Appendix B

Supplemental Modeling Results for New Alternatives

EXHIBIT FOLSOM-25
(excerpt from SWRCB-3)

Appendix B
Supplemental Modeling Results for New Alternatives

B.1 Alternative 4A CALSIM II Sensitivity Analysis

B.1.1 Introduction

Given the similarities between the Alternative 4A included in the REIR/EIS, and the Alternative 4 of the draft EIR/EIS, a brief sensitivity analysis was performed using Alternative 4 CALSIM II models to understand if the incremental changes associated with Alternative 4A would be consistent with the incremental changes found for the Alternative 4 when compared to the No Action Alternative. This section summarizes the sensitivity analysis performed for Alternative 4A using CALSIM II models. It includes a summary of the CALSIM II assumptions and presents key CALSIM II model results from the sensitivity analysis.

B.1.2 Alternative 4A vs. Alternative 4

As described in Section 4 of the REIR/EIS, Alternative 4A is a dual conveyance alternative with proposed north Delta diversion (3 intakes of 3,000 cfs each), and existing south Delta intakes consistent with the Alternative 4 in the Draft EIR/EIS. Operational components of the water conveyance facilities under Alternative 4A would be similar, but not identical, to those described under Scenario H in Chapter 3, Section 3.6.4.2 of the Draft EIR/EIS. In contrast to the Scenario H operations proposed for Alternative 4 in the Draft EIR/EIS, under Alternative 4A, the decision tree process would not be used to determine the outflow criteria to be applied at the start of new operations. Instead, Alternative 4A includes a new criterion for spring outflow to specifically avoid unacceptable effects on longfin smelt, and also includes the Fall X2 requirements in the FWS (2008) BiOp. Thus, Alternative 4A operational criteria is similar to Alternative 4, and would fall within the range of Alternative 4 H3 and H4 decision tree outcomes.

Alternative 4A includes new facilities including north Delta intakes and the permanent head of Old River barrier, which would be operated based on the proposed operating criteria for each of these facilities, consistent with Alternative 4. Additionally, Alternative 4A includes a new minimum flow criterion at Rio Vista from January through August consistent with Alternative 4. All other criteria included in the FWS (2008) and NMFS (2009) BiOps and State Water Resources Control Board Water Right Decision 1641 (D-1641), including Fall X2, the E:I ratio, and operations of the Delta Cross Channel gates and the Suisun Marsh Salinity Control Gates will continue to be complied with as part of the continued operations of the CVP and SWP.

Alternative 4A would not include operational elements associated with Fremont Weir modifications as they would be assumed to occur as part of the No Action Alternative as may be required by the existing NMFS (2009) BiOp. Alternative 4A, further, only includes a limited portion of the tidal habitat restoration considered under the Conservation Measure 4 (CM4) of the draft BDCP that could affect the operations. In contrast to the 65,000 acres of tidal habitat restoration considered in the Alternative 4 from draft EIR/EIS, Alternative 4A would include less than 200 acres beyond the

tidal habitat restoration required under the existing FWS (2008) BiOp, which would also be part of the No Action Alternative.

B.1.3 Modeling Approach

For this sensitivity analysis, Alternative 4A was assumed to be represented by the Alternative 4 H3 and H4 scenarios modified from the draft EIR/EIS, as two bookends. Table B-1 summarizes the differences between Alternative 4 and Alternative 4A that would potentially affect the CVP–SWP operations, and associated CALSIM II modeling assumption for the Alternative 4A sensitivity analysis. A full description of the CALSIM II modeling, and the assumptions used for Alternative 4 are included in the Appendix 5A *Modeling Technical Appendix* of the draft EIR/EIS.

Alternative 4 H3 and H4 CALSIM II models from the draft EIR/EIS were modified to include following specific changes to represent Alternative 4A in this sensitivity analysis.

- ANN used in CALSIM II to simulate flow–salinity relationship in the Delta under Alternative 4 was modified to be consistent with the No Action Alternative, which does not include any effects associated with tidal habitat restoration in the Delta.
- Fremont Weir notch was not included consistent with the No Action Alternative.
- Assumed D-1641 agricultural salinity compliance location on the Sacramento River at Threemile Slough was reverted back to Emmaton location consistent with the No Action Alternative.

All the remaining CALSIM II assumptions for Alternative 4A remained consistent with Alternative 4 including the assumptions related to the water supply allocation and reservoir balancing. These sensitivity runs did not include any additional refinements.

Table B-1. Differences between Alternative 4 and Alternative 4A that Potentially Affect the CVP–SWP Operations

	Alternative 4	Alternative 4A	CALSIM II Assumption for Alternative 4A Sensitivity Analysis
Spring Delta Outflow beyond D-1641 requirements	Included as part of Alternative 4 decision tree scenario H4	Included; outflow requirement within the range of Alternative 4 decision tree scenarios H3 and H4	Modeled as two scenarios with Alternative 4 H3 and H4 Delta outflow criteria as bookends
Fremont Weir modification, and operations	Included as part of CM2	Not included; considered as part of the No Action Alternative	Not included
Tidal habitat restoration	Included as part of CM4 (25,000 acres at ELT and 65,000 acres at LLT)	Less than 200 acres beyond 8,000 acres required under FWS (2008) BiOp	Not included
Shift of D-1641 Emmaton water quality compliance location to Threemile Slough	Included as part of Alternative 4 in the Draft EIR/EIS	Not included	Not included

Alternative 4A sensitivity analysis CALSIM II models were simulated for both Early Long-term (ELT) and Late Long-term (LLT) conditions. ELT conditions represent projected climate change (Q5) at about year 2025 and a sea level rise assumption of 15 cm at the Golden Gate Bridge. Similarly, LLT conditions represent projected climate change (Q5) at about year 2060 and a sea level rise assumption of 45 cm.

For the Alternative 4A sensitivity analysis Alternative 4 CALSIM II models from draft EIR/EIS were used as is, without including any recent updates to the CALSIM II since the draft EIR/EIS was completed, to remain consistent with the draft EIR/EIS modeling.

This approach allowed in verifying if the draft EIR/EIS modeling could be used to inform Alternative 4A impact analysis in the REIR/EIS.

B.1.4 Results

A representative set of key CALSIM II results from this sensitivity analysis are included in this section for both ELT (Figures B-1 – B-36) and LLT (Figures B-35 – B-72) conditions. Results presented include:

- Probability of exceedance plots of end of May and end of September storage conditions for Trinity, Shasta, Oroville, Folsom and San Luis (CVP and SWP portions) reservoirs.
- Monthly flows averaged by water year type (wet and dry) for key locations on Trinity River, Sacramento River, Feather River, American River, San Joaquin River, Delta Outflow and Combined Old and Middle River flows.
- Probability of exceedance plots of the spring and fall average X2 conditions
- Probability of exceedance plots of the annual total Delta exports
- Long-term average proportion Delta exports from the north and south intakes

Each figure includes five (5) scenarios as summarized below:

1. NAA: No Action Alternative
2. A4_H3: Draft EIR/EIS Alternative 4 H3
3. A4_H4: Draft EIR/EIS Alternative 4 H4
4. Alt4A (H3): Draft EIR/EIS Alternative 4 H3 without CM2, withoutCM4 and without shift in Emmaton compliance to Threemile Slough
5. Alt4A (H4): Draft EIR/EIS Alternative 4 H4 without CM2, without CM4 and without shift in Emmaton compliance to Threemile Slough

As shown in the figures Alt4A (H3) and Alt4A (H4) CALSIM II results are generally similar to A4_H3 and A4_H4, respectively. The results indicate that the incremental changes for Alt4A (H3) and Alt4A (H4) when compared to the No Action Alternative are trending similar to A4_H3 and A4_H4, at both ELT and LLT.

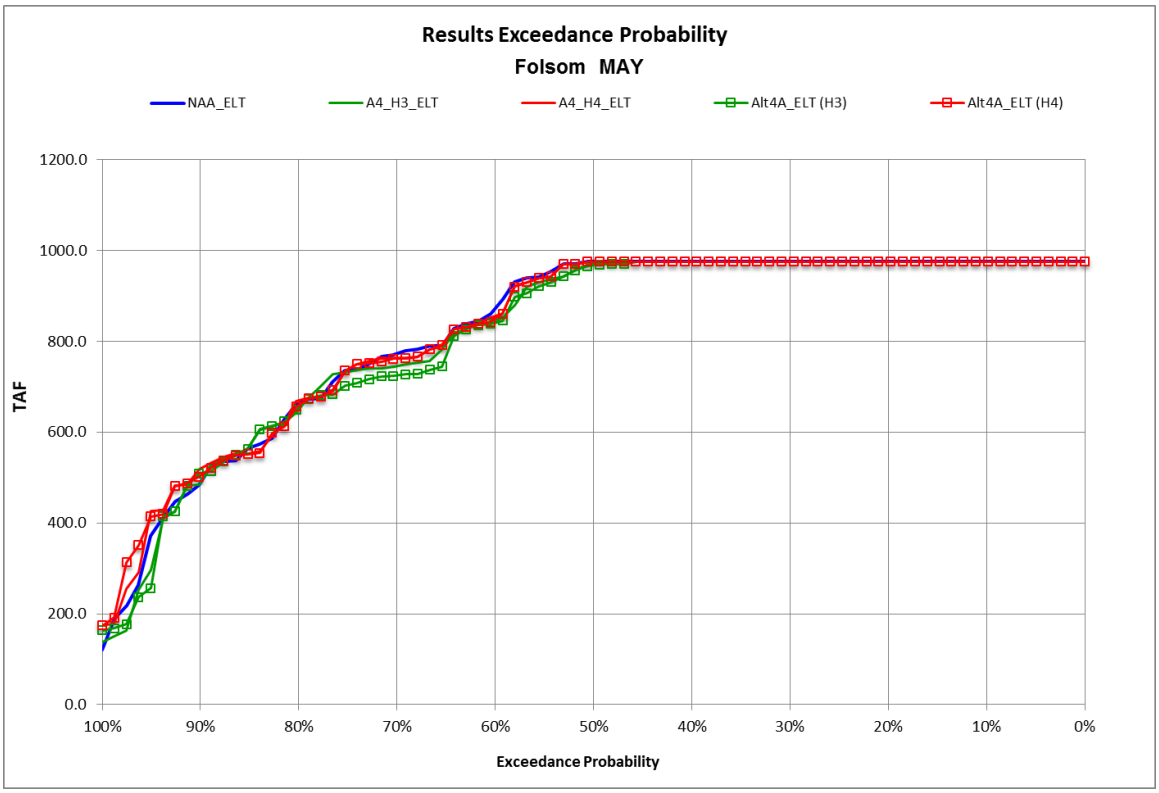

Figure 7. Storage Exceedance Probability for Folsom, End of May (ELT).

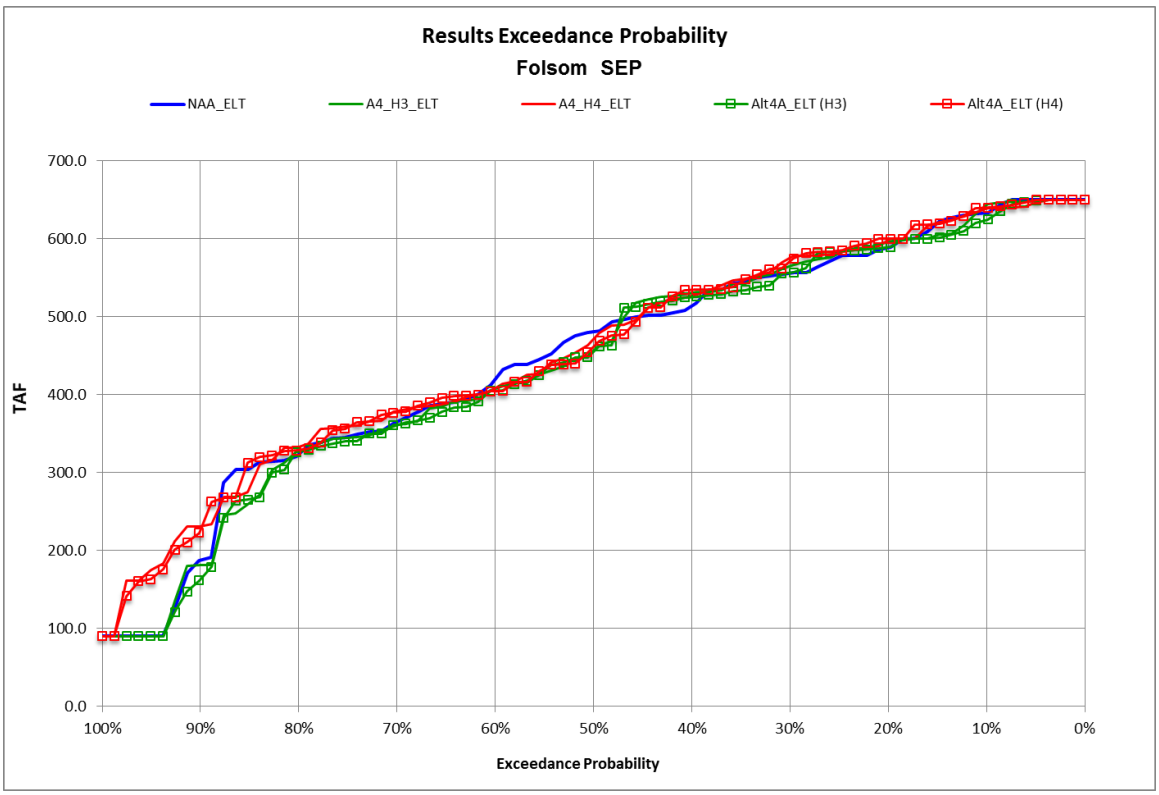

Figure 8. Storage Exceedance Probability for Folsom, End of September (ELT).