New analyses have indicated flow:survival relationship is nonlinear, and is best fit by a step function.

**Proposed Change to the Model (provide specific changes to the model, and identify parameter or data values when applicable)**: Survival should vary in response to flow in the Sacramento River, with a step function. Specifically, survival for acoustic tagged spring-outmigrating (i.e., fall-run and spring-run) salmon smolts that experienced flows below 4,259 cfs as measured at Wilkins Slough gauge was 3.0%, 18.9% for flows between 4,259 and 10,712 cfs, and 50.8% for flows above 10,712 cfs.

**Scientific Rationale for the Proposed Change to the Model, including Specific Hypotheses and Support From Published/Unpublished References or Ongoing Research and Monitoring Activities**: Previous studies have found a linear relationship between Sacramento River flow and river survival (Henderson et al., 2019; Kjelson and Brandes, 1989). However, these studies did not investigate the potential for the relationship to be non-linear. A recent analysis conducted by myself, Jeremy Notch, and Flora Cordoleani (UCSC/NMFS-SWFSC) indicates that a step function relationship is significantly better supported than a linear relationship. This could have significant impacts on DSM scenarios, both in deciding the magnitude of pulse flows and minimum base flows in the Sacramento, as well as assessing the potential impacts of the two.

**Instructions on How to Integrate the Proposed Change into the Model**: Change flow survival relationship for Sacramento River to follow the step function described above. Also, I suggest that any base flow or pulse flow DSM scenarios utilize the flow thresholds described above.

**Citation(s) of Documents Supporting the Proposed Change to the Model (provide a full citation as would appear in a published journal article, *and* provide copies of the reference or unpublished data sets)**:

 Michel., C. J., J. J. Notch, F. Cordoleani. *Currently in NOAA internal review*. Nonlinearities in the flow-survival relationship for juvenile Chinook salmon, and implications for ecologically functional flows in a highly managed river system.