Operations and Water Quality/Level Impacts from CM1

- Clarify constant "low level" pumping based on various flows
- Summary of immediate post project water stages and quality, looking at daily modeled values
  - Geographic focus areas: North Delta at Freeport, Sutter Slough, Steamboat, Ryer and Prospect Islands
- Review of outflow and export by water year type as well as representative years
- Review restoration location and climate change assumptions used in water quality modeling
- Review effectiveness of avoidance/mitigation for Delta water quality impacts

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Constant "Low Level" Pumping

- Applicable during December through June.
- Allows diversions of up to 6% of the river flow for flows greater than 5,000 cfs upstream of the north Delta diversion.
- No more than 300 cfs at any one intake, with a combined limit of 900 cfs for the three intakes in Alternative 4.
- The low level pumping is constrained such that the river flow downstream of the intakes never falls below 5,000 cfs.

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SUMMARY OF IMMEDIATE SIMULATED WATER LEVELS FOR ALTERNATIVE 4 AT ELT

(Results from model runs used for BDCP document)

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Water Surface Elevations in the North Delta

- Water surface elevations in the Delta channels simulated on a tidal scale over a 16-year period (WY1976 – 1991), using the DSM2 model.
- DSM2 flow boundary conditions are from monthly CALSIM II outputs.
- Model results over the 16-year period for BDCP Alternative 4 decision tree scenarios are compared to the No Action Alternative at Early-Long Term (ELT).
- Daily maximum and daily minimum water levels are presented to understand BDCP effects across the tidal cycle.
- Results demonstrate expected changes in water levels under BDCP (changes due to modified CVP-SWP operations, north Delta diversion, large-scale tidal marsh restoration, and sea level rise).

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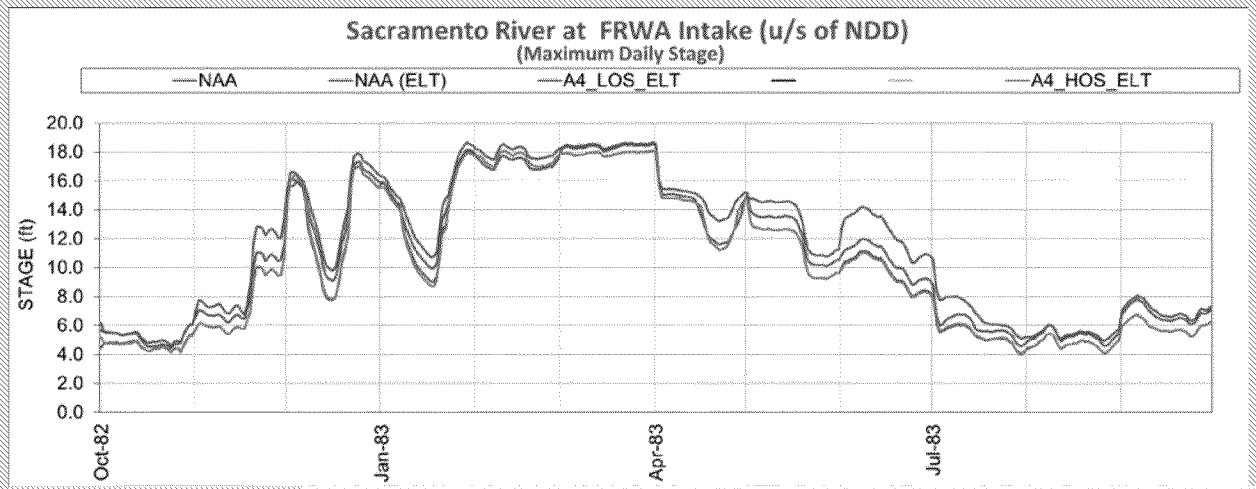
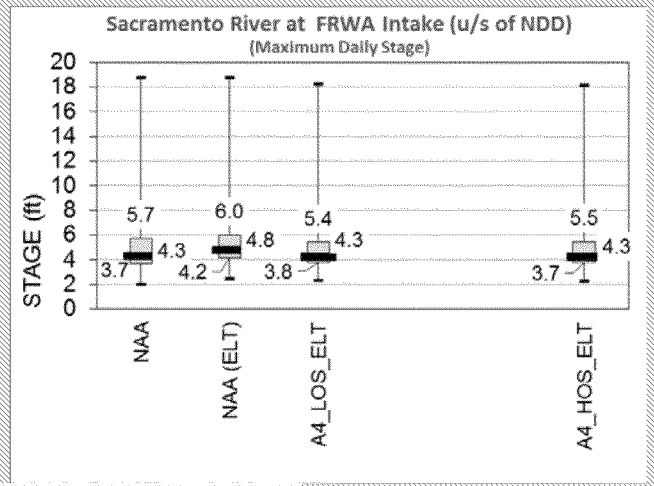
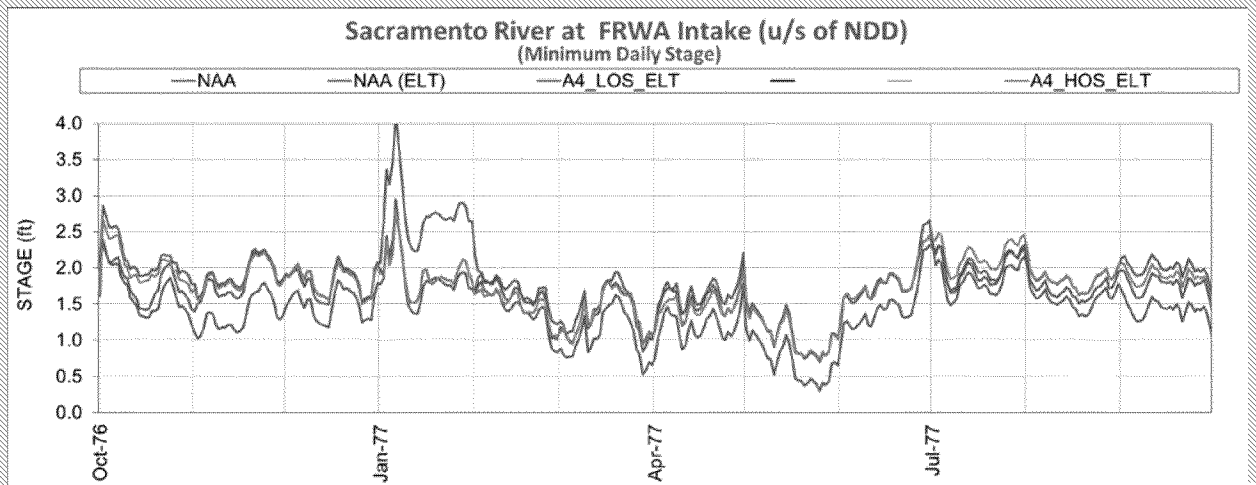
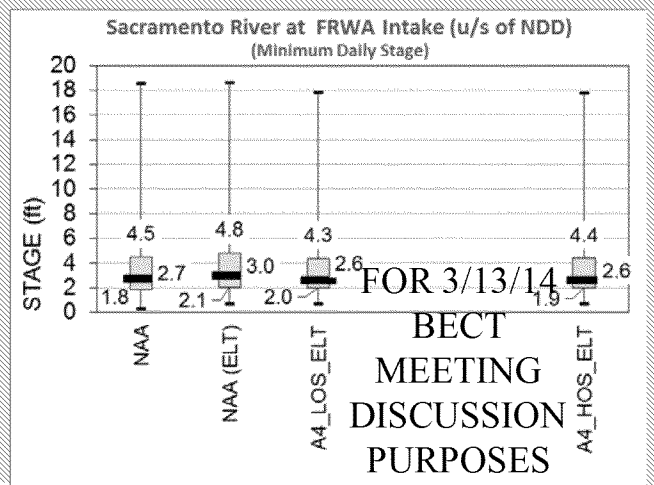
Sacramento River upstream of NDD
Simulated Water Levels at ELT





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
90% of days less than	**12.2**	**12.5**	**10.7**	**10.7**





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
10% of days less than	**1.3**	**1.6**	**1.6**	**1.6**

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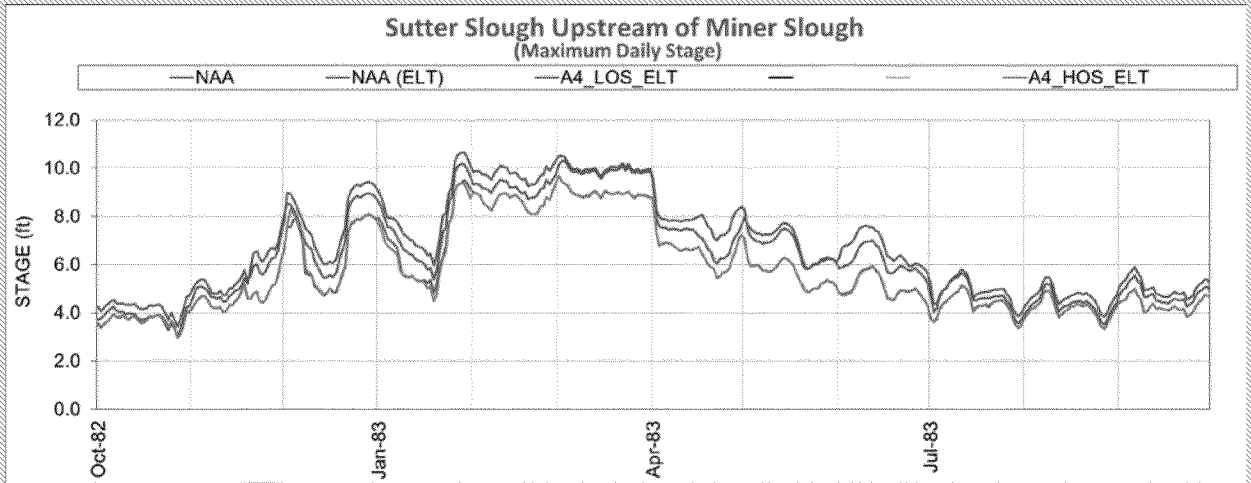
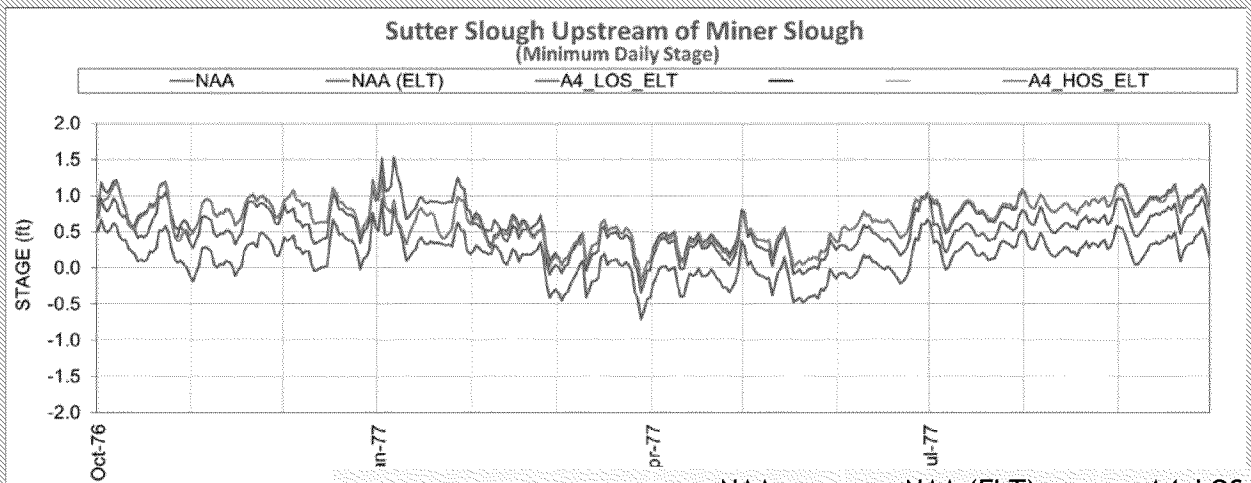
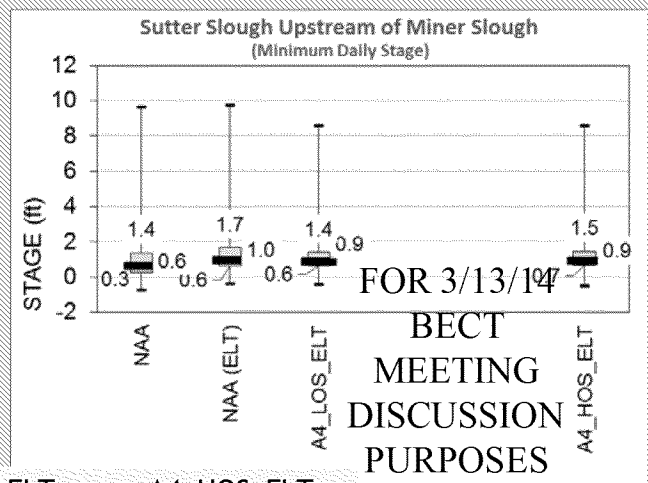
Sutter Slough upstream of Miner Slough
Simulated Water Levels at ELT



	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
90% of days less than	**6.3**	**6.8**	**5.3**	**5.3**





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
10 % of days less than	**0.0**	**0.4**	**0.4**	**0.4**

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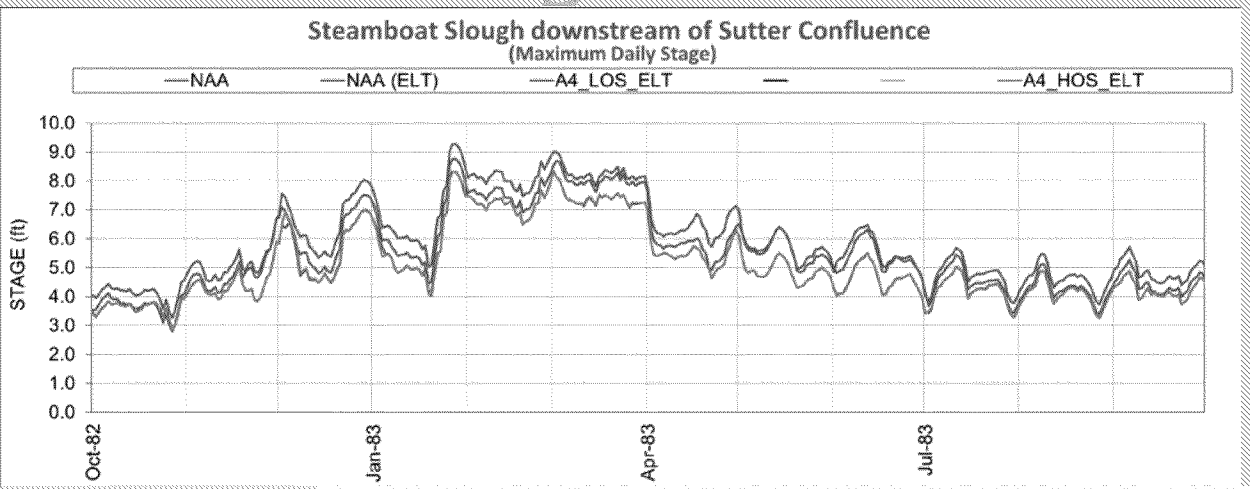
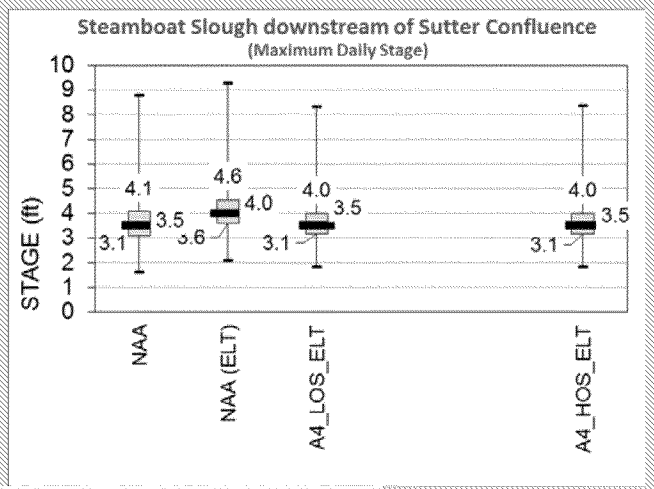
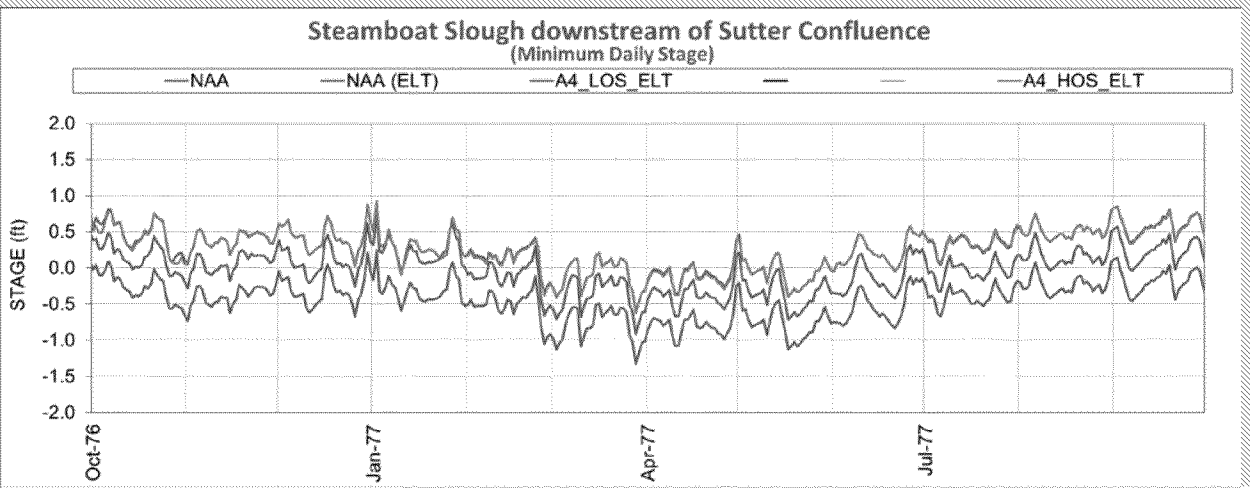
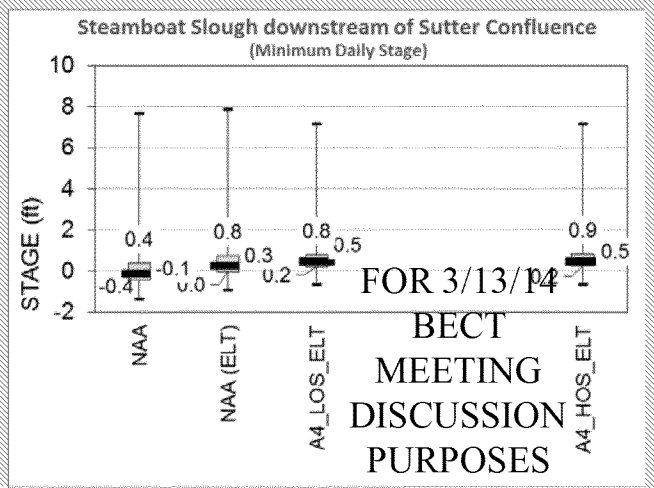
Steamboat Slough downstream of Sutter Slough Simulated Water Levels at ELT





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
90 % of days less than	**5.3**	**5.6**	**4.8**	**4.8**





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
10% of days less than	**-0.6**	**-0.2**	**0.0**	**0.0**

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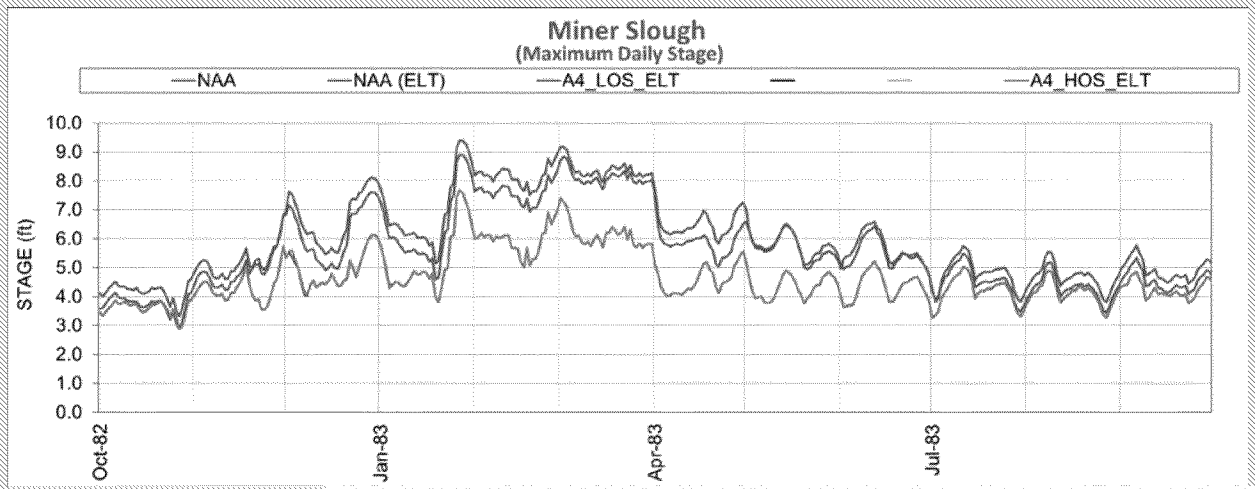
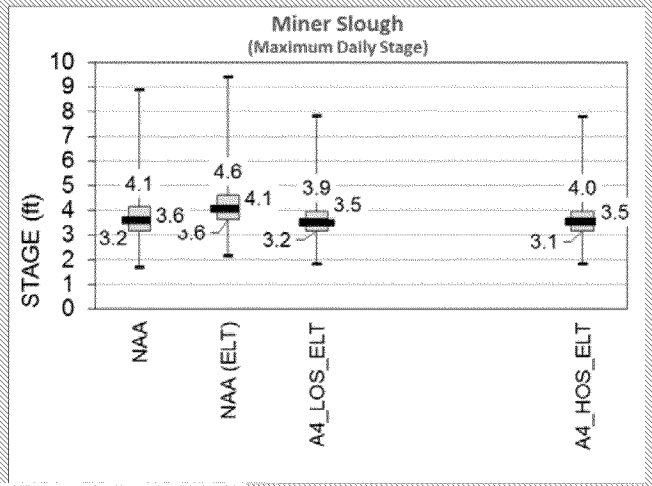
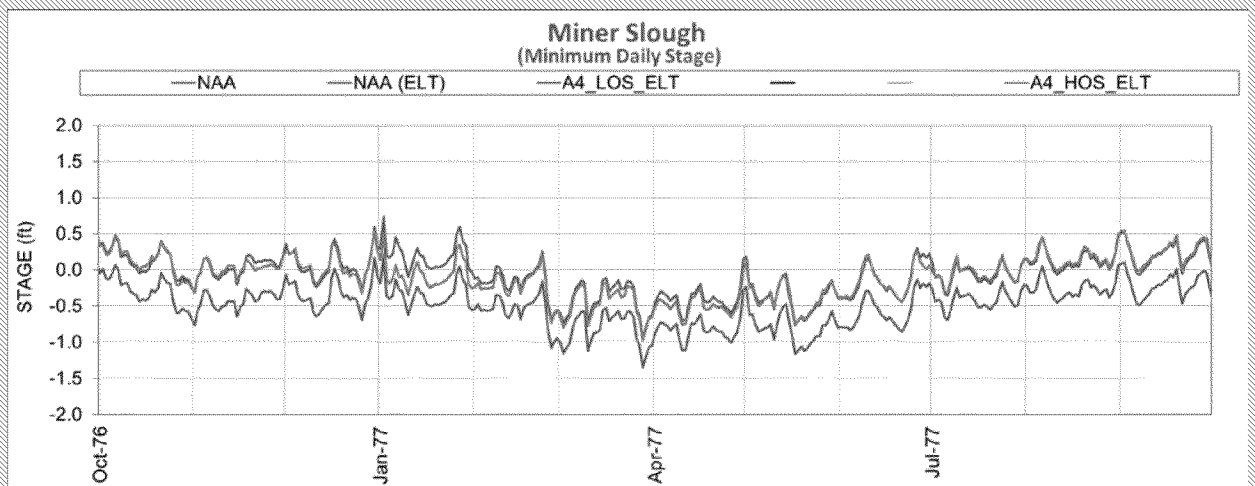
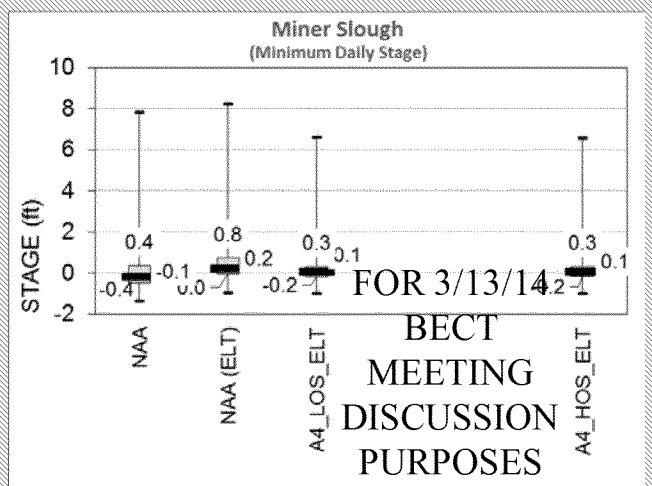
Miner Slough
Simulated Water Levels at ELT





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
90% of days less than	**5.4**	**5.7**	**4.5**	**4.5**





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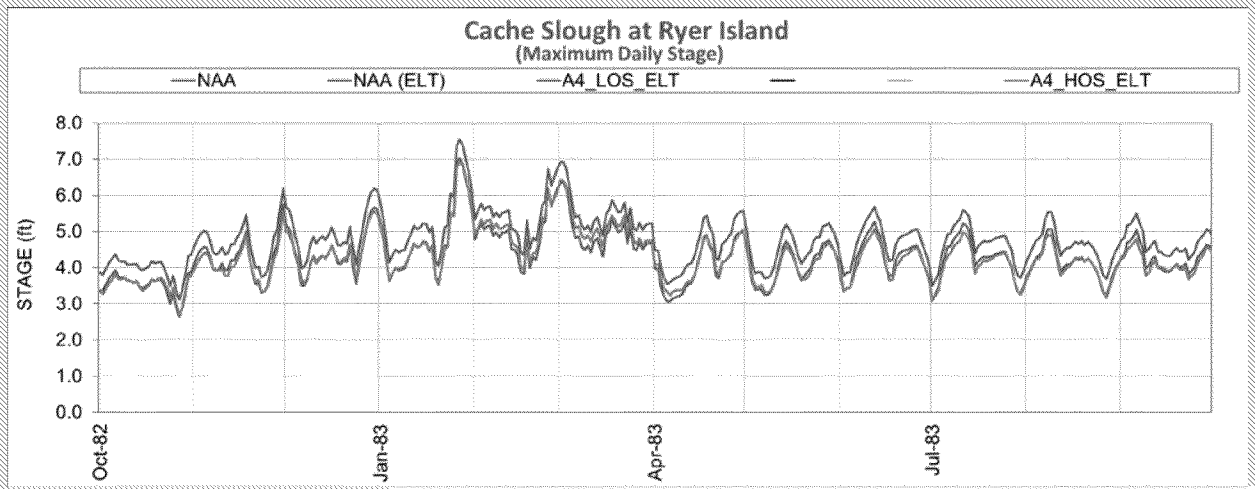
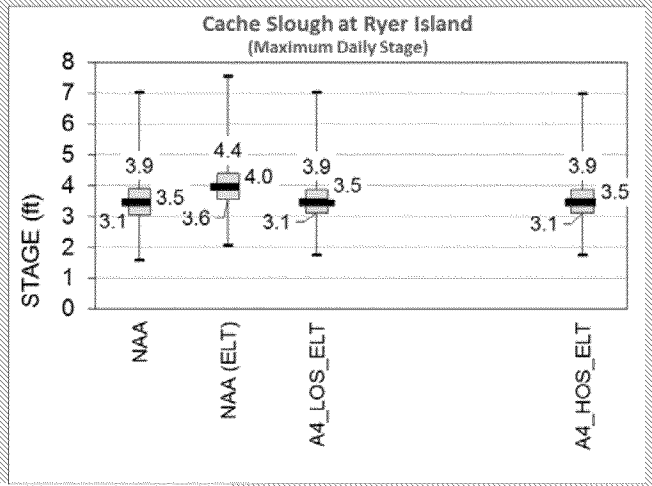
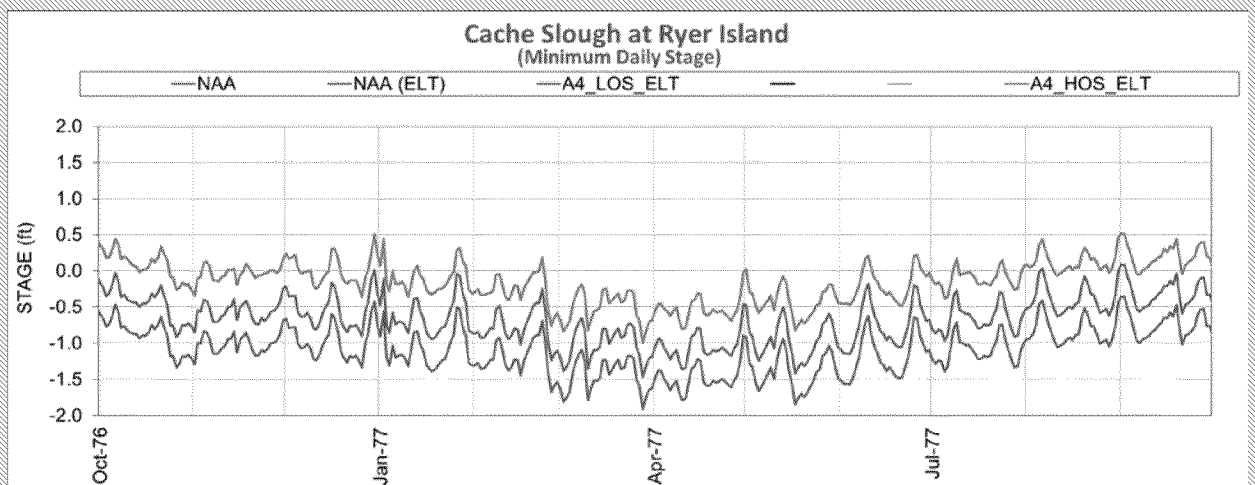
	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
10 % of days less than	**2.8**	**3.3**	**2.8**	**2.8**

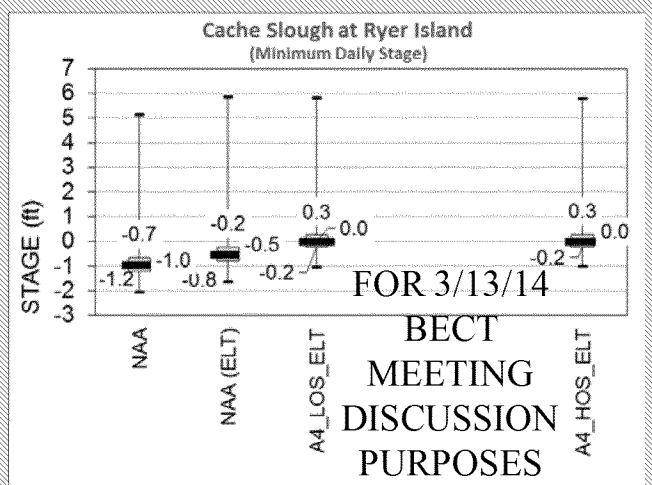
Cache Slough at Ryer Island
Simulated Water Levels at ELT





	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
90% of days less than	**4.3**	**4.8**	**4.3**	**4.3**





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	NAA	NAA (ELT)	A4_LOS_ELT	A4_HOS_ELT
10 % of days less than	**-1.4**	**-1.0**	**-0.4**	**-0.4**

Summary of Water Level Changes for Alternative 4 at ELT

- Water levels in the Delta are expected to increase at ELT because of sea level rise, even under the No Action Alternative.
- Daily minimum water levels expected to remain similar or increase by about 0.5 ft in most of the north Delta, except Miner Slough where decreases by about 0.5 ft.
- Daily maximum water levels expected to decrease by 0.5 ft to 1.8 ft in the north Delta.

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SUMMARY OF SIMULATED DELTA OUTFLOW FOR ALTERNATIVE 4 AT LLT

(Information from Public Draft BDCP EIR/EIS Appendix 5A Section C)

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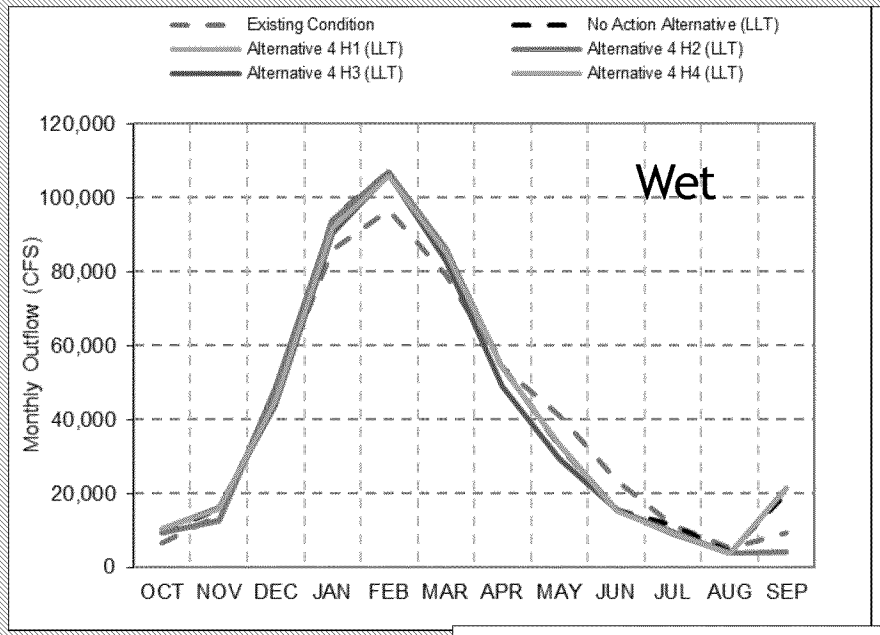
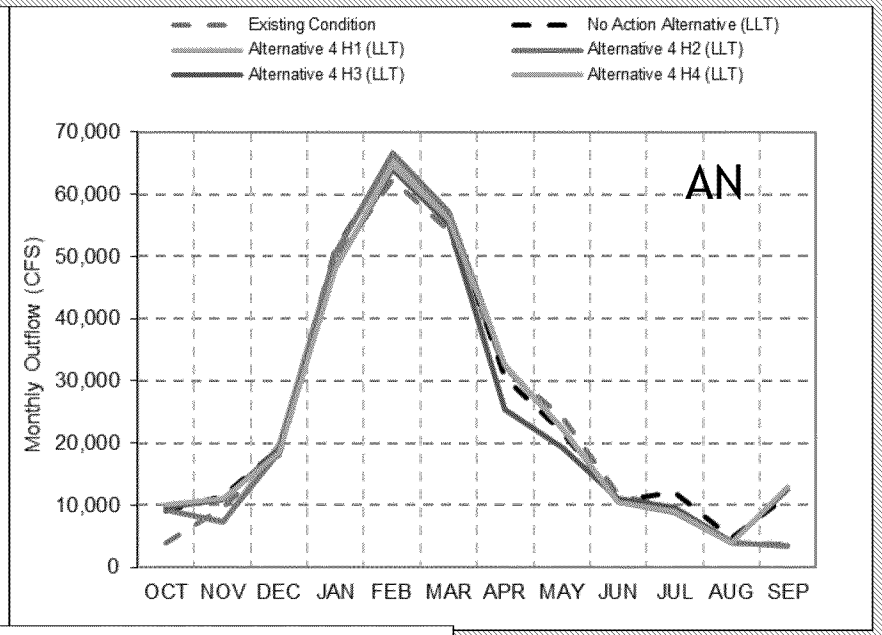
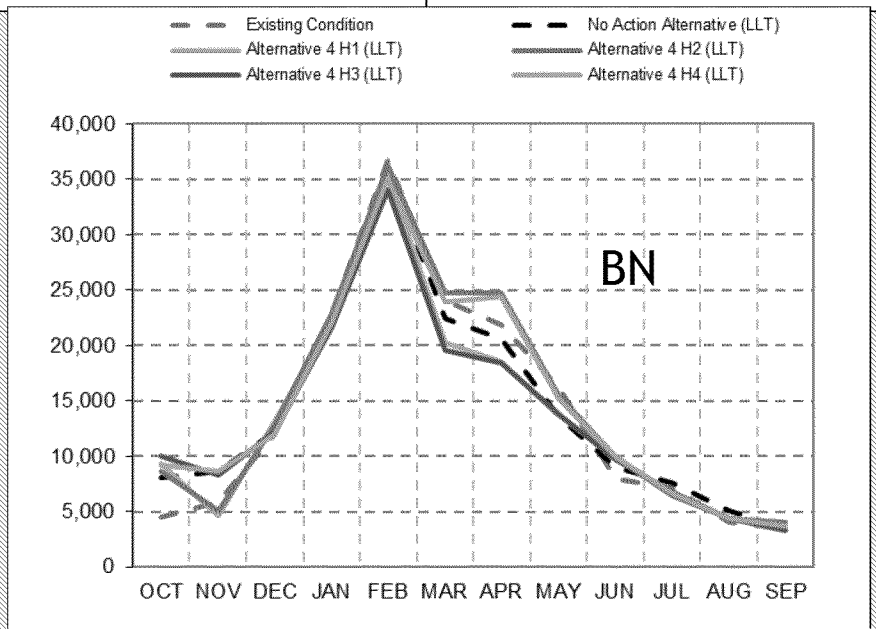
Simulated Delta Outflow at LLT for Alternative 4







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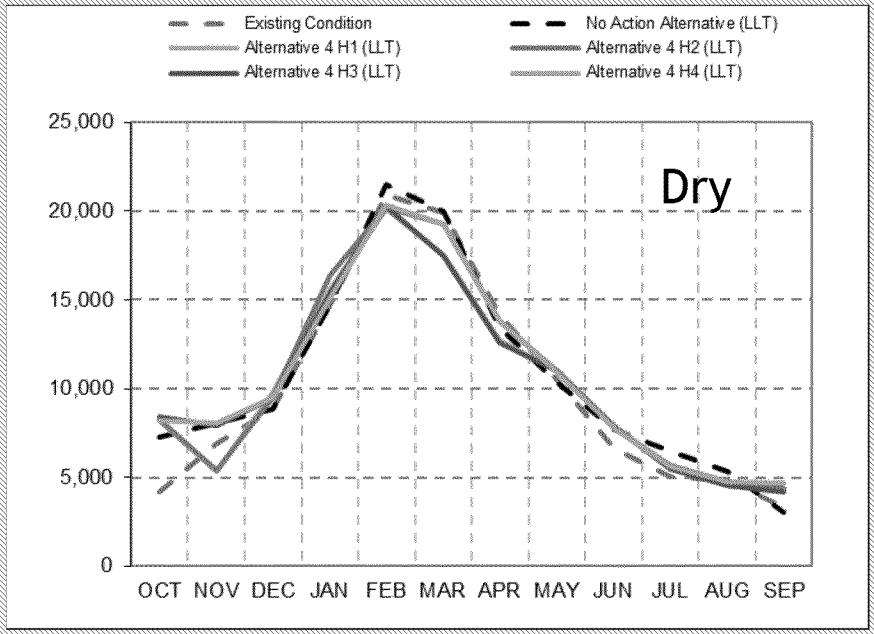
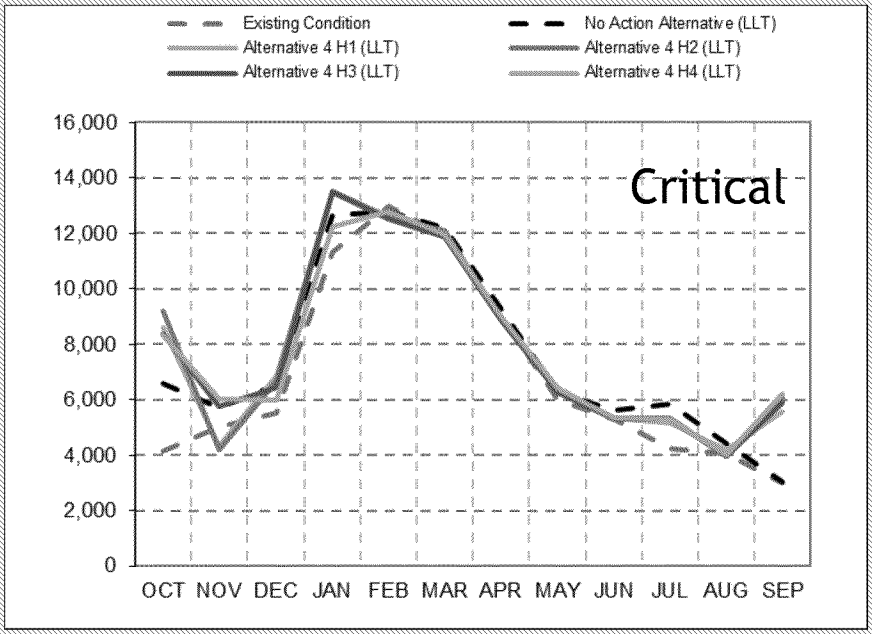
Simulated Delta Outflow at LLT for Alternative 4





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SUMMARY OF SIMULATED ANNUAL DELTA EXPORTS FOR ALTERNATIVE 4 AT LLT

(Information from Public Draft BDCP EIR/EIS Appendix 5A Section C

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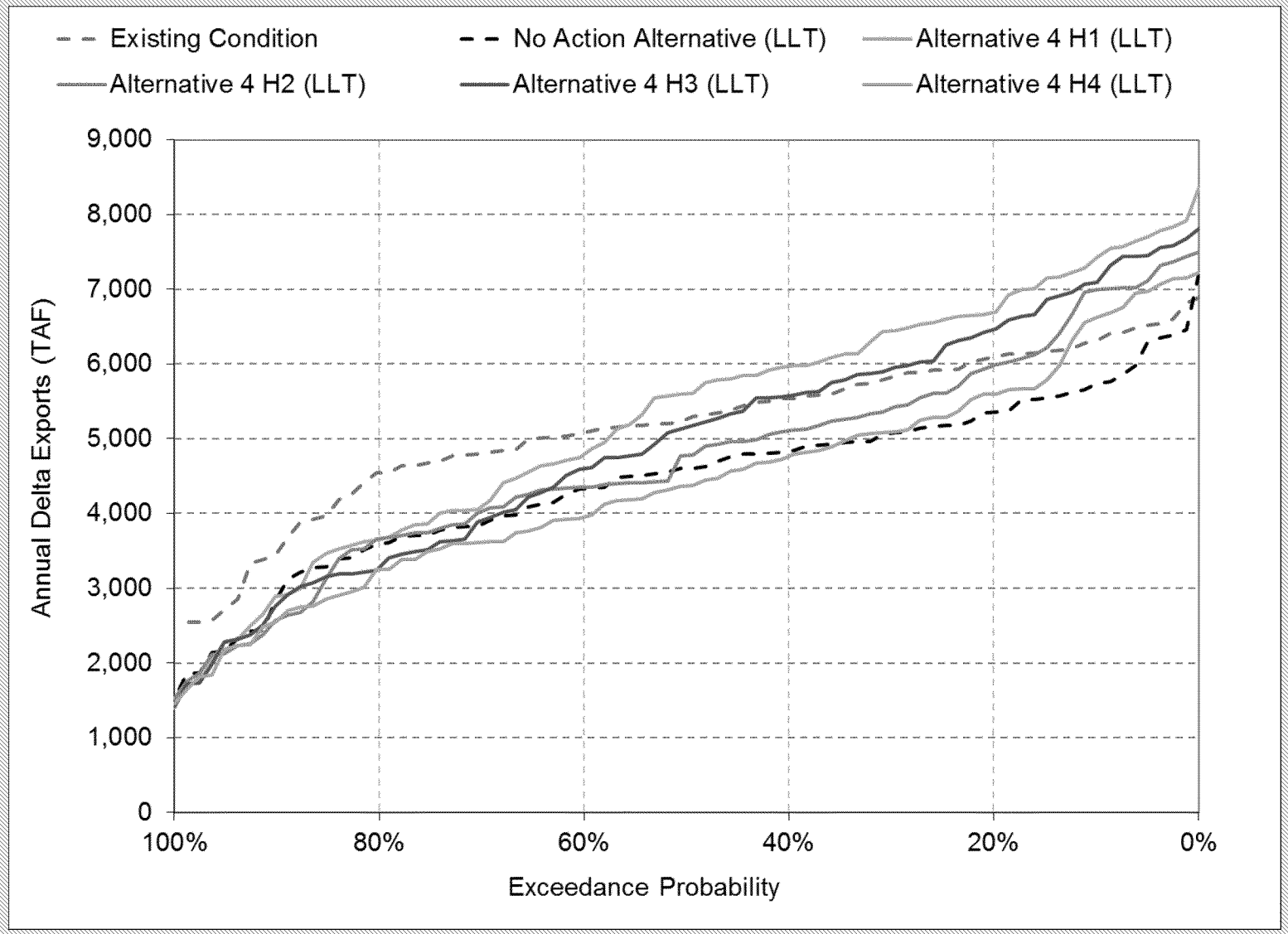
Annual Delta Exports at LLT for Alternative 4



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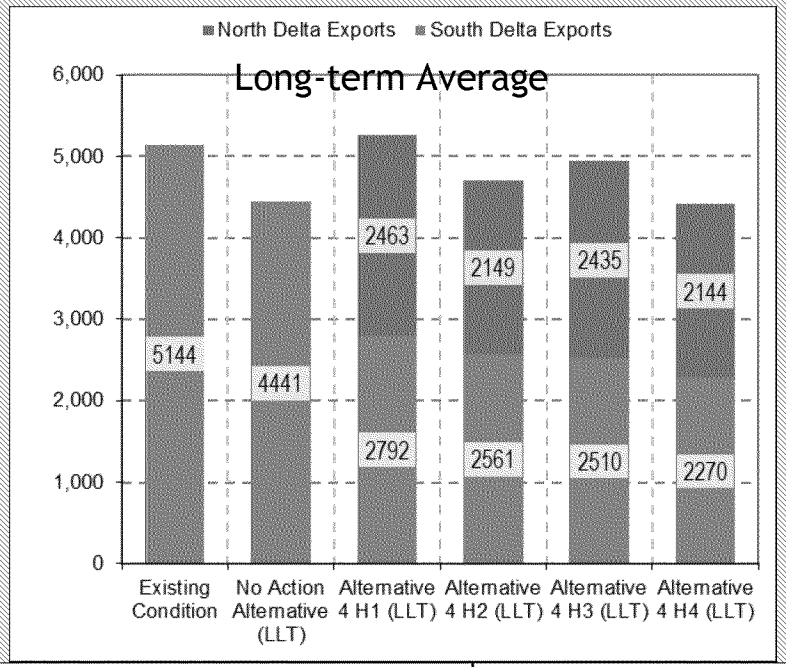
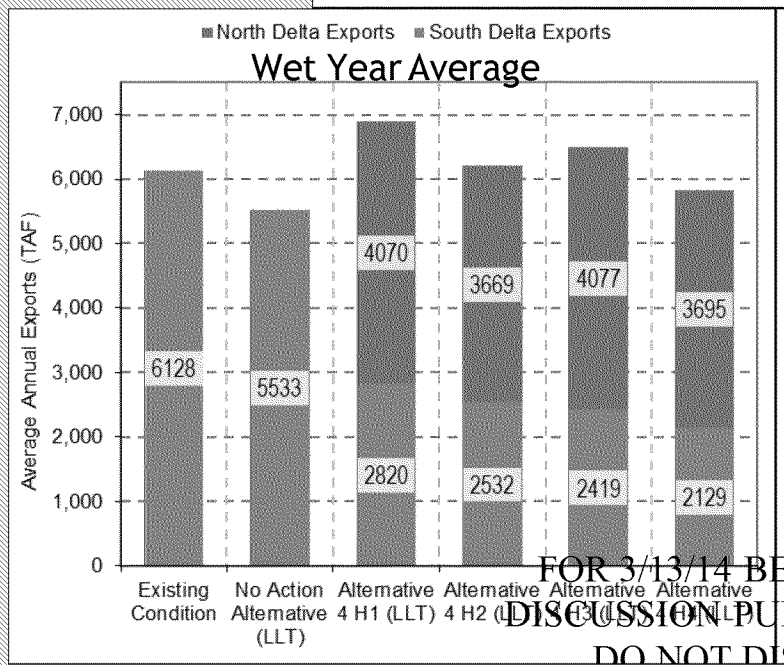
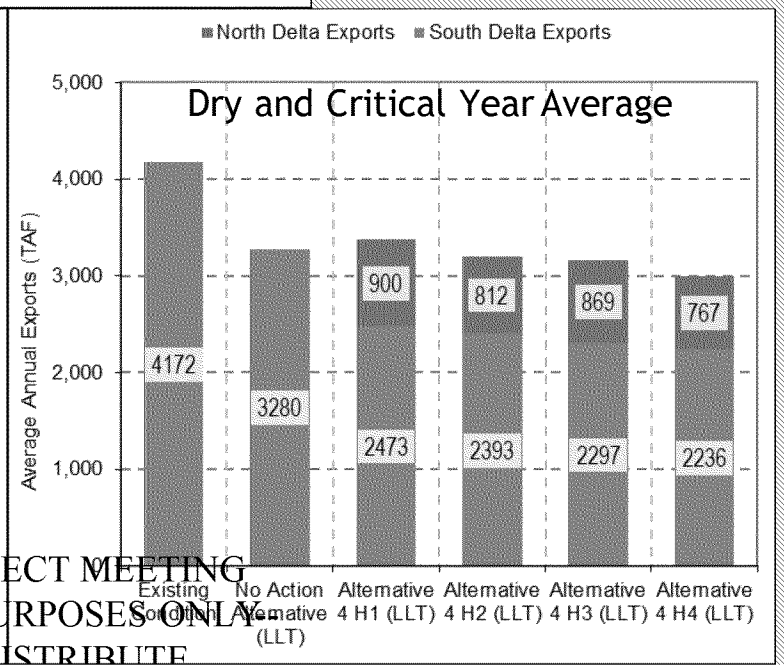
Annual Delta Exports at LLT for Alternative 4







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"HYPOTHETICAL" RESTORATION ASSUMPTIONS FOR BDCP MODELING

(Information from Public Draft BDCP EIR/EIS Appendix 5A Section D)

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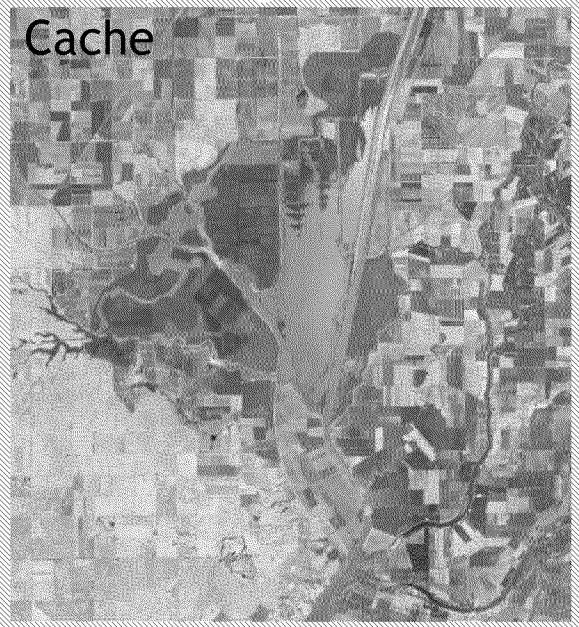
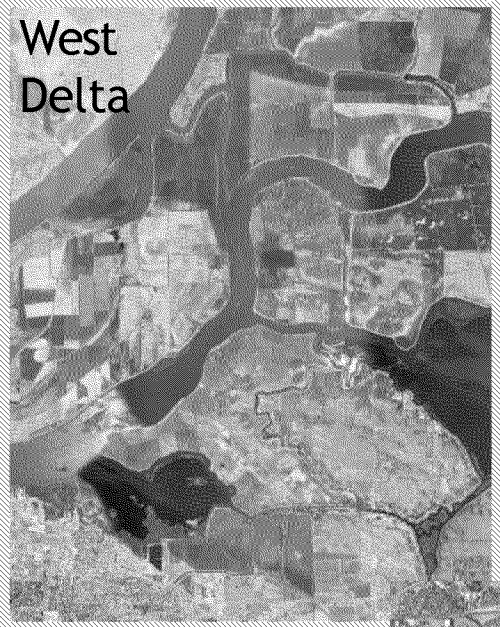
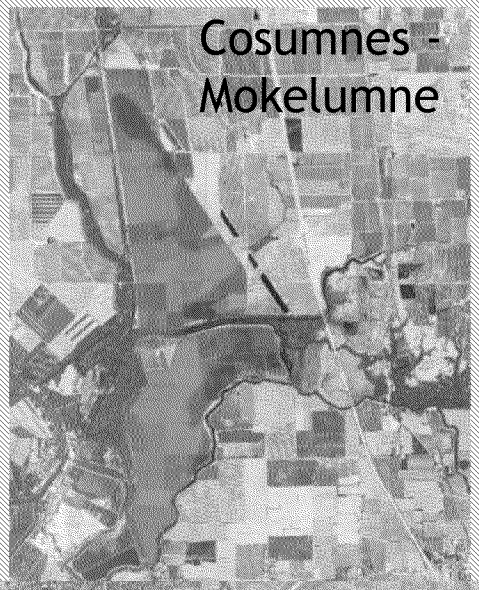
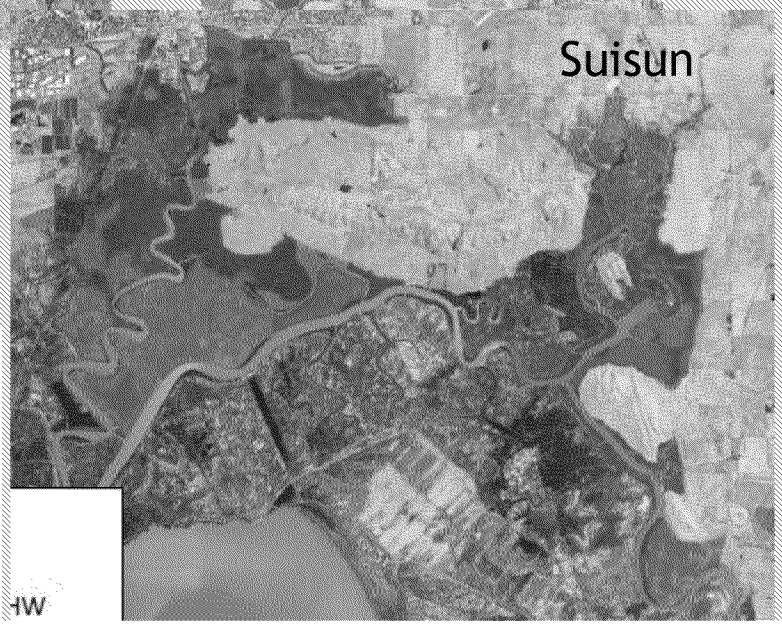
"Hypothetical" Restoration Assumptions for BDCP Modeling - ELT

Early Long-Term: ~25000 acres of tidally connected open water areas in the Delta









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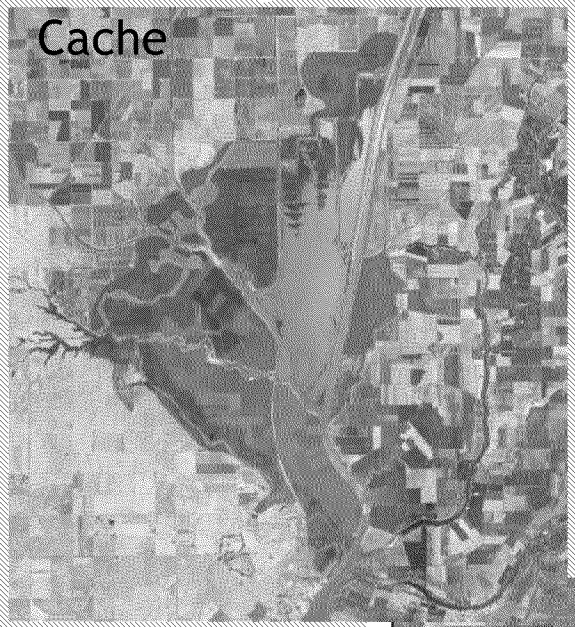
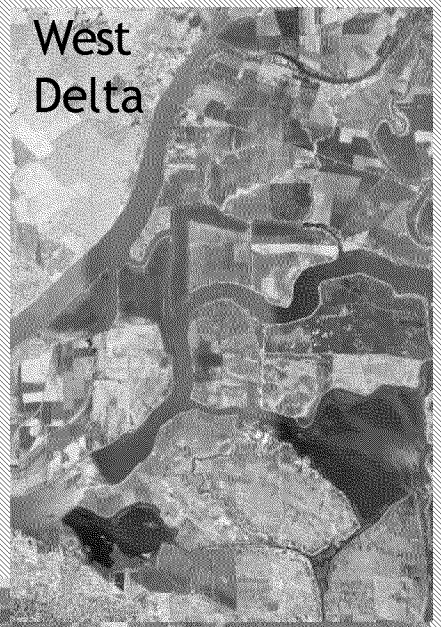
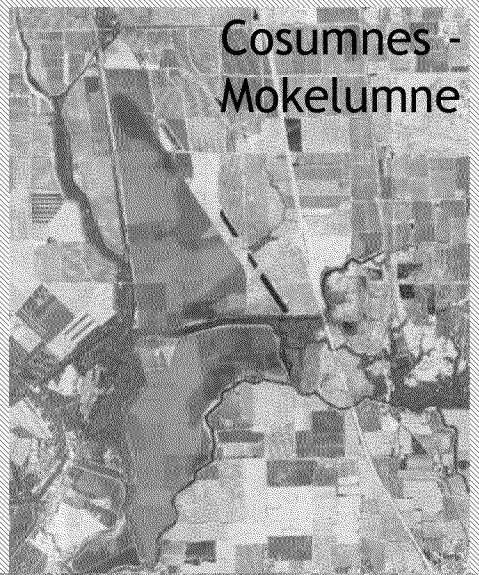
- Above EHW
- MHHW to EHW
- MLLW to MHHW
- Below MLLW

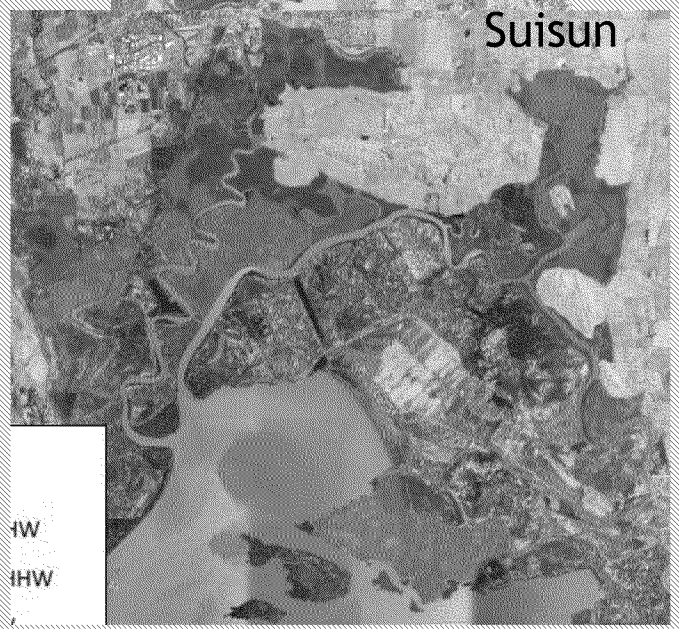
"Hypothetical" Restoration Assumptions for BDCP Modeling - LLT

Late Long-Term: ~65000 acres of tidally connected open water areas in the Delta









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- Above EHW
- MHHW to EHW
- MLLW to MHHW
- Below MLLW

CLIMATE CHANGE ASSUMPTIONS FOR BDCP MODELING

(Information from Public Draft BDCP EIR/EIS Appendix 5A Sections A & D)

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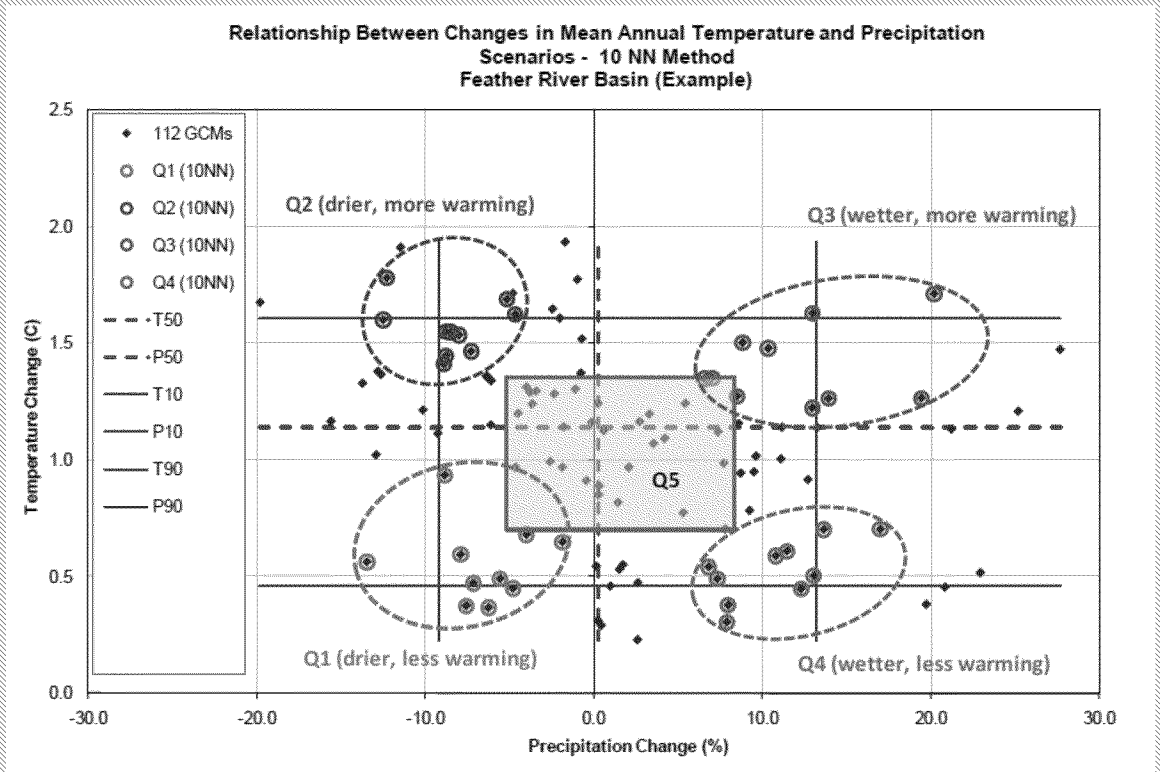
Climate Change Assumptions for BDCP Modeling

- 112 downscaled future climate projections (IPCC, AR4 – LLNL)
- 5 climate scenarios (Q5 – central tendency; Q1 – Q4 sensitivity bounds)



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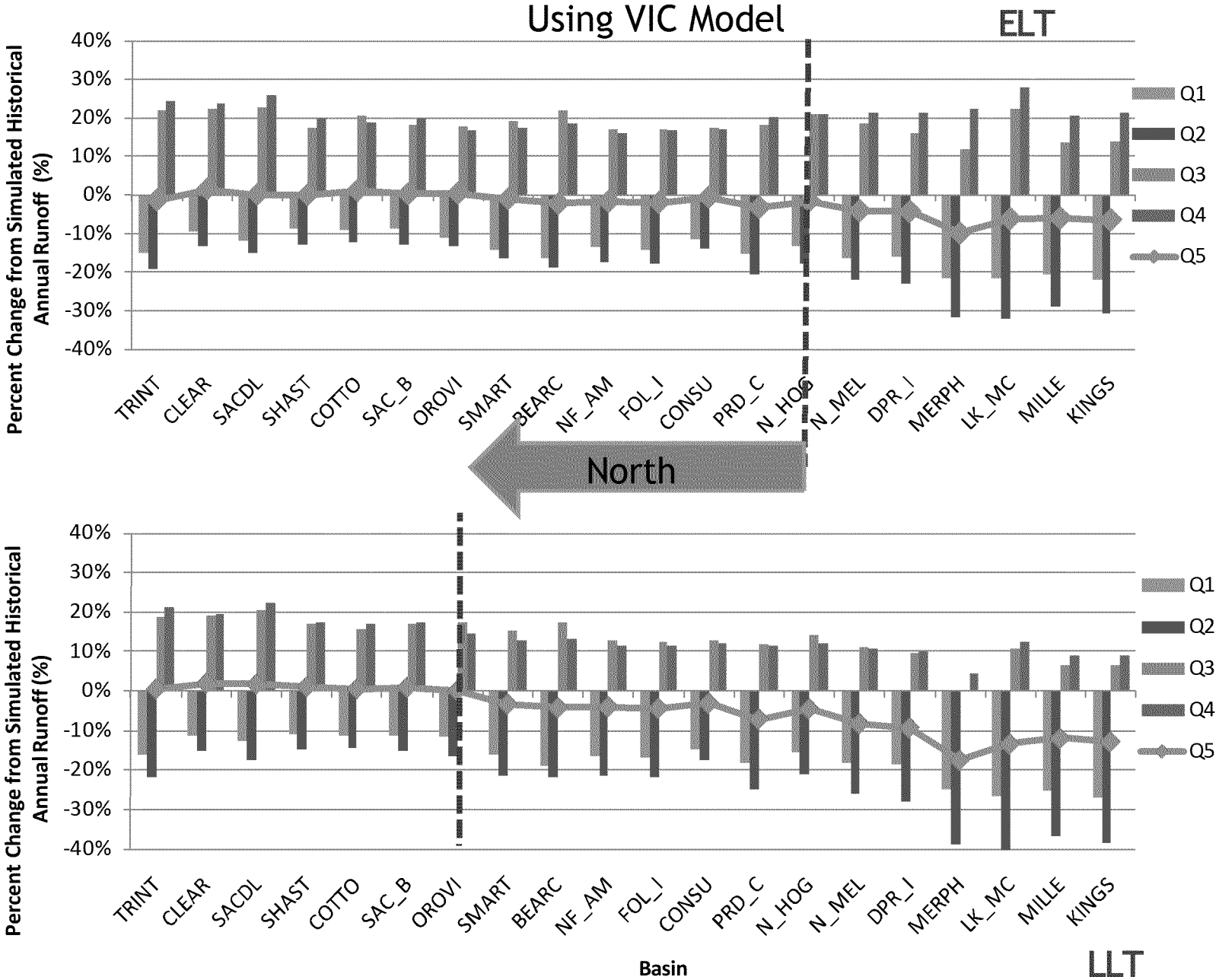
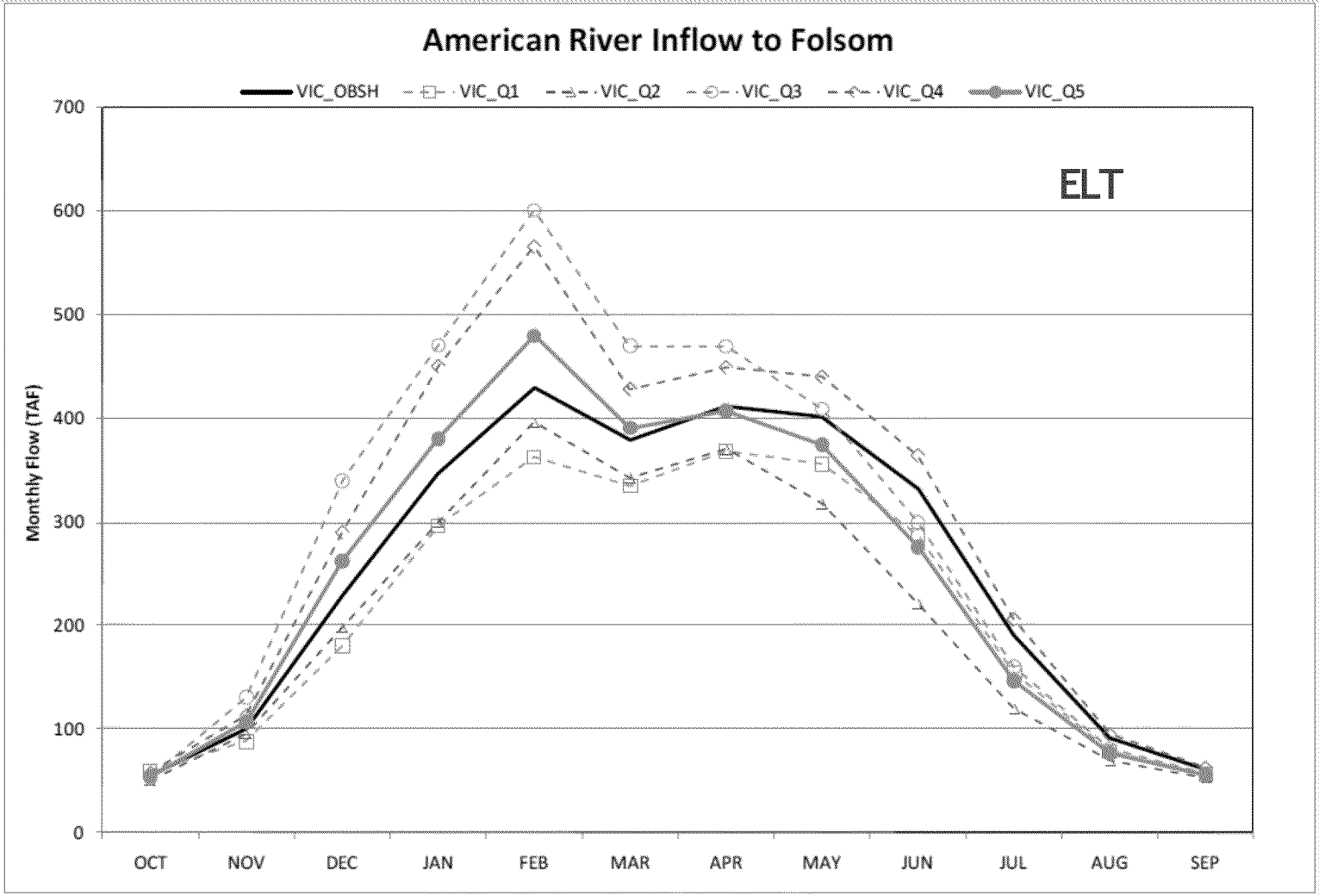
FOR 4/13/14 BDCT MEETING DISCUSSION PURPOSES ONLY--DO NOT DISTRIBUTE

Change in Annual Runoff
Using VIC Model



Climate Change Effect
Monthly Folsom Inflow



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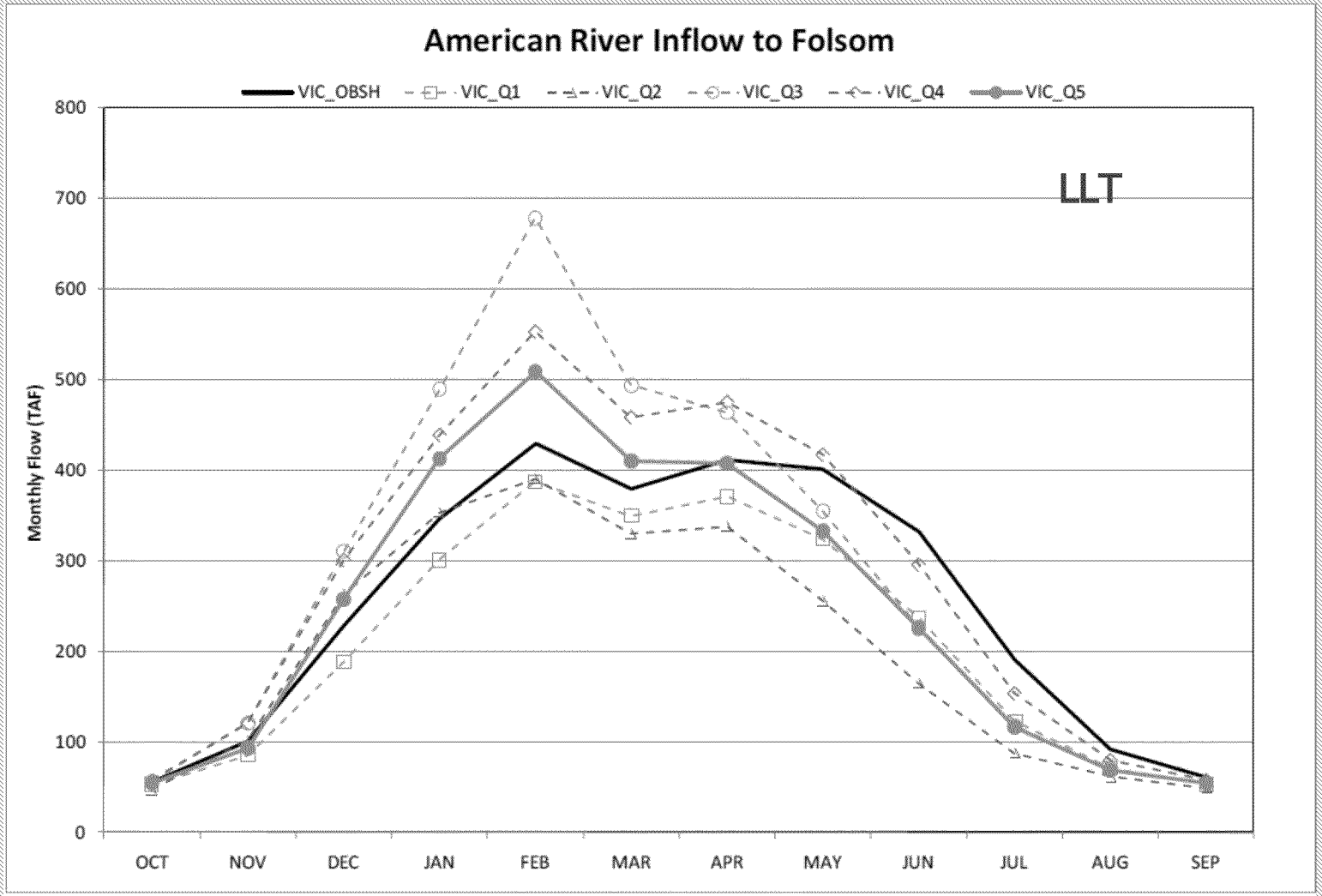
Climate Change Effect
Monthly Folsom Inflow



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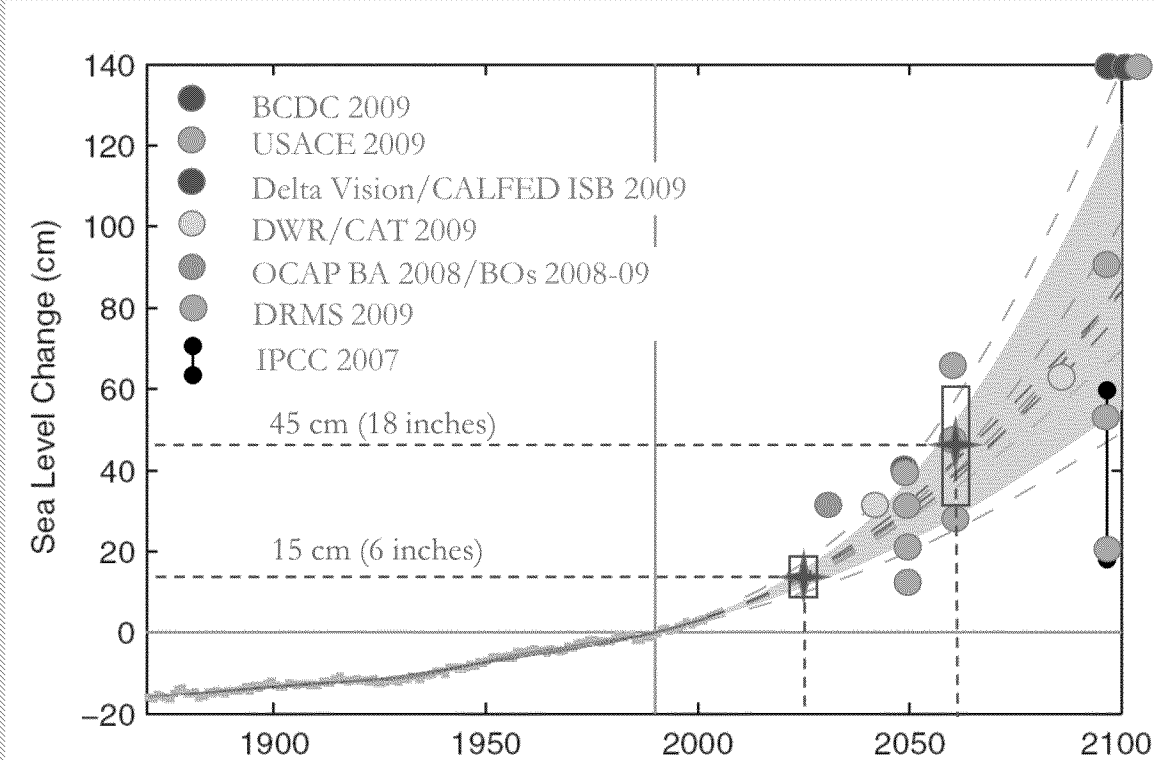
Sea Level Rise Assumptions

- Sea level rise projections based on Rahmstorf (2007)
- 15 cm rise at ELT, and 45 cm rise at LLT at Golden Gate



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