

Modeling Estimates of Potential Water Supply Impacts of the Wanger Smelt Decision

Armin Munévar

CH2M HILL

California Water & Environmental Modeling Forum Annual Meeting
February 28, 2008

Outline

- Wanger decision overview
- Goals of CALSIM modeling
- Planning model simulations
- Insights from planning simulations
 - Water supply effects
 - Operational responses
 - Ecosystem indicators
 - Water quality effects
- 2008 Near-term position analysis modeling
- Summary

Acknowledgements

- Paul Hutton – MWDSC
- Ryan Wilbur – DWR
- Marcelo Reginato – CH2M HILL

Wanger Decision Overview

- Decision provides protection for Delta smelt through Old and Middle River (OMR) flow restrictions during late December through June
- Triggering begins in late December based on turbidity conditions
- January-February OMR flows are required to be greater than - 5000 cfs
- A range of OMR flows between -750 and -5000 cfs is required for March-Jun and is at the discretion of the fishery agencies
- OMR flow is governed by SJR flow, south Delta AG and M&I diversions, and project exports

Goals of CALSIM Modeling

- To estimate the range of water costs in meeting the OMR criteria
- To better understand the operational responses and recovery capability of the projects
- To serve as a basis for evaluating water quality effects of OMR criteria
- To bracket the range near-term SWP water delivery impacts under varying Oroville storage conditions

Description of Planning Model Studies

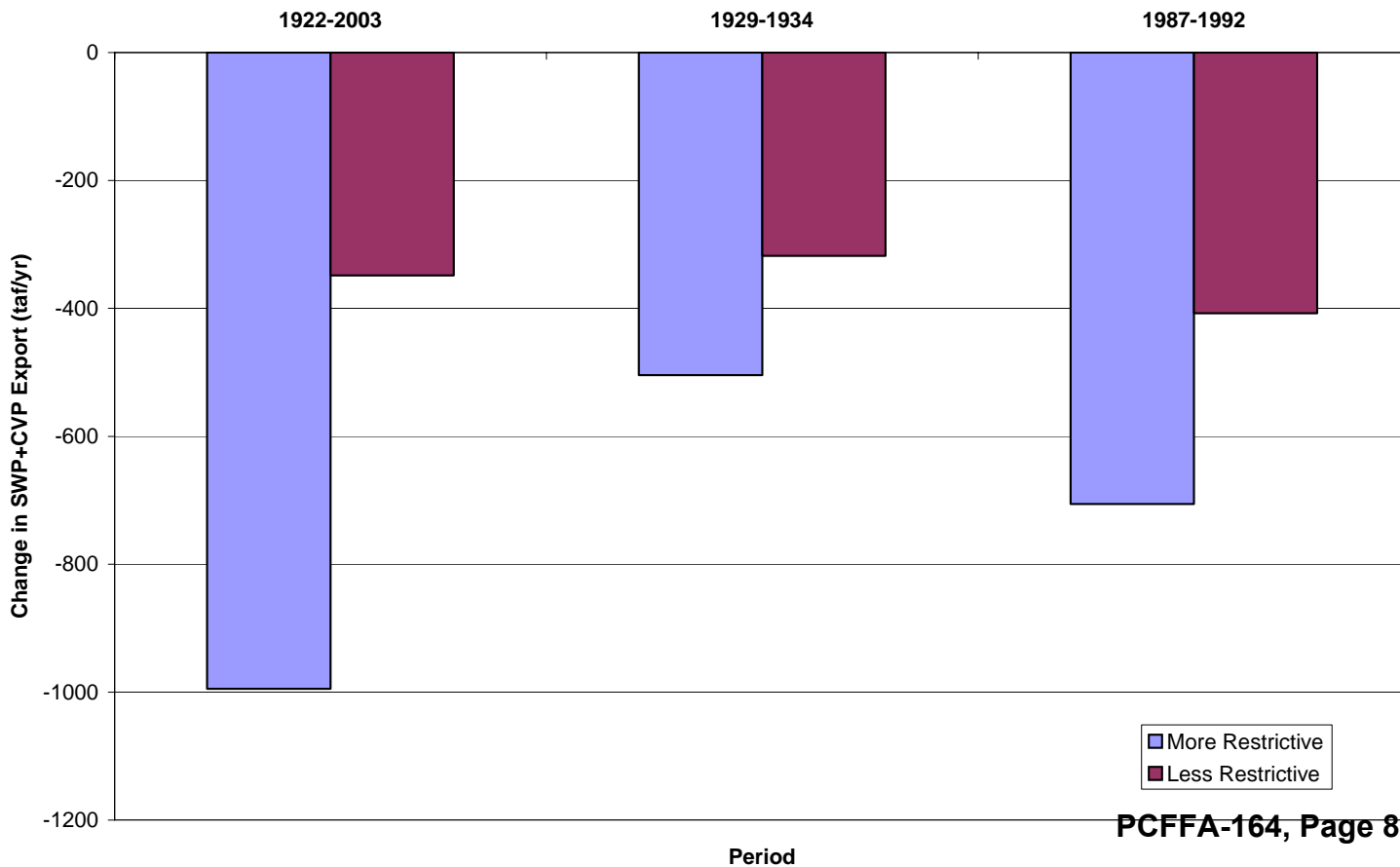
- 3 CALSIM II simulations developed
 - Base: representing pre-Wanger conditions
 - Alt 2: representing more restrictive of Wanger criteria
 - Alt 3: representing less restrictive of Wanger criteria
- Monthly analysis with 1922-2003 hydrologic conditions
- Existing facilities and 2008 level demands (Full Table A)
- CVPIA (b)(2) actions
- OMR restrictions applied

Insights from Planning Study Results

- Exports and delivery effects
- Seasonal shifts in reservoir storage and export patterns
- OMR flows and operation controls
- Preliminary Delta water quality effects

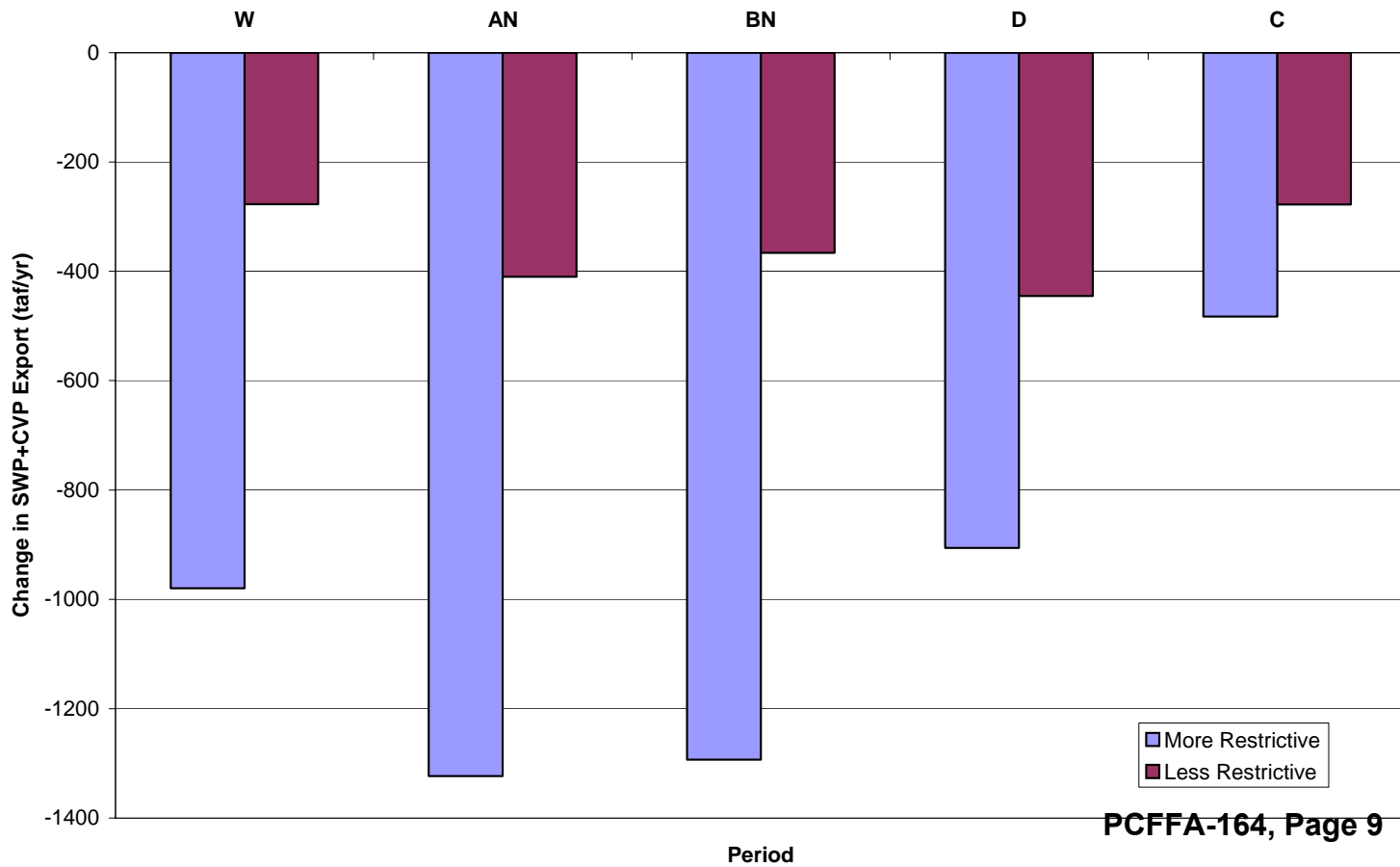
Exports

Export Changes under Wanger Smelt Criteria



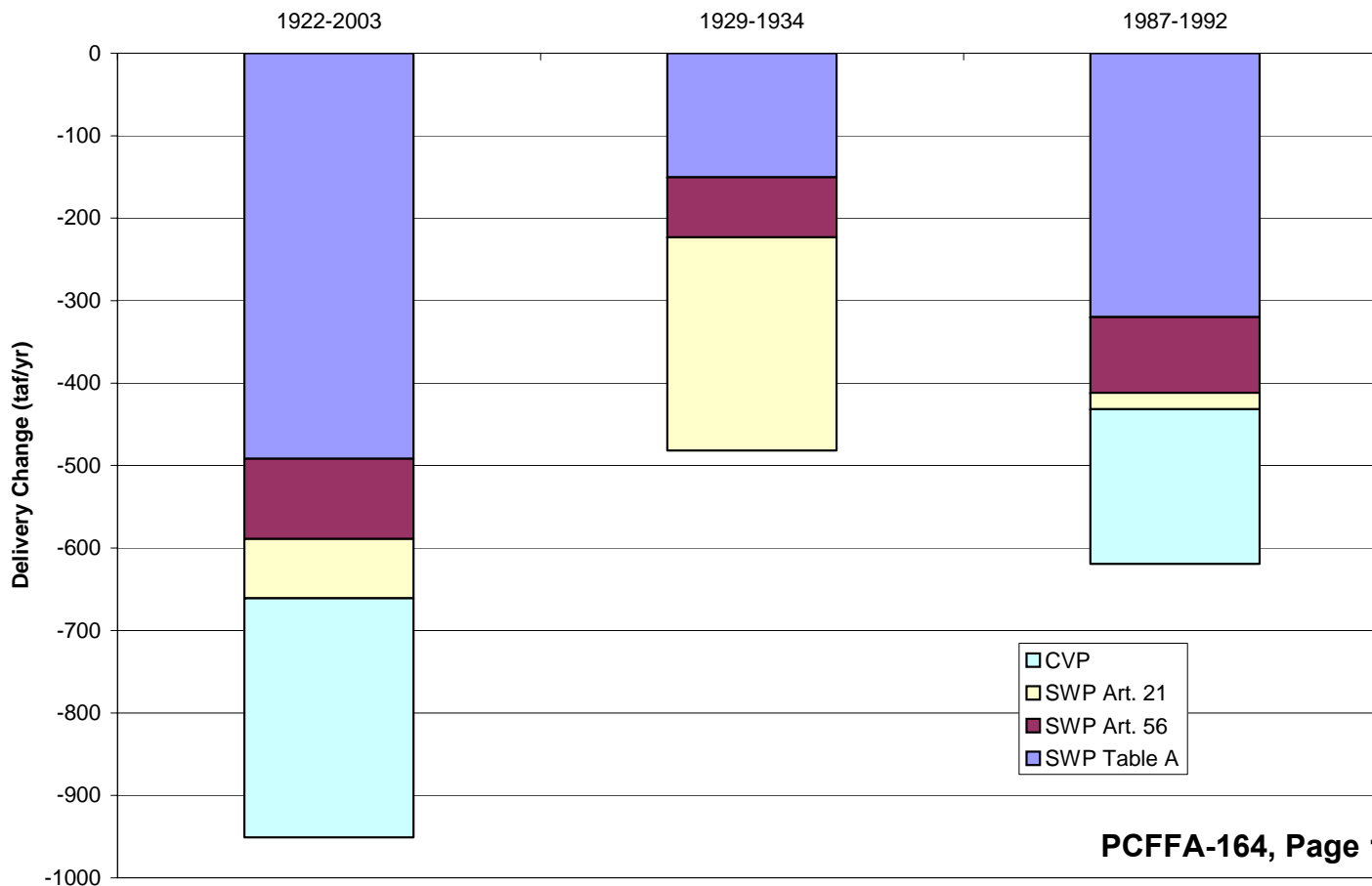
Exports

Export Changes under Wanger Smelt Criteria



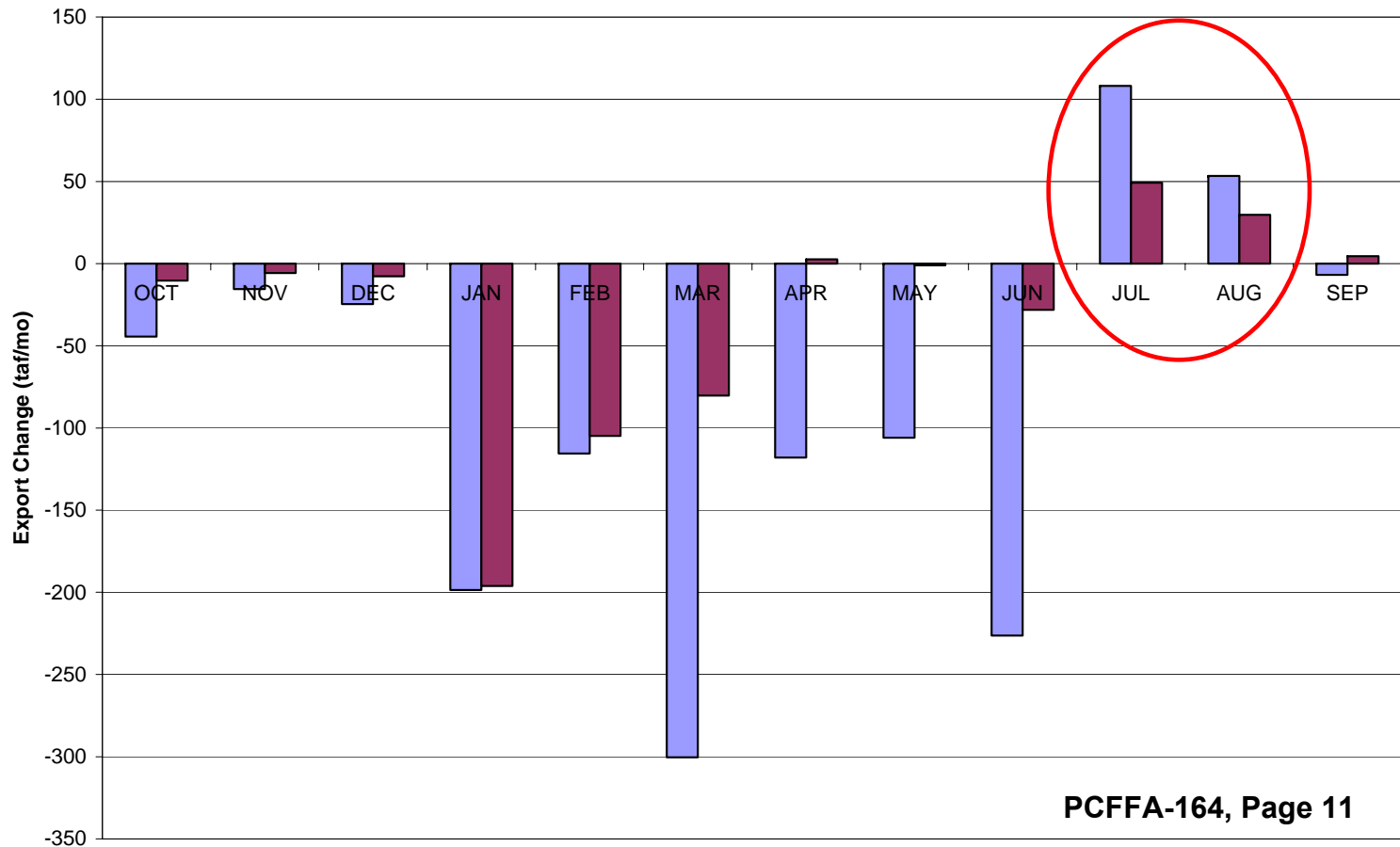
Delivery Changes

Project Delivery Change by Type



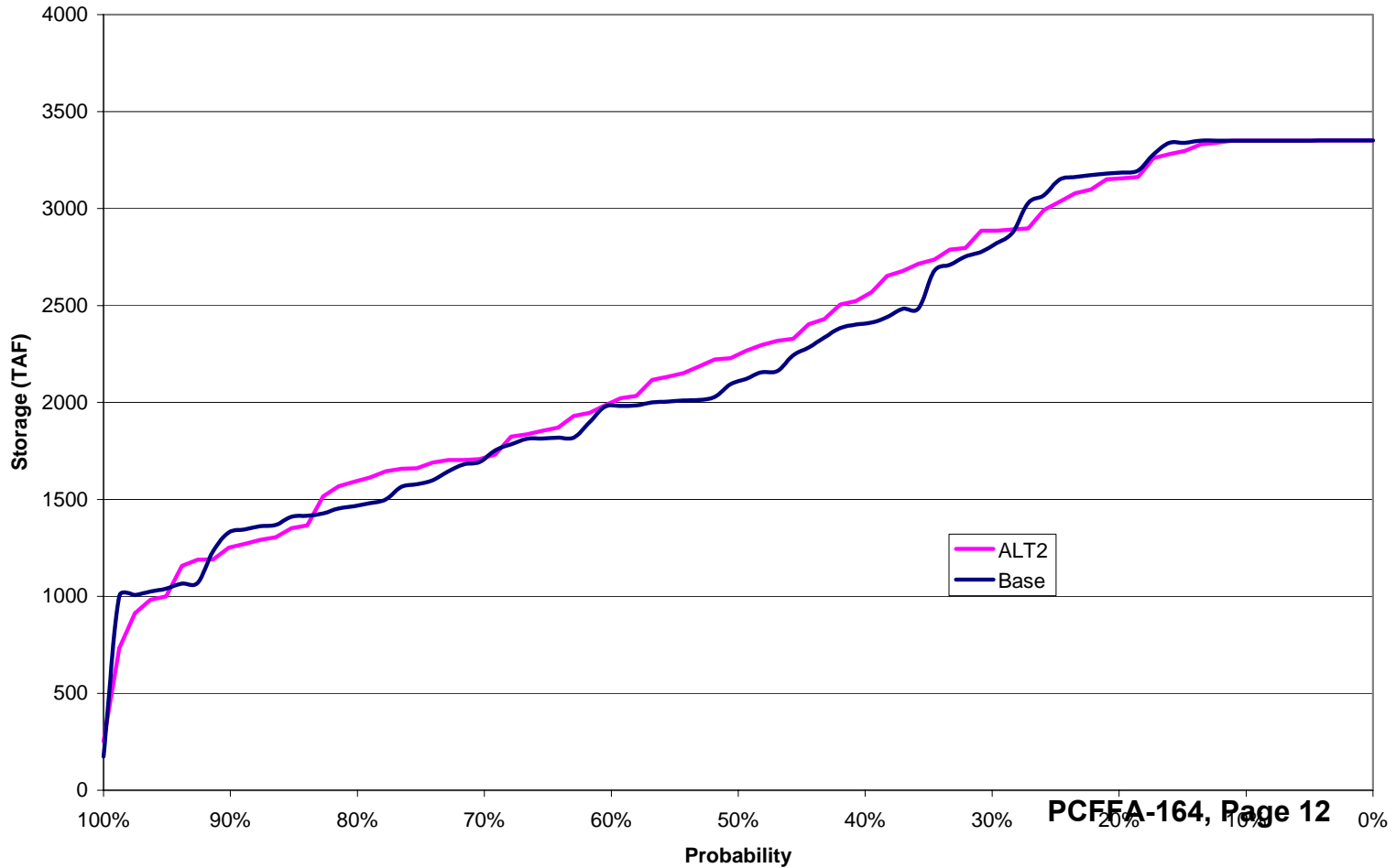
Seasonal Export Changes and Recovery

Seasonal Export Changes



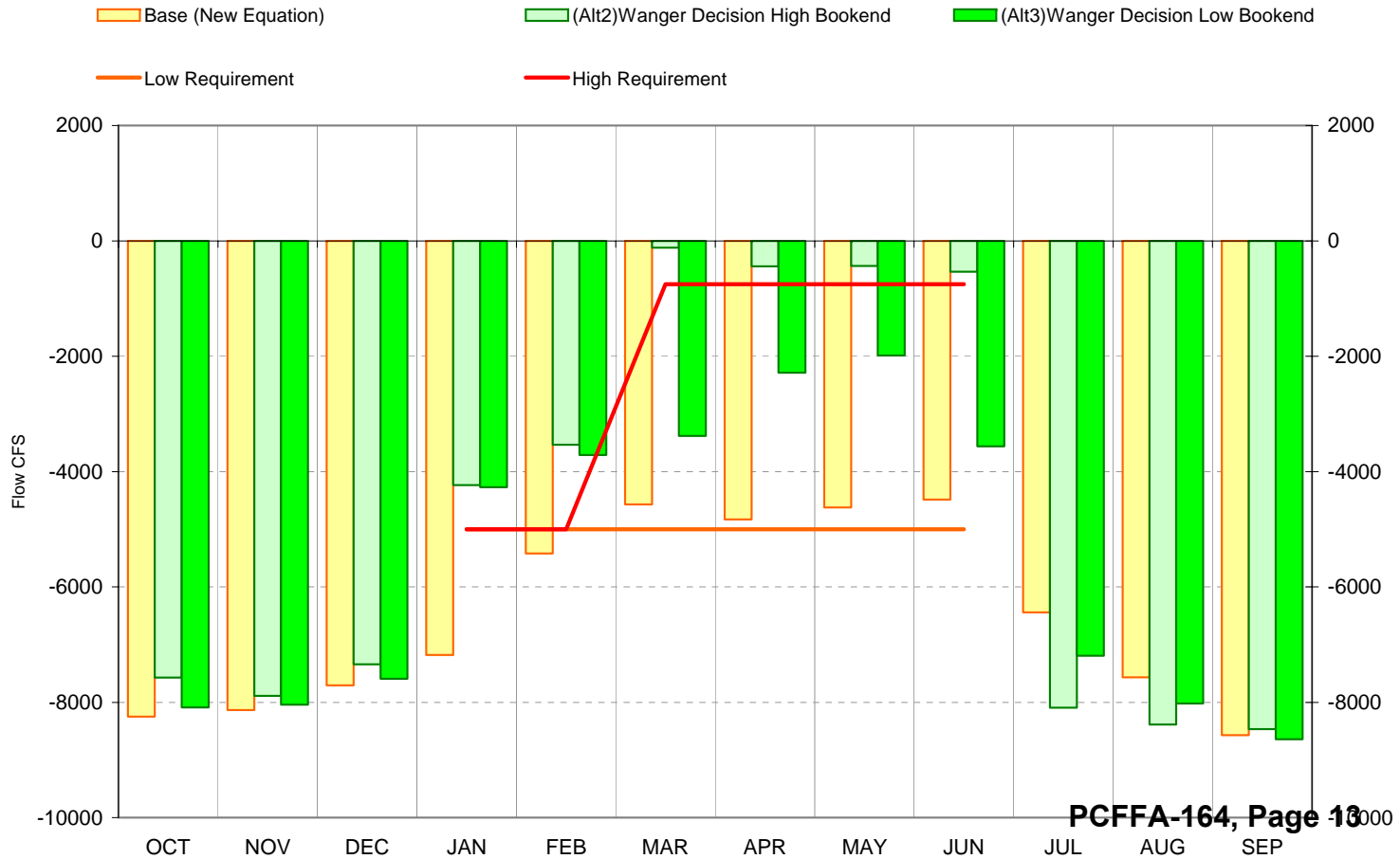
North of Delta Storage Backup

Oroville Storage Exceedance Probability (end of September)



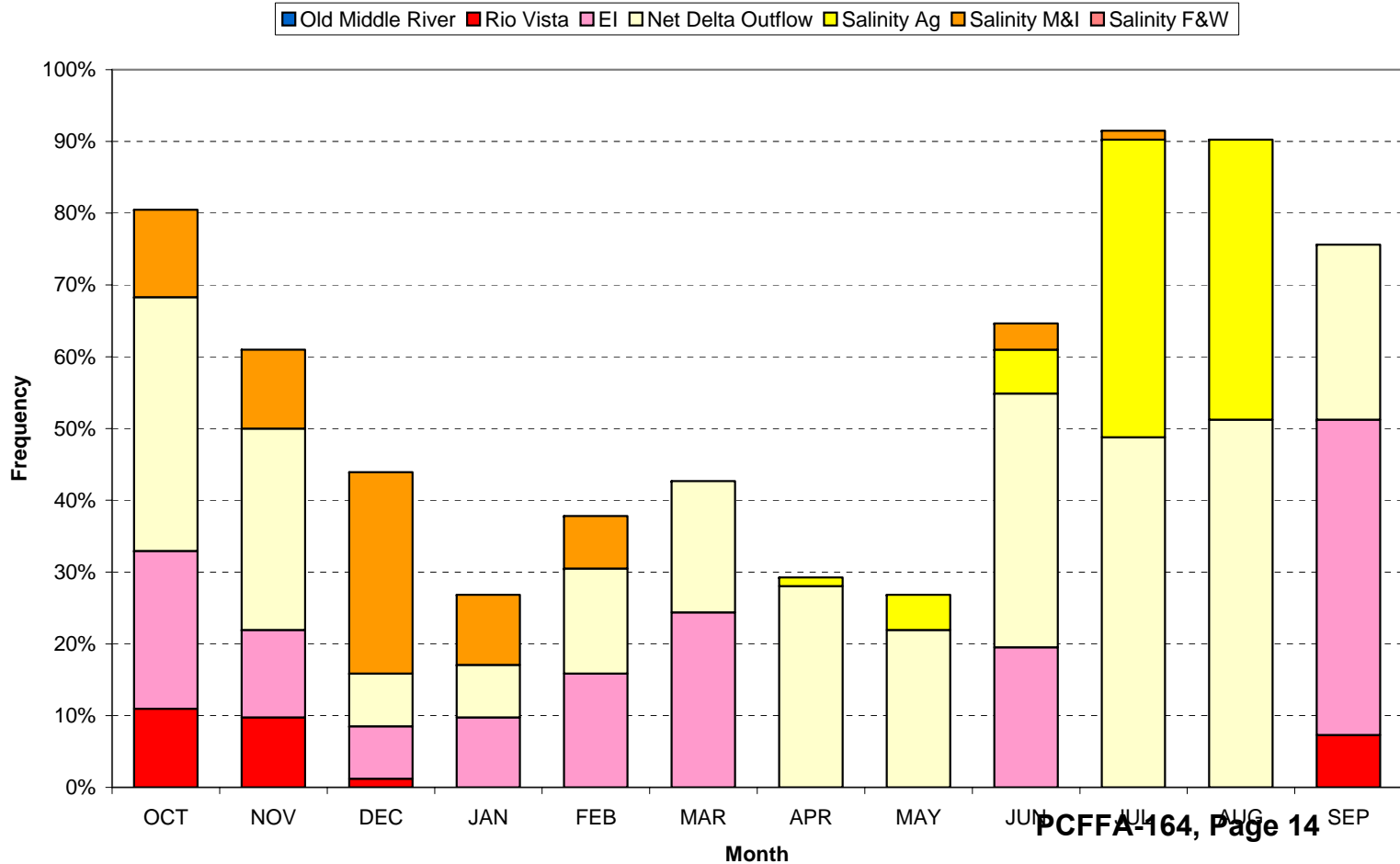
Old and Middle River Flow Changes

Combined Old and Middle River Monthly Average Flows (1922-2003)



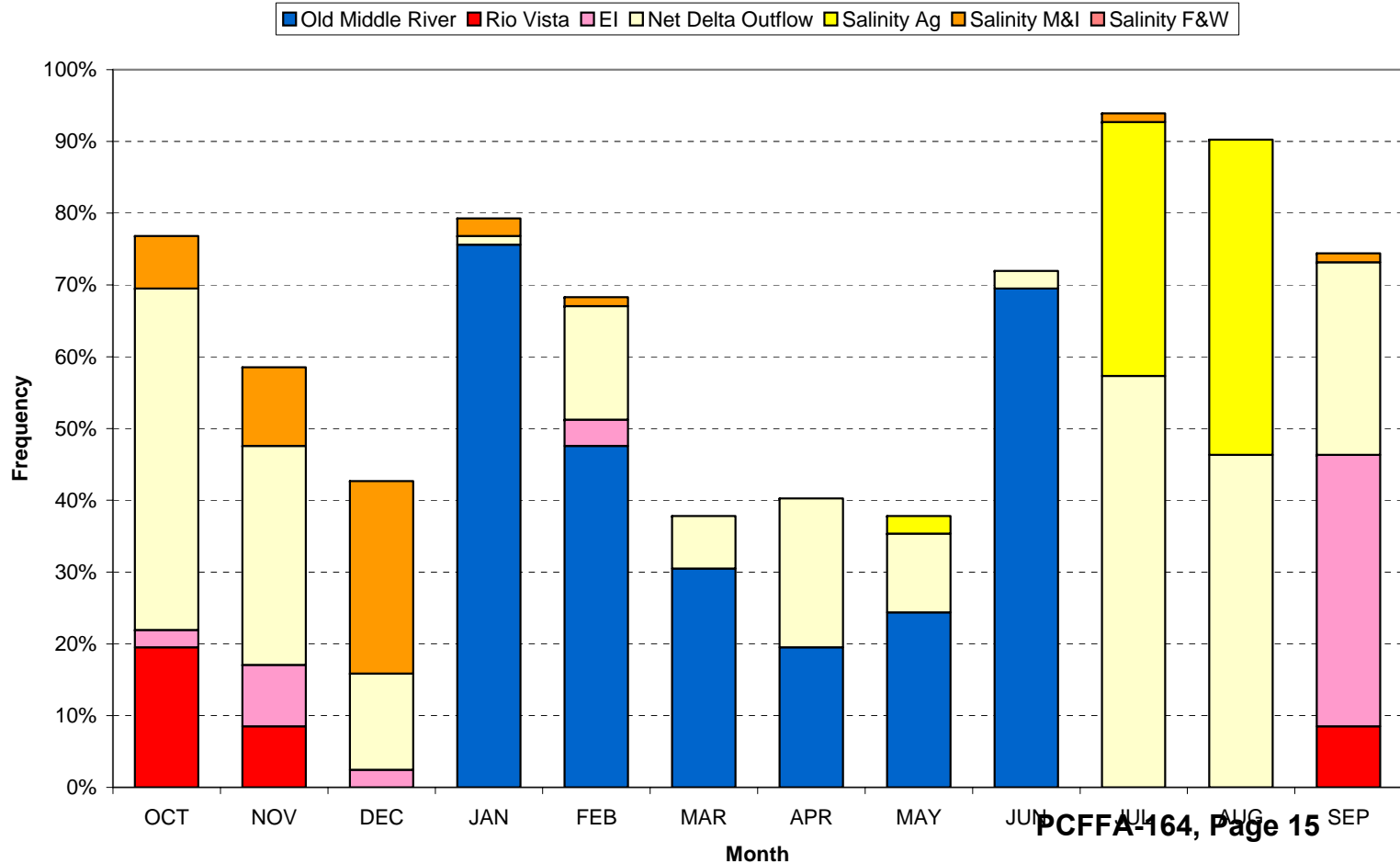
Old and Middle River Flow Controls - Base

Delta Export Controls



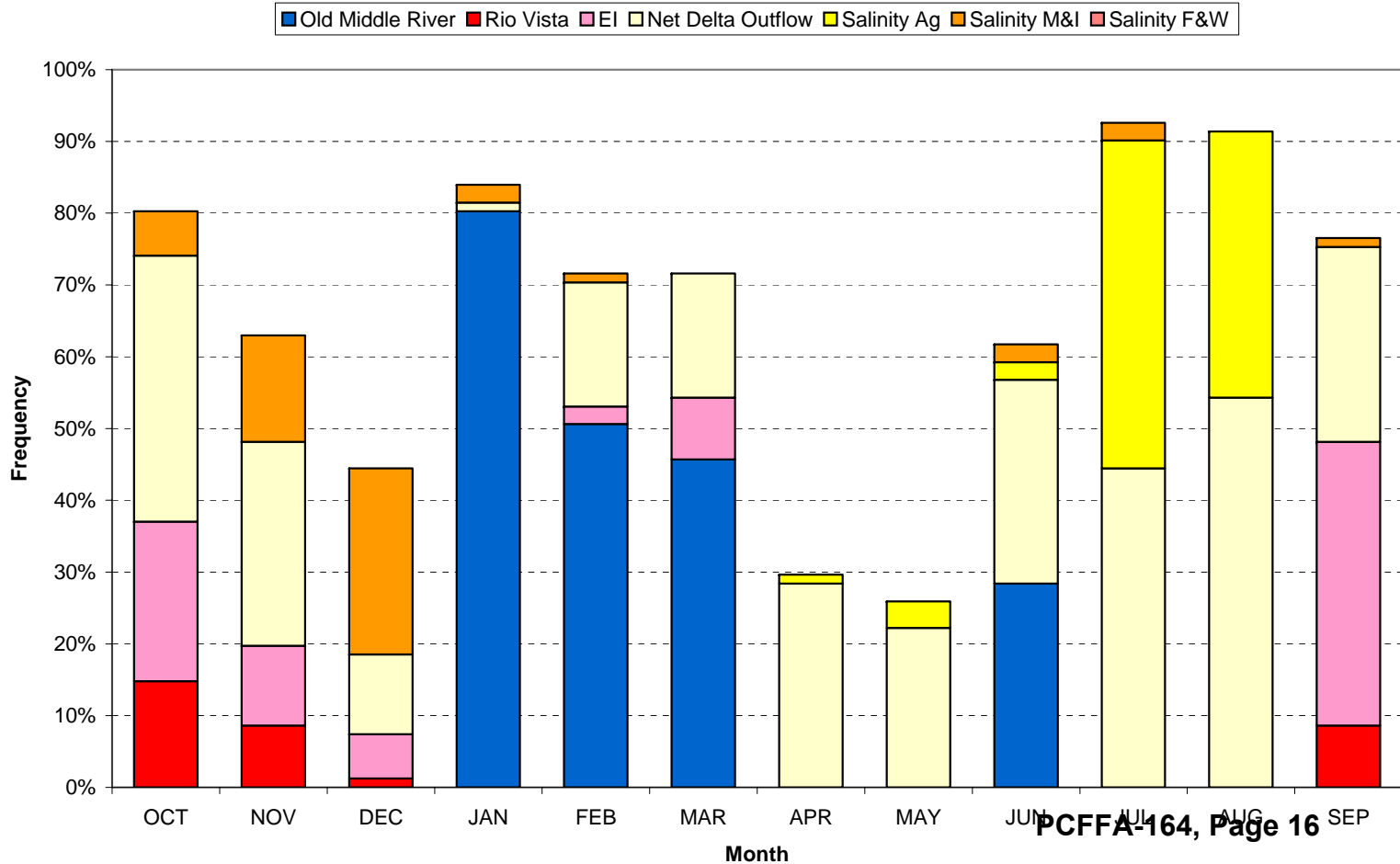
Old and Middle River Flow Controls – Alt 2

Delta Export Controls



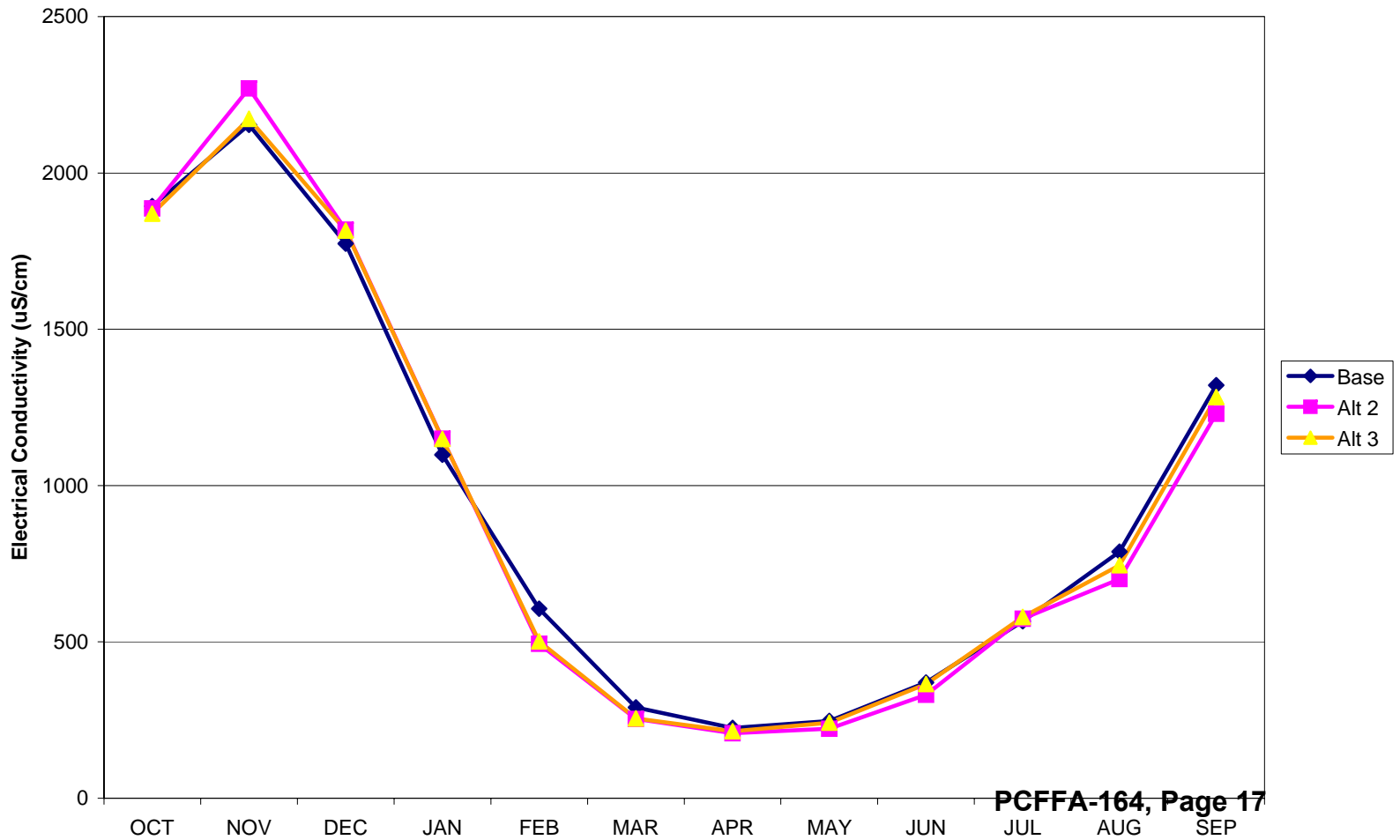
Old and Middle River Flow Controls – Alt 3

Delta Export Controls



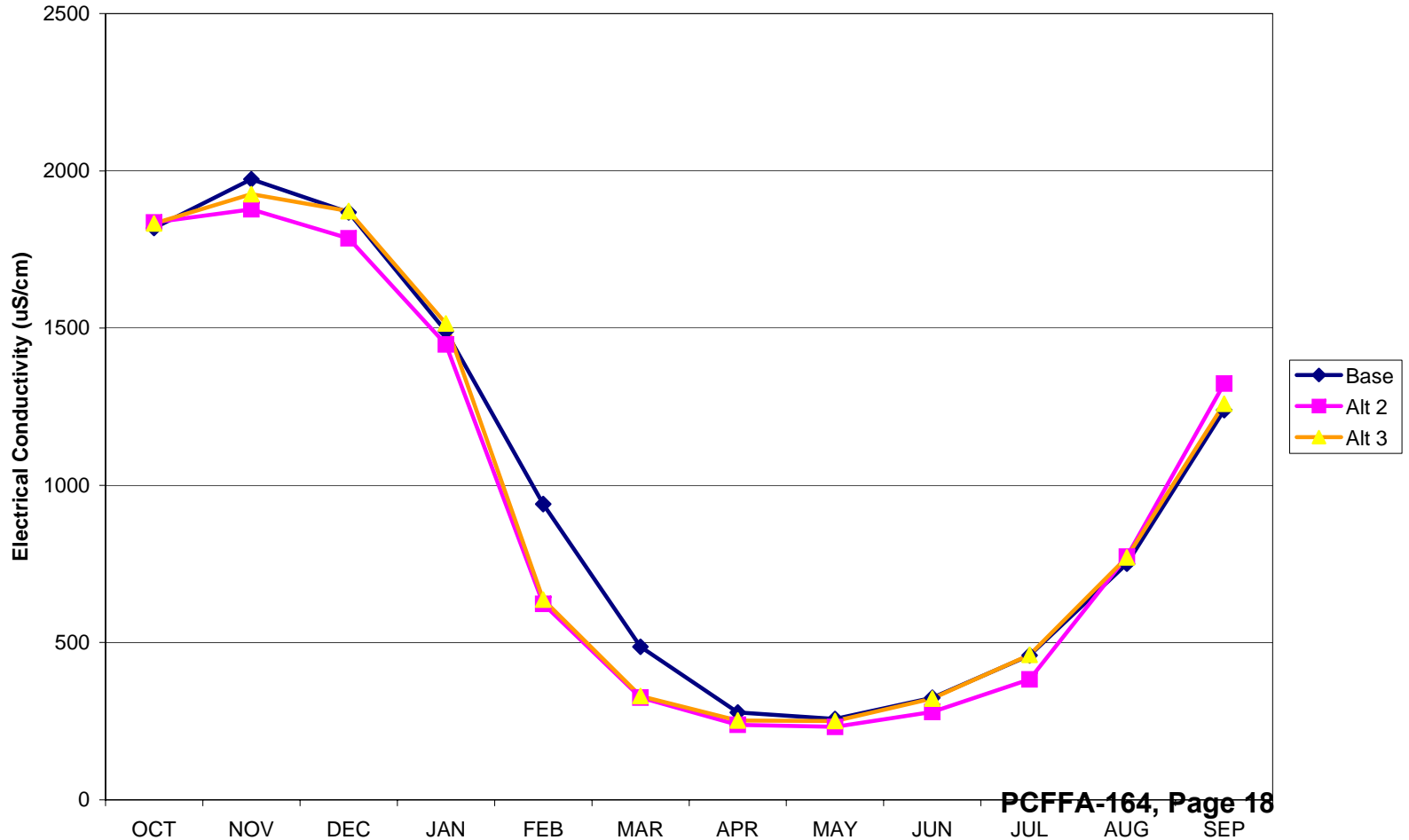
Delta Water Quality Changes - Emmaton

Emmaton Salinity



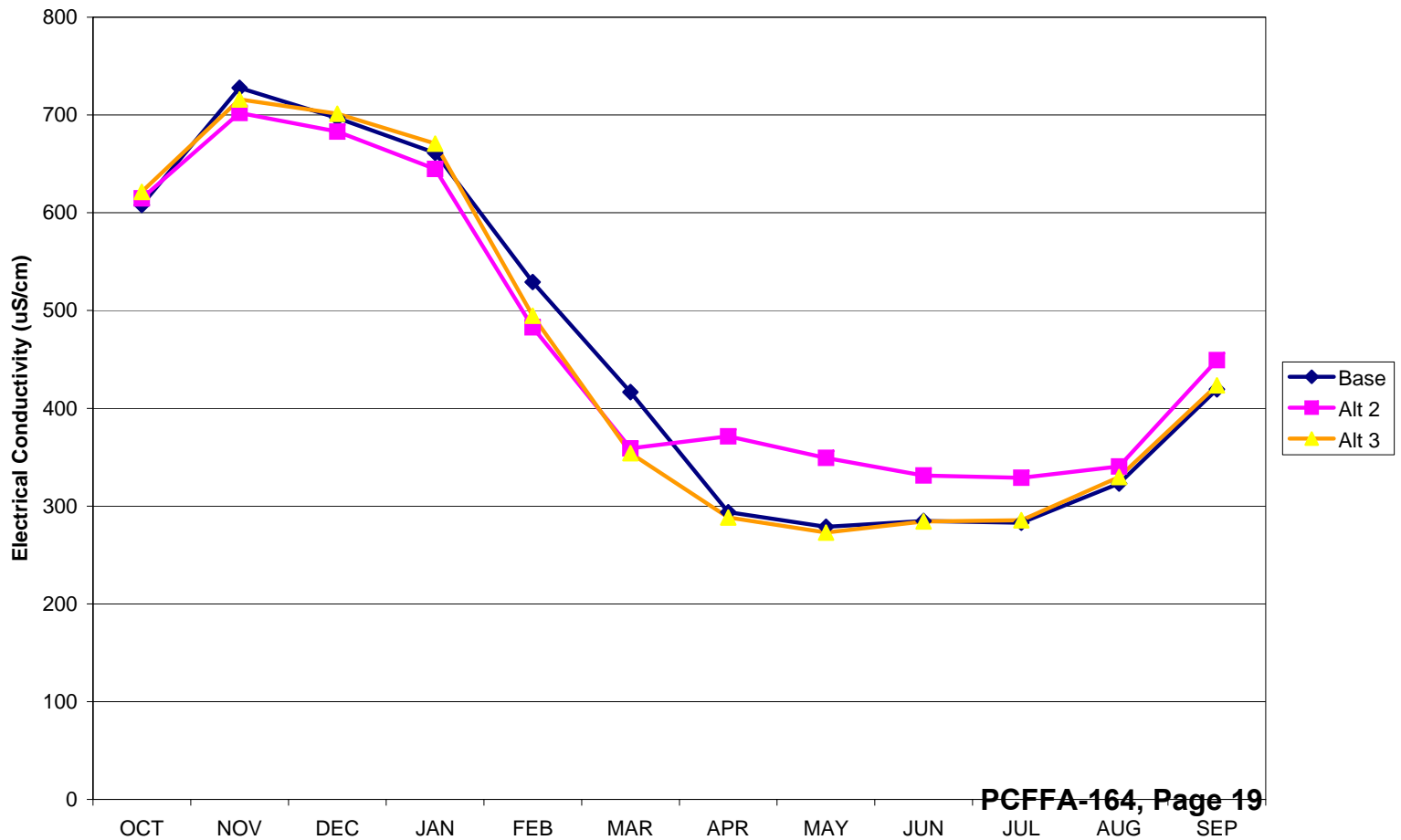
Delta Water Quality Changes – Jersey Pt

Jersey Point Salinity



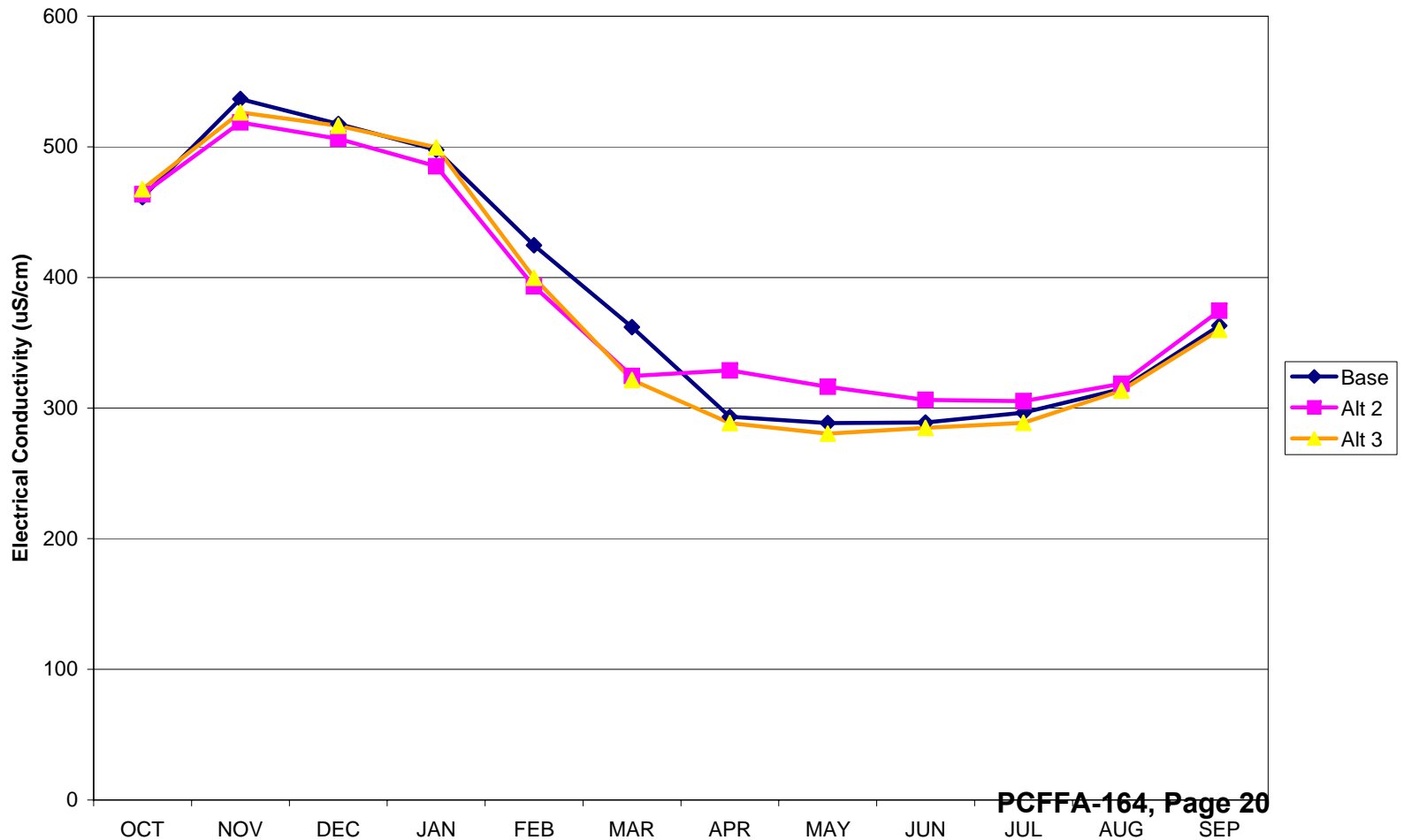
Delta Water Quality Changes – Old River @ Rock Slough

Old River at Rock Slough Salinity



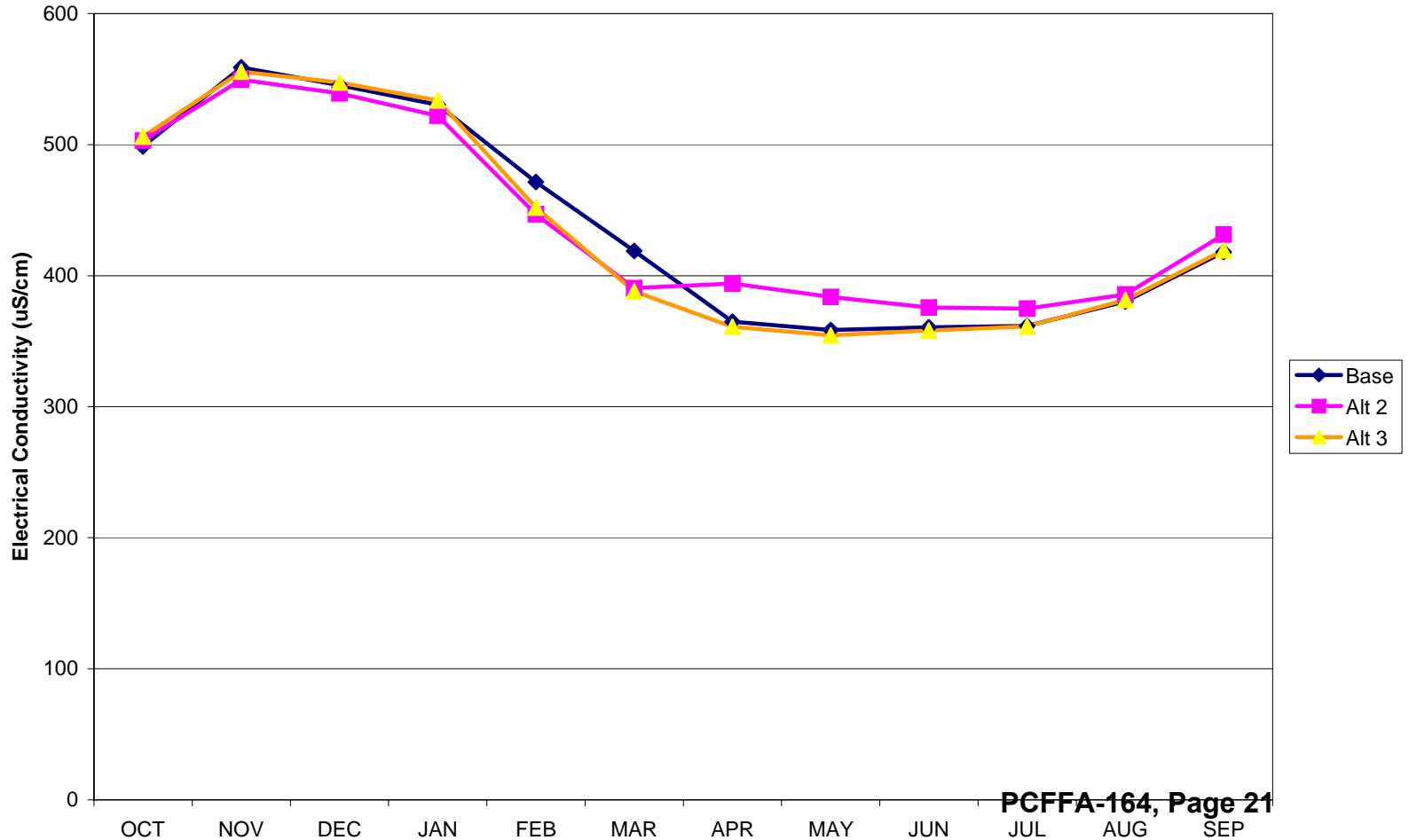
Delta Water Quality Changes – Banks PP

Banks PP Salinity



Delta Water Quality Changes – Jones PP

Jones PP Salinity



Estimating Near-term 2008 SWP Allocations under Wanger Restrictions

- Want to approximate 2008 SWP allocations under range of future hydrology
- Used a position analysis approach with initial conditions set to those of December 4, 2007
- Sensitivity to initial Oroville storage conditions (suggest use beyond 2008)
- Percentile statistics provide summaries of range of responses

December 4, 2007 Initial Conditions (or approximate)

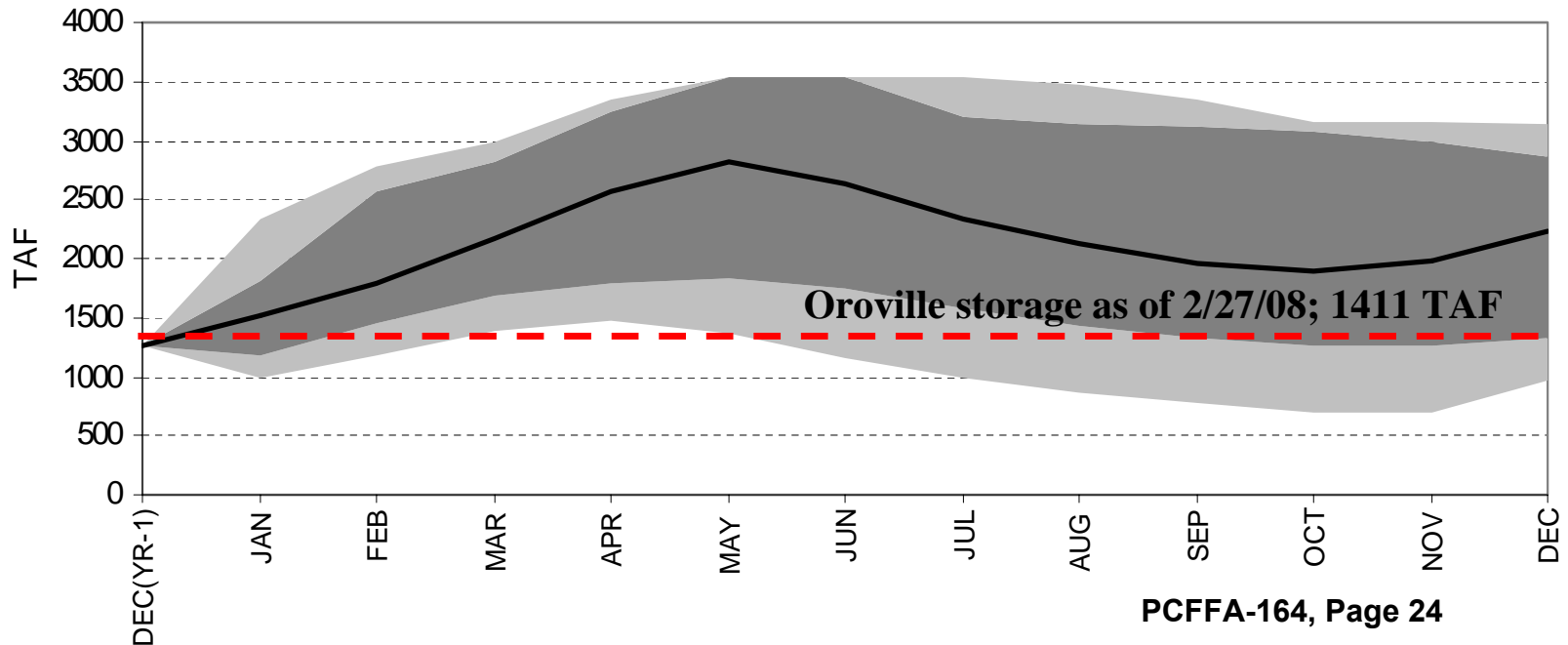
North of Delta	Storage (TAF)
Trinity	1,365
Shasta	1,725
Oroville	1,263
Folsom	232
CVP SL	503
SWP SL	566
Del Valle	30
Silverwood	72
Perris	66
Pyramid	161
Castaic	257
New Hogan	120
New Melones	1,439
Tulloch	55
New Don Pedro	1,221
Lake McClure	263
Eastman Lake	16
X2	81 Km

Model Projections for 2008 Oroville Storage

Position Analysis Results in Percentile Ranges

BASE Position Analysis (Initial Conditions as in 12/04/2007) - Oroville

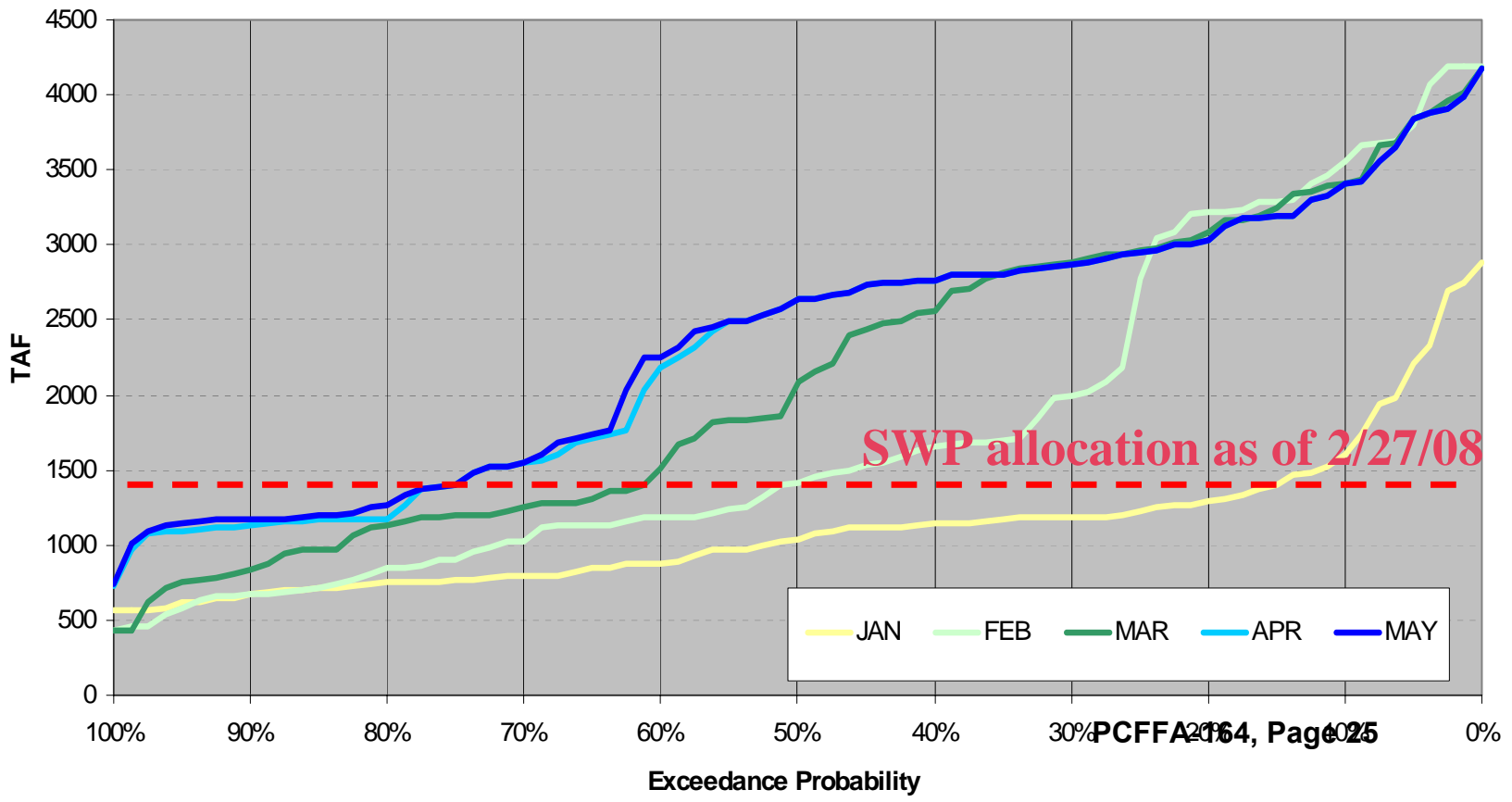
- 50 th Percentile
- 25 th - 75 th Percentile
- 10 th - 90 th Percentile



Model Projections of SWP 2008 Allocation (More restrictive OMR scenario; Dec projection)

Position Analysis Results Exceedance Probability

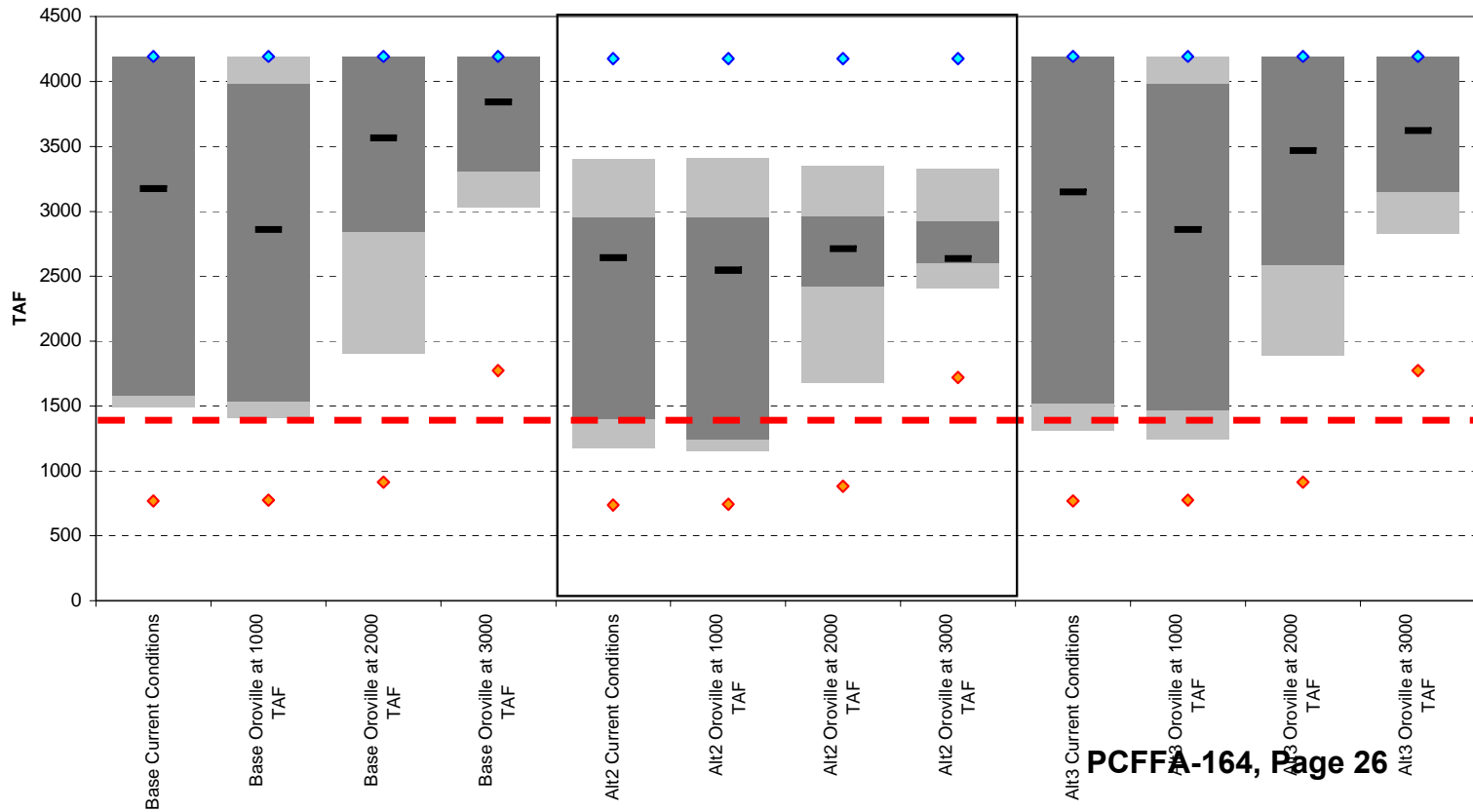
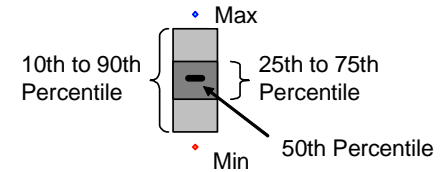
SWP_ALLOCATION SWP-



SWP allocation as of 2/27/08

Sensitivity to OMR criteria and Oroville Storage

Position Analysis Results in Percentile Ranges
SWP Allocation for all PA studies



Key Findings from Near-Term Model Studies

- Changes in initial storage value for Oroville does not significantly influence the median SWP allocation under the high OMR restriction scenario (Alt 2)
 - *export limitations are the principal drivers, not water supply conditions,*
 - *higher Oroville storage, however, reduces the uncertainty in SWP allocations even under Alt2,*
- SWP allocation at the 90th percentile (under the hydrologic conditions simulated) is 36% for the Base scenario, 28% for Alt 2, and 31% for Alt 3
- Article 21 is significantly reduced in both Alt 2 and Alt 3 as compared to projected Base conditions
 - higher level of confidence that it will be zero for 2008

Summary

- Provided initial estimates of long-term average reductions in the range of 350 – 1,000 taf/yr
- OMR criteria strongly control project operations (both exports and upstream)
- 2008 projections indicate that SWP allocations will be export constrained with OMR restrictions
- Article 21 supplies are likely to be severely limited

Questions?