

Bay Delta Conservation Plan EIR/EIS - CALSIM II Model Concerns Identified Since Completion of Administrative Draft Modeling

DATE: December 1, 2011

Introduction

The Bay Delta Conservation Plan (BDCP) EIR/EIS Administrative Draft CALSIM II and DSM2 models have been completed for the Existing Conditions, No Action Alternative and Alternative 1. The administrative draft models were completed by May 2010. Subsequent modeling of other alternatives is consistent with the modeling performed for the Existing Conditions, No Action Alternative and Alternative 1.

Since completion of the administrative draft models a number of model issues have been identified as part of ongoing work on BDCP and other projects. It is not an unusual circumstance for issues to arise while modeling and analysis activities for a project are being completed. Modeling issues could include the interpretation and agreement on assumptions as well as the implementation of these assumptions in the models. This document only addresses issues associated with the implementation of assumptions in the CALSIM II model. This document only addresses issues identified prior to October of 2011.

The Department of Water Resources (DWR) BDCP modeling team has evaluated the potential impact of these model issues on the Existing Conditions, No Action Alternative and Alternative 1. The review has included DWR, Bureau of Reclamation (Reclamation) and Fish and Wildlife Services (FWS) modeling staff. DWR management has been advised of the findings of the review.

DWR and Reclamation model development activities are ongoing and according to budget and schedule requirements separate from any particular project. The inventory of model issues in this document will be added to as other model development activities and reviews continue. These issues may be considered in future modeling for the BDCP and incorporated if and when the management team directs the modeling team to include updates based on this inventory.

Upon completion of the Draft and Final BDCP EIR/EIS documents, as directed by the management, a technical appendix will be developed to document the model issues identified in this memorandum and other issues subsequently identified, and the associated sensitivity and limitations of model results subject to these issues.

Model Issues

The following tables inventory the model issues as of the date of this memorandum. The list of issues has been separated into three categories:

- Table 1 inventories corrections to the models in regard to implementation of assumptions for Existing Conditions and No Action Alternative.
- Table 2 inventories improvements to the models that would improve the operations of the BDCP Alternative 1 (and other alternatives) as well as improve comparative analysis of results. Table 1 improvements are assumed to also be included in alternatives models when applicable.
- Table 3 inventories general improvements to the models (not specific to a particular scenario) that would improve the behavior of individual models as well as improve comparative analysis of results.

Table 1: Corrections to Existing Conditions and No Action Alternative CALSIM II and DSM2 Models

#	Item	Comments
1	January NDOI	Correct lookup table for NDOI
2	Export constraint associated with NMFS BiOp DCC closure	Modify code to keep the initial EC condition unchanged and to carry export constraint through latter cycles in the CONV step and TXFR step
3	Upgrade of LV module for future level models	Los Vaqueros 60,000 ac-ft additional storage to be included in No Action Alternative
4	Stanislaus fish volumes and fish patterns (NMFS RPA III.1.3)	NMFS modeling matches Figure 11-1 in the NMFS Biop, but differs slightly from Appendix 2E in wetter years. Update model to match Appendix 2E. Reclamation provided Stanislaus fish flows lookup table without dry year relaxation (dry year relaxation has not been resolved at policy level)
5	Stanislaus instream flows	Reclamation provided C520_instream correction
6	Vernalis Flows	VernQ value incorrect in TXFR step - when Vernalis is above 16,000 cfs alternate sets of coefficients for calculating OMR won't be used. This rare condition may be less rare as the model is used to explore percent-of-SJR Basin-inflow MIFs, etc. It would definitely become a more frequent problem if HORB installation logic were inserted with a lower flow threshold
7	D1641 EI ratio	DICU term was redefined along Sacramento River and EI ratio (using D1641 definitions of terms) is not accounting for this change in DICU (small change)

Table 2: Improvements to BDCP Alternative 1 CALSIM II and DSM2 Models

#	Item	Comments
1	D1641 Emmaton standard relaxation for moving the standard to Threemile Slough	Update to correct relationship for translation to Threemile Slough based on DSM2 model results; varies with ELT and LLT conditions
2	DXC regression equations	Update to correct DXC regression equations based on DSM2 model results; varies with current conditions, ELT and LLT conditions (varies by alternative and No Action as well)
3	Health and safety minimum export pumping	Apply criteria to total exports in the alternatives, instead of only to south Delta exports

Table 3: General Improvements to CALSIM II and DSM2 Models

#	Item	Comments
1	DXC regression equations	Update to correct DXC regression equations based on DSM2 model results
2	FWS BiOp Action 3 Temperature Trigger day table	Temperature triggers to be updated to reflect climate change on temperature triggers
3	Sutter and Steamboat flow equations	Equations are reversed for when the DCC is open and when it is closed (output only)
4	C407 and NBA weight changes	Revise weights to avoid non-unique solutions and thus improve comparability between different studies
6	OMR condition corrections	Change "condition month>=dec .or. month<=jun" to "condition month>=dec .and. month<=jun"
7	ANN Salinity Station Output	Add C157 to the output calculations for the Salinity Stations (output only)
8	Shasta and Folsom Level 5 weight changes	Level 5 water weight too high to move water from upstream to San Luis through the intertie. Intertie has a -10 weight that prevents transfer of Level 5 water to San Luis. Change Level 5 weight to 50.
9	Napa and Oak Flat SWP deliveries	deltar variables in swp_contractor_perdel_B.wresl for Napa and Oak Flat use the incorrect Contractor Type percent delivery values
10	Limit Lake Oroville releases for exports when storage drops below certain levels.	Feather River special code is already developed; update includes current month inflow and storage to determine how much releases to back off

Table 3: General Improvements to CALSIM II and DSM2 Models

#	Item	Comments
11	sac_oth definition in AnnCommon1.wresl	Need to change the bounds from standard bounds to allow for negative values; as defined, sac_oth can potentially limit NBA diversions when Yolo, Calaveras, and Mokelumne flow are low
12	Article 56 stored water adjustment to WSI-DI allocation method	Adjust WSI for Article 56 stored water so that early month allocations are not artificially higher
13	Wheeling continuity	Add complete set of terms for wheeling continuity in Delta
14	SWP allocation logic for conditions when SJR is in flood condition	Update SWP allocation logic
15	American River FMS	Reclamation updates implemented

BDCP Model Updates RESULTS

07-22-2011

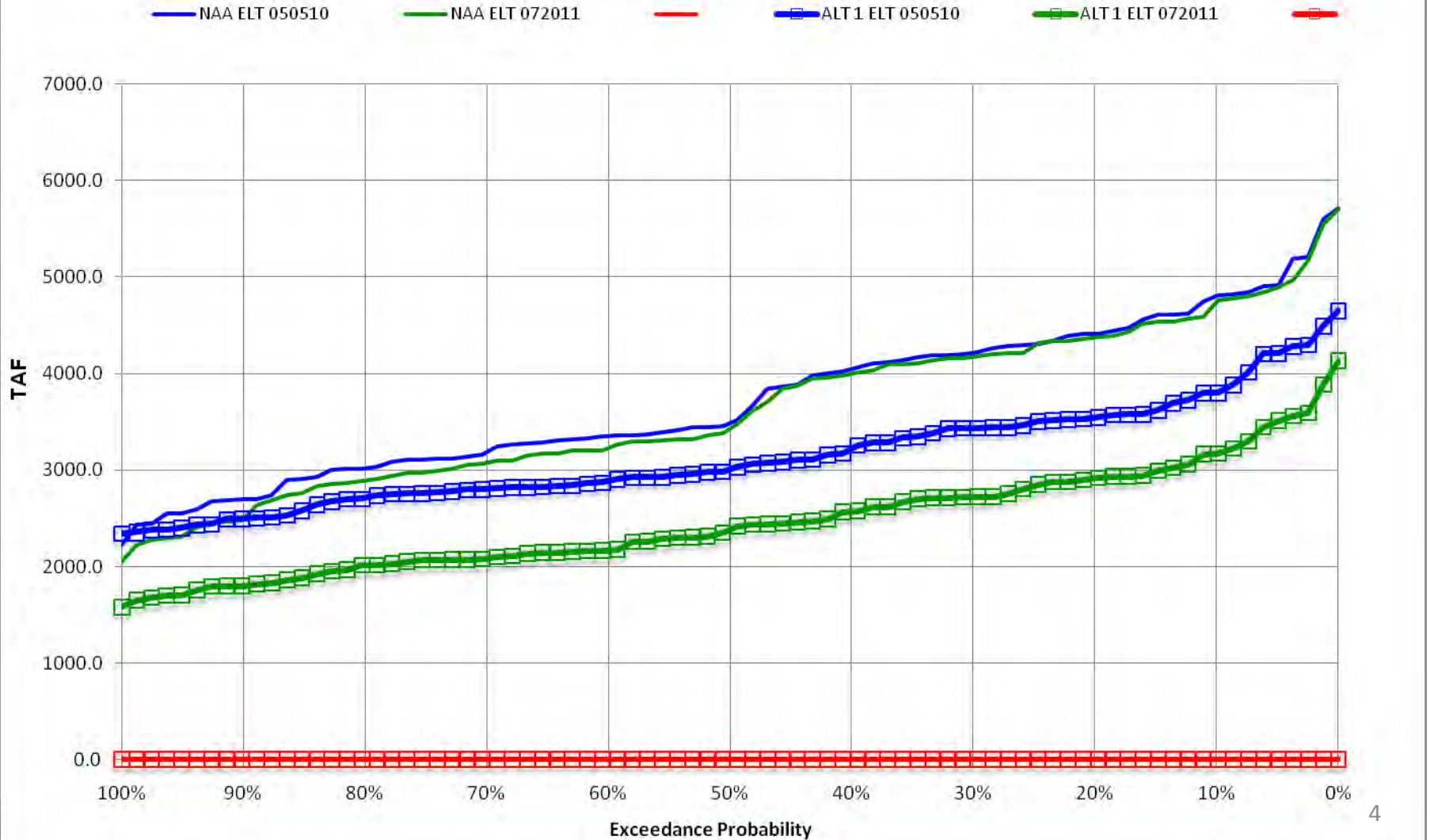
Description of the CALSIM II Studies

- BDCP NAA ELT 072011
 - Based on BDCP NAA ELT 050510 Model
 - Uses 050510 NAA ELT WSI-DI curves
- BDCP ALT 1 ELT 072011
 - Based on BDCP PP ELT 050510 Model
 - Uses 050510 PP ELT WSI-DI curves
- Notes common to both studies
 - includes model fixes listed in the “*BDCP_Modeling_Issues_Log_Rev12.xlsx*” except for the LV upgrade and the exchange contractors’ VAMP contribution fixes
 - Requires WSI-DI retraining

DCC

DCC

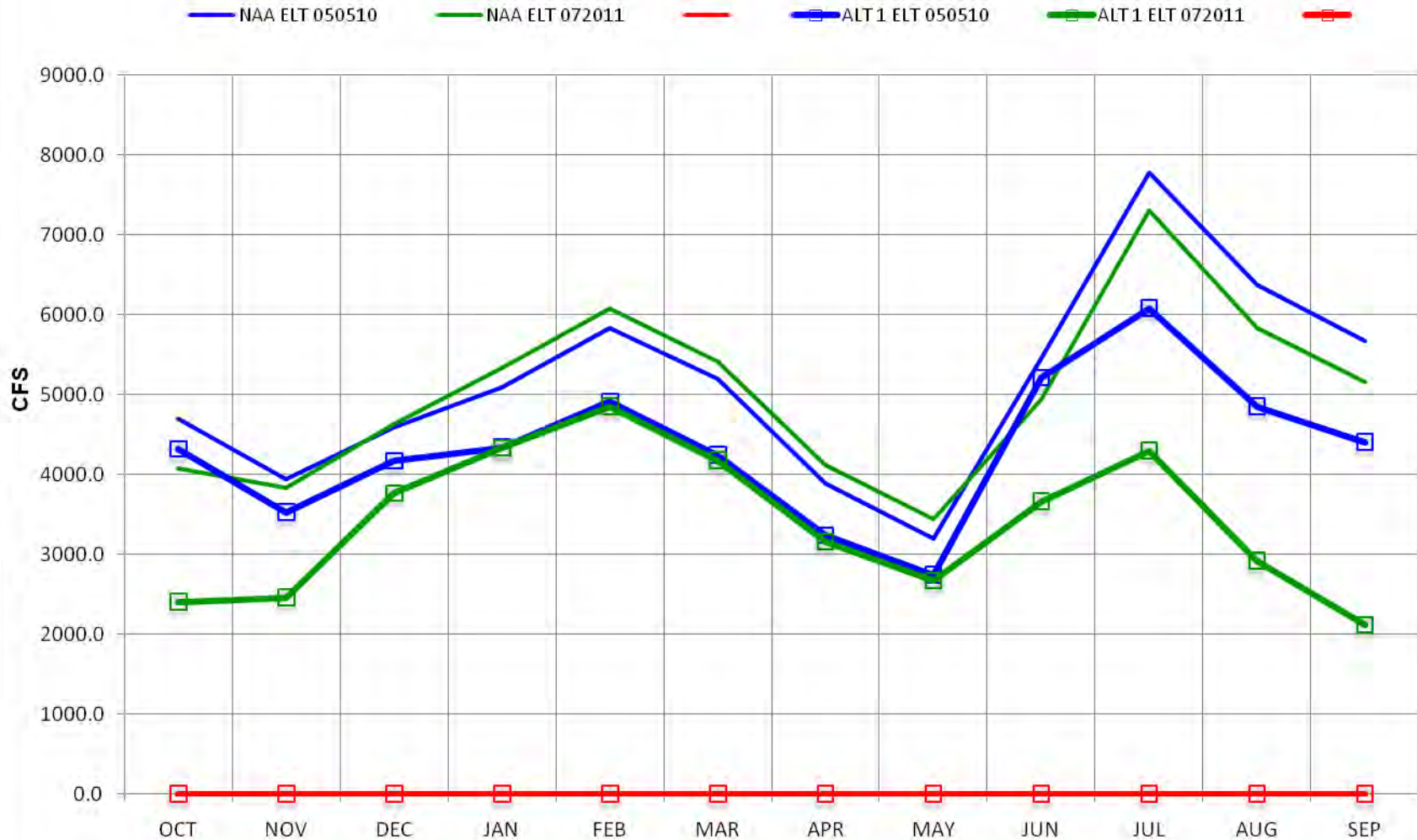
Results Exceedance Probability
DCC & GEO Flow ANNUAL



DCC

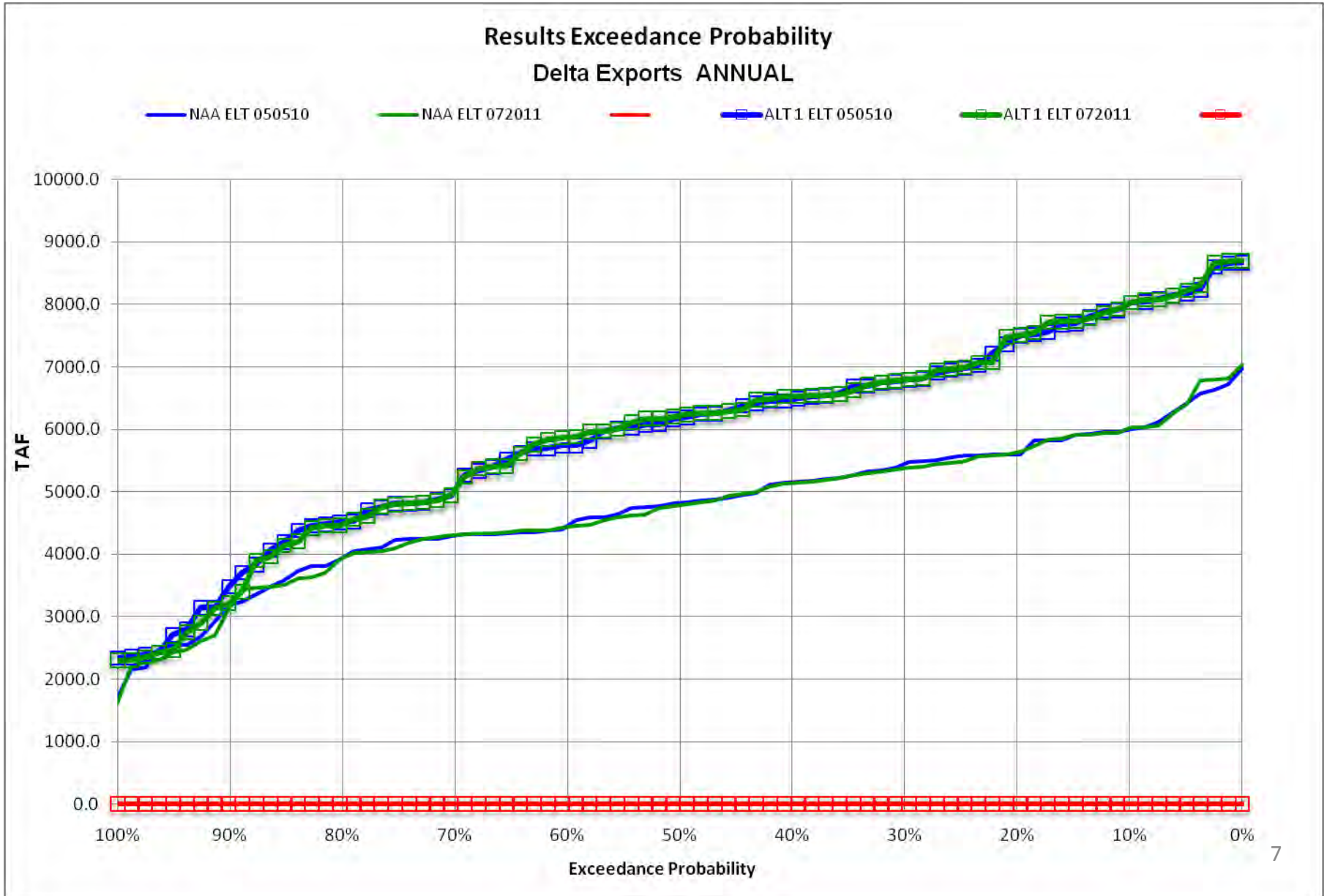
Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
DCC & GEO Flow



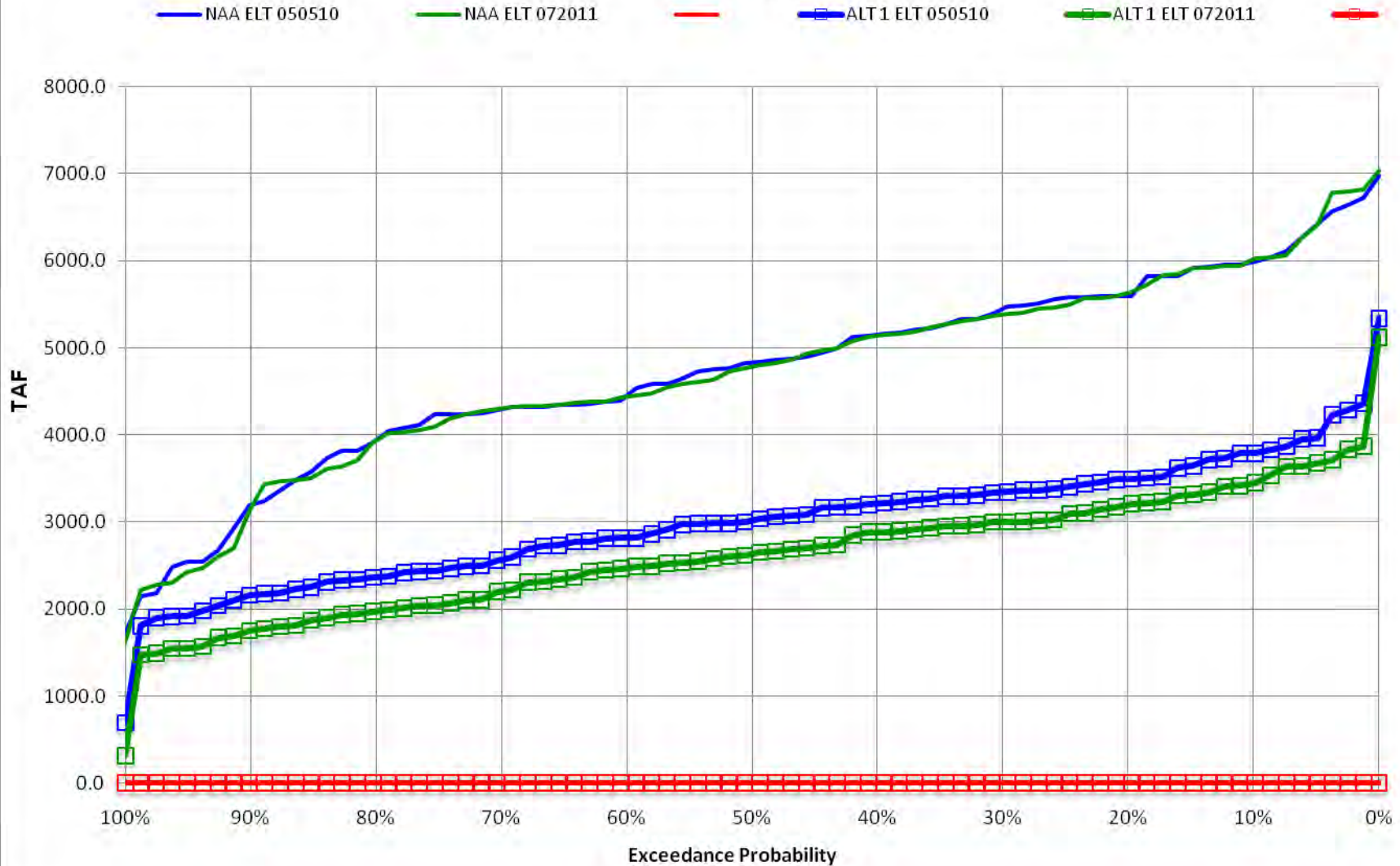
TOTAL DELTA EXPORTS

Total Delta Exports



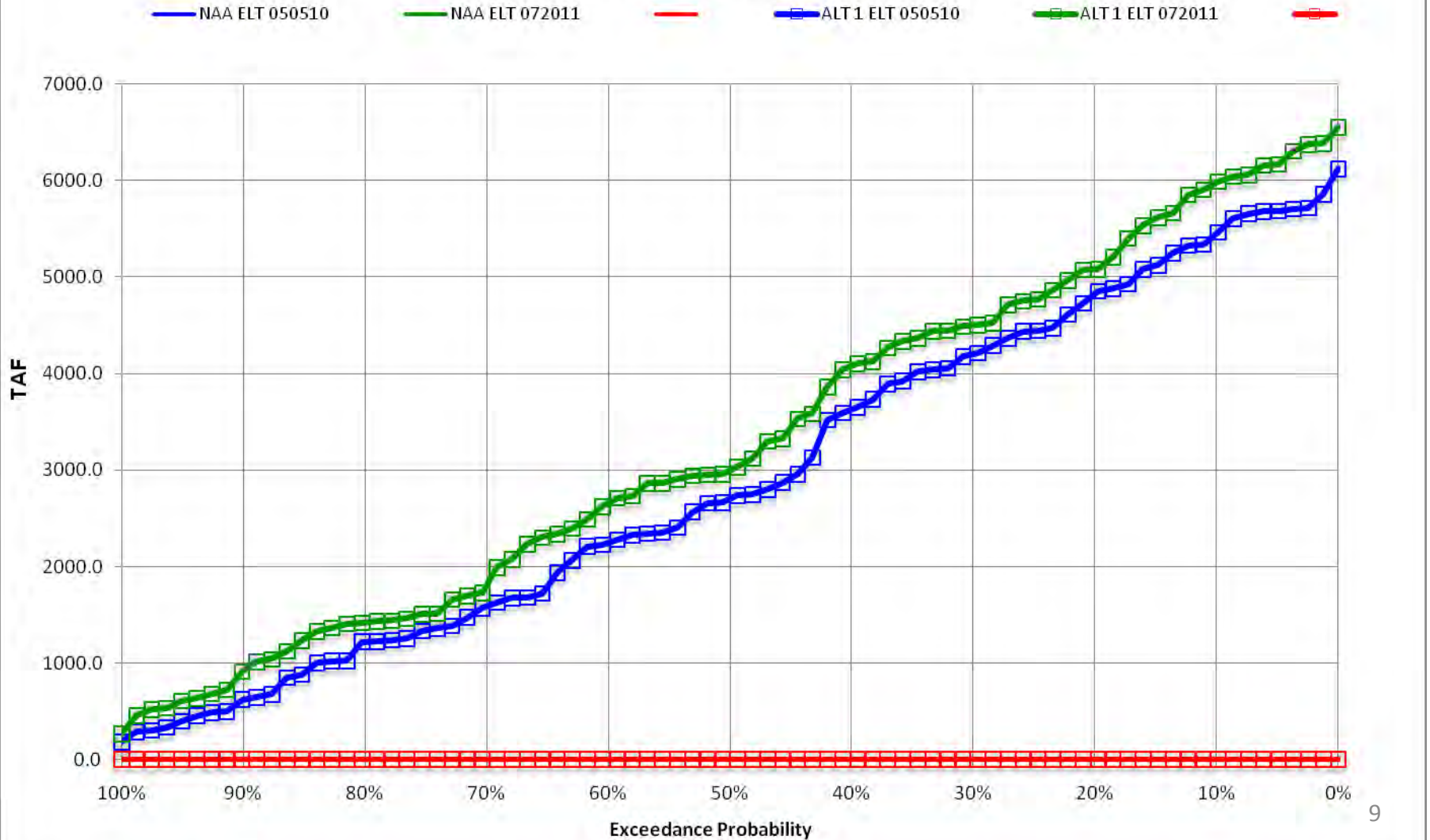
Total South Delta Exports

Results Exceedance Probability
Total South Delta Exports ANNUAL



Total North Delta Exports

Results Exceedance Probability
Total IF ANNUAL

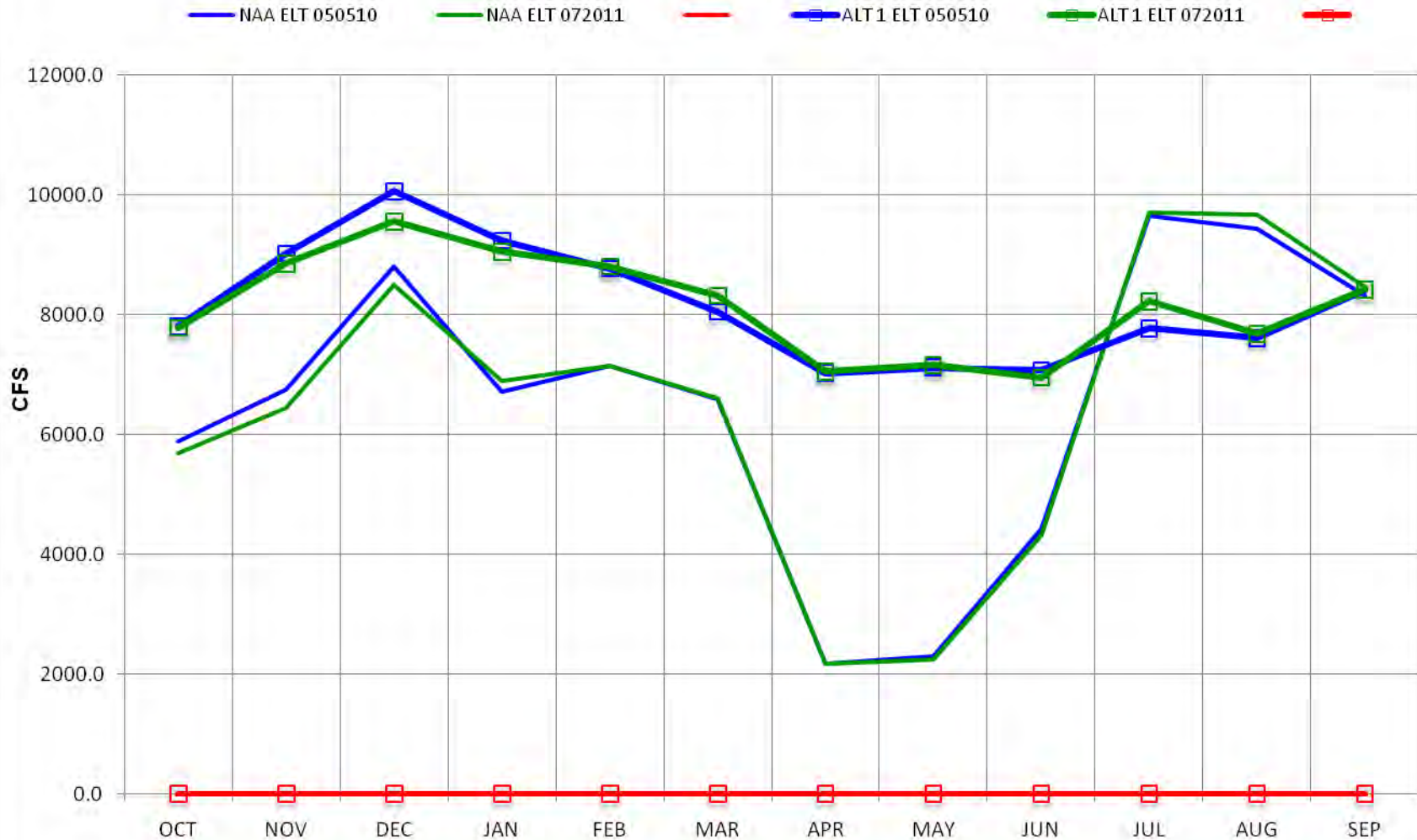


PRELIMINARY – NOT FOR DISTRIBUTION

Total Delta Exports

Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Delta Exports



PRELIMINARY – NOT FOR DISTRIBUTION

Total South Delta Exports

Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Total South Delta Exports

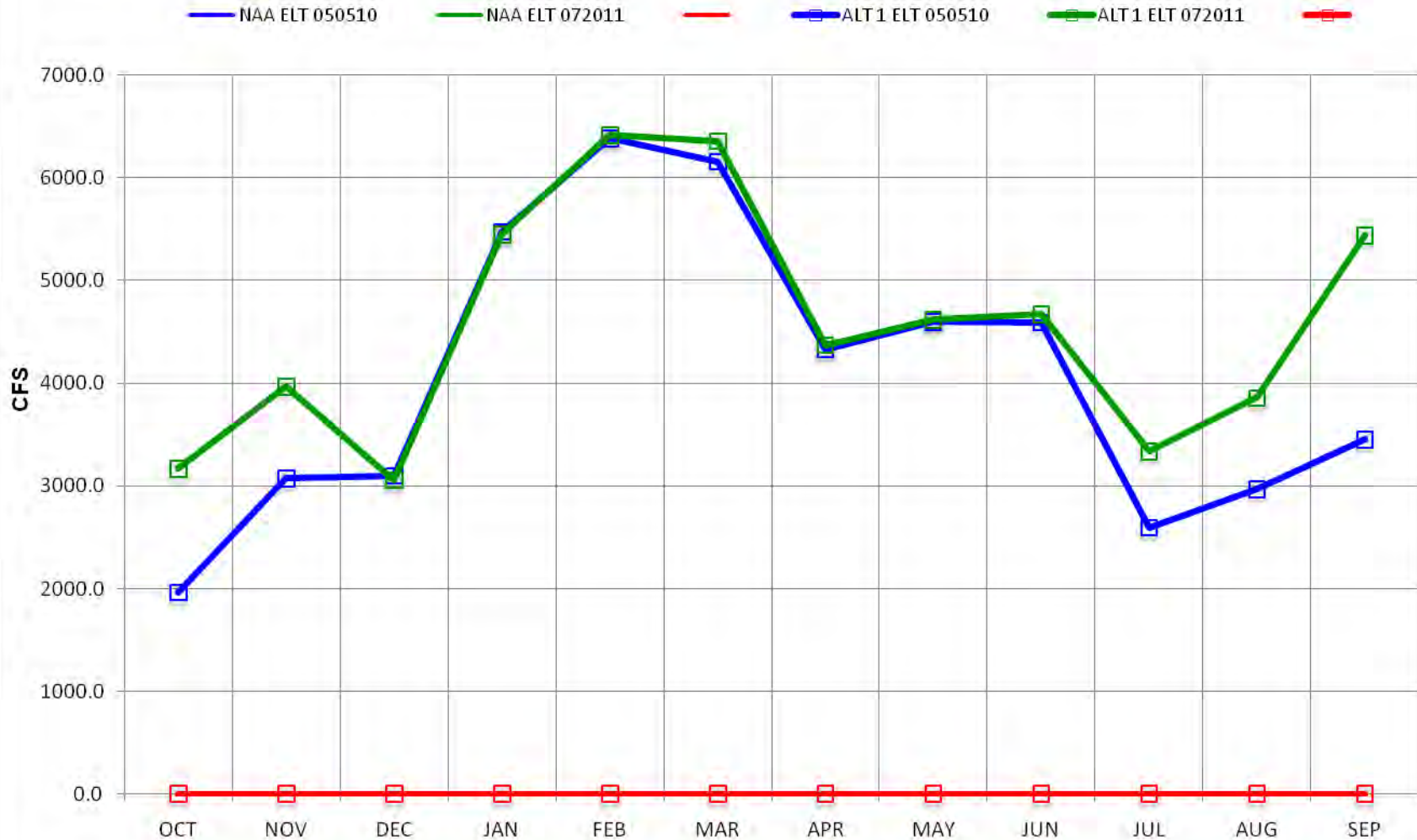


PRELIMINARY – NOT FOR DISTRIBUTION

Total North Delta Exports

Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Total IF



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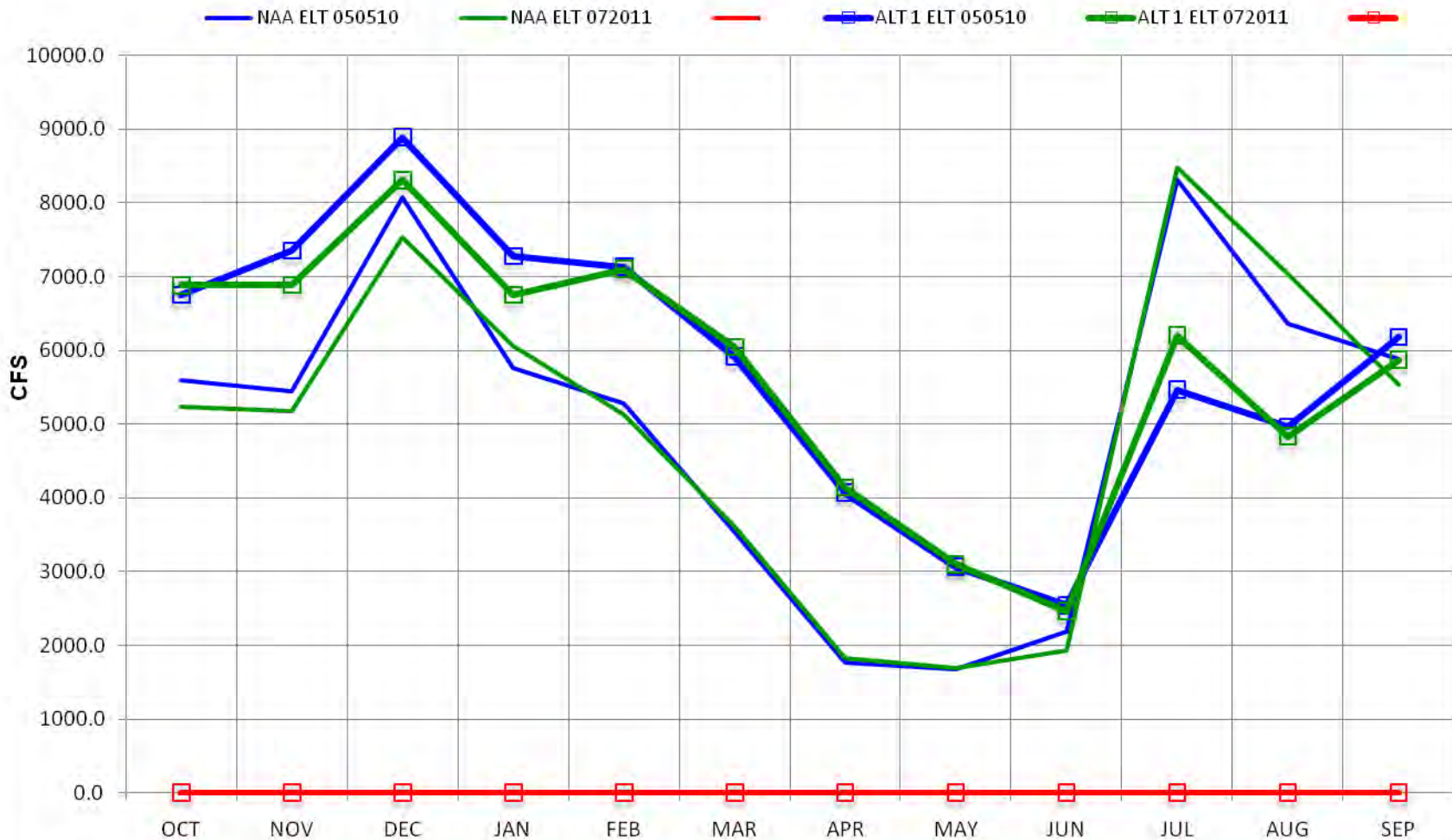
Total Delta Exports

Dry and Critical Year Average

Multi Study Comparison - Monthly Avg Results - Dry and CRITICAL Years

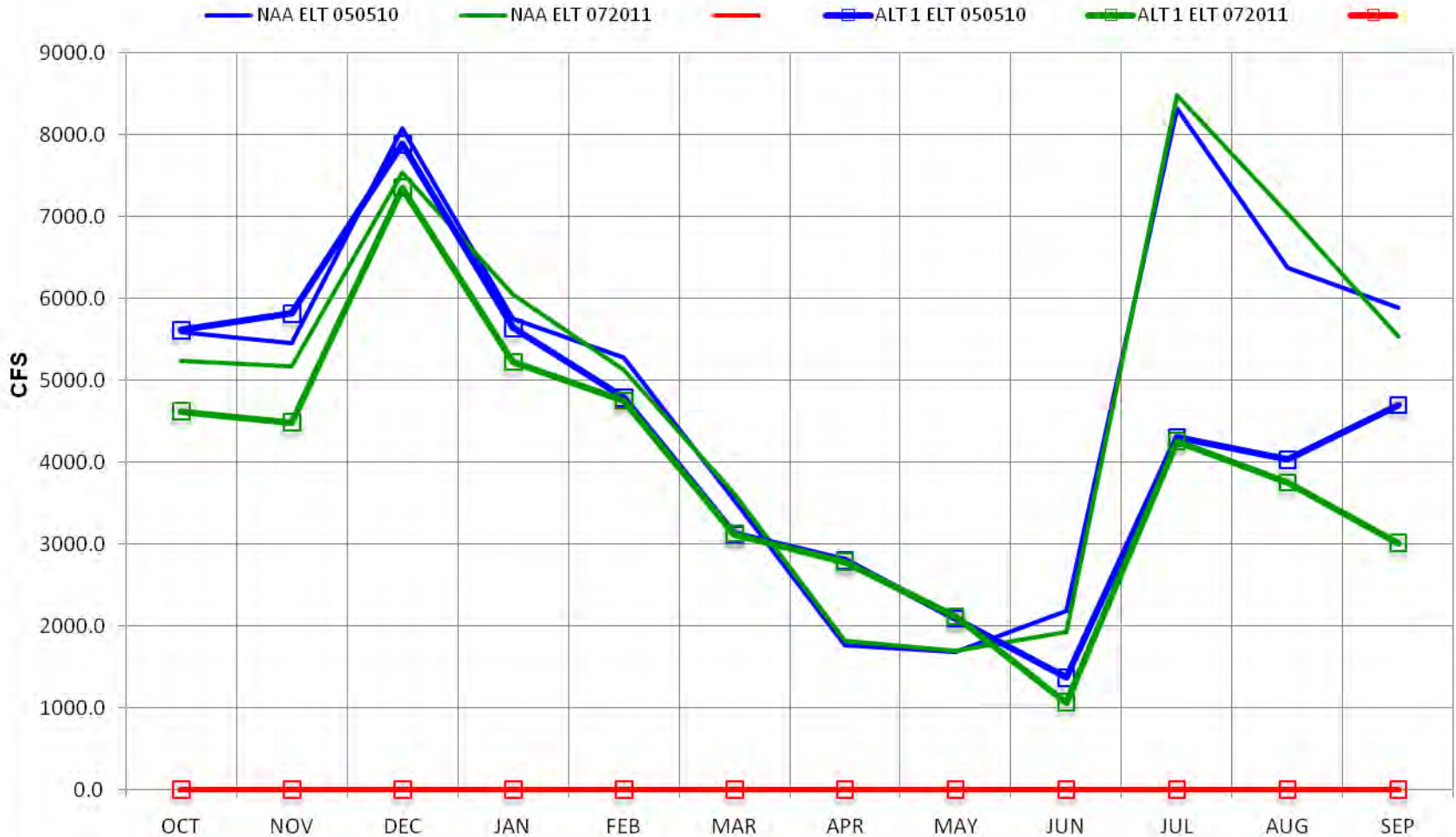
Delta Exports

Water Year Classification: SAC 40-30-30



PRELIMINARY – NOT FOR DISTRIBUTION
Total South Delta Exports
Dry and Critical Year Average

Multi Study Comparison - Monthly Avg Results - Dry and CRITICAL Years
Total South Delta Exports
Water Year Classification: SAC 40-30-30

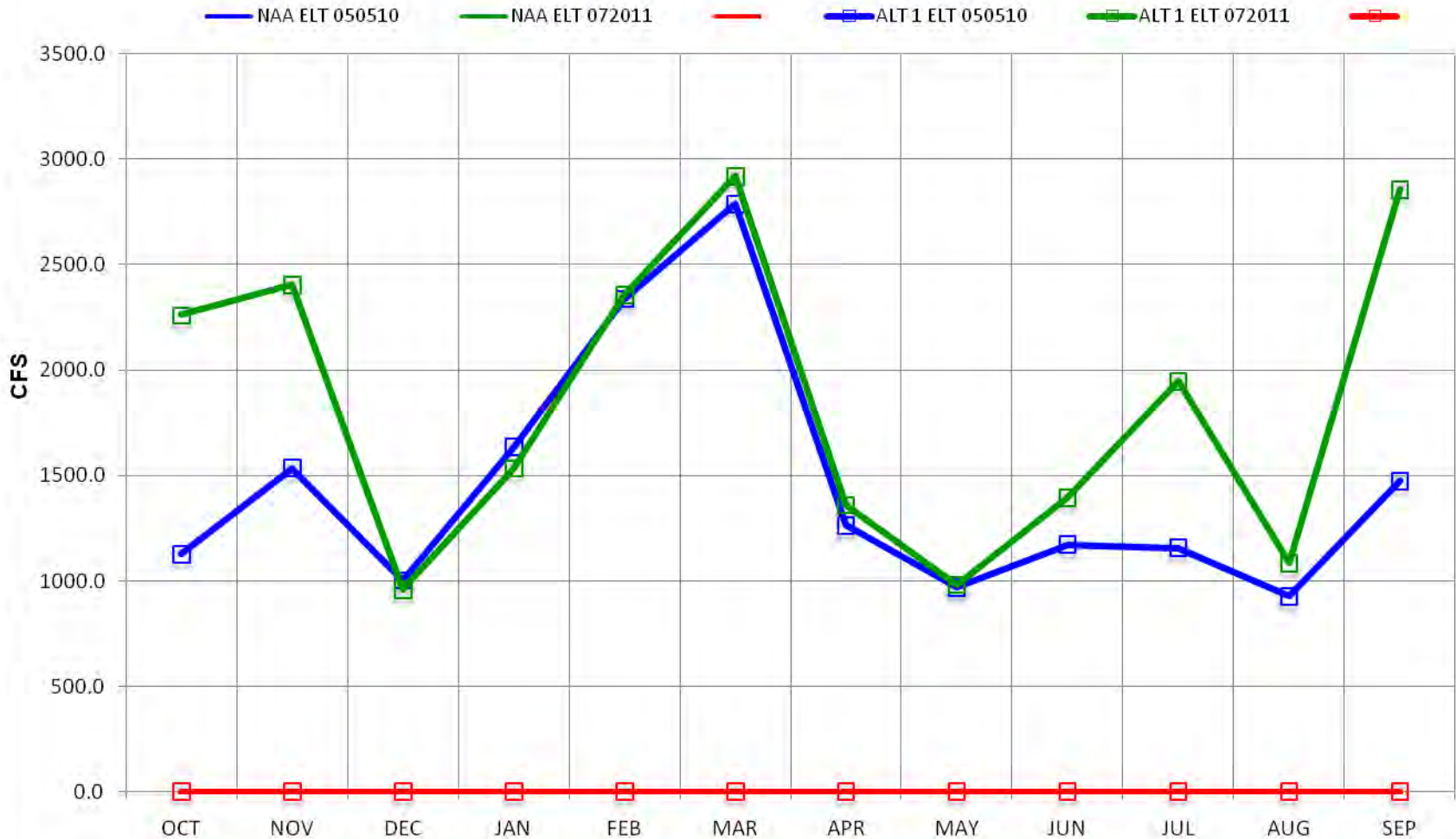


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Total North Delta Exports
Dry and Critical Year Average

Multi Study Comparison - Monthly Avg Results - Dry and CRITICAL Years

Total IF

Water Year Classification: SAC 40-30-30

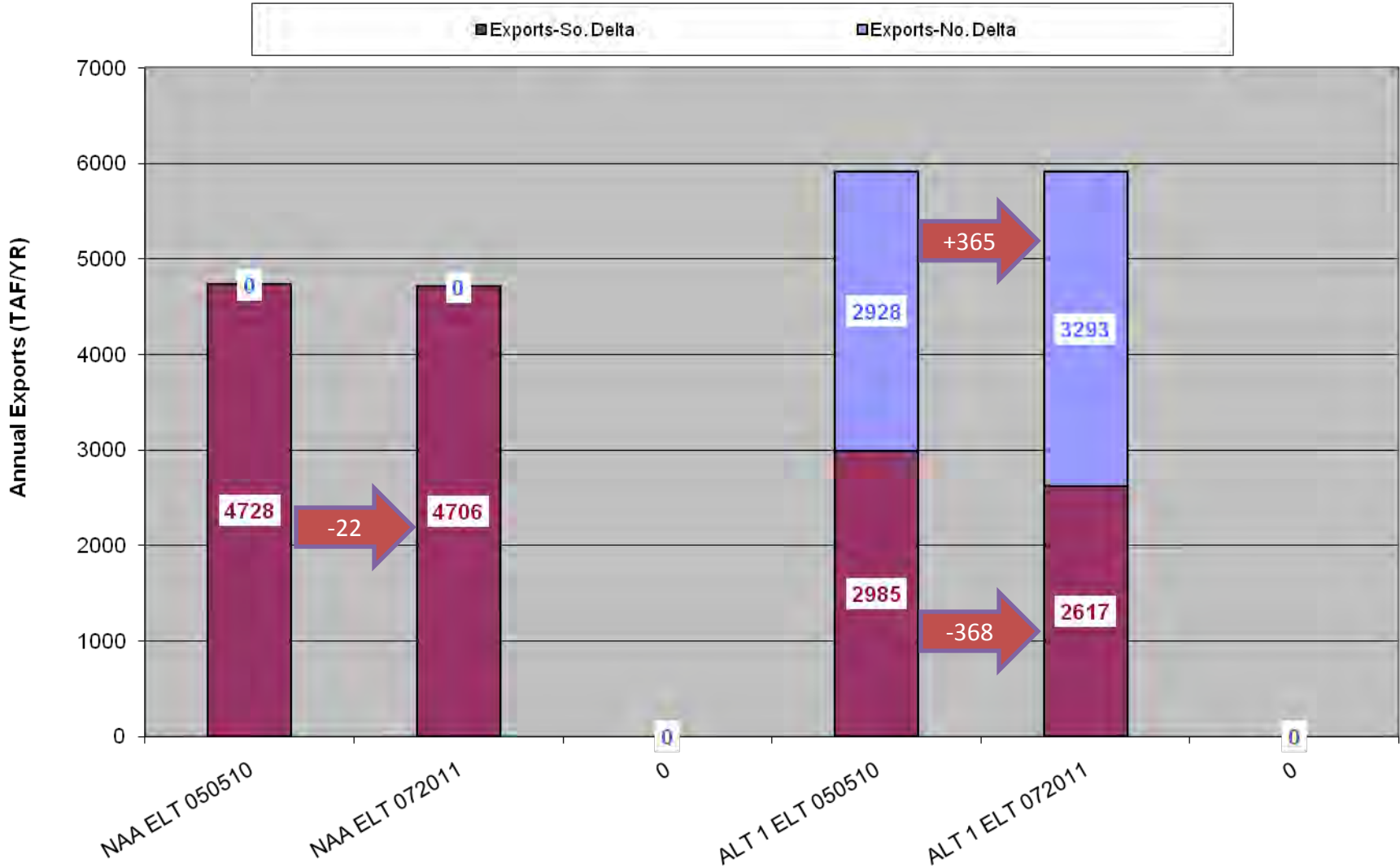


PRELIMINARY – NOT FOR DISTRIBUTION

Total Delta Exports

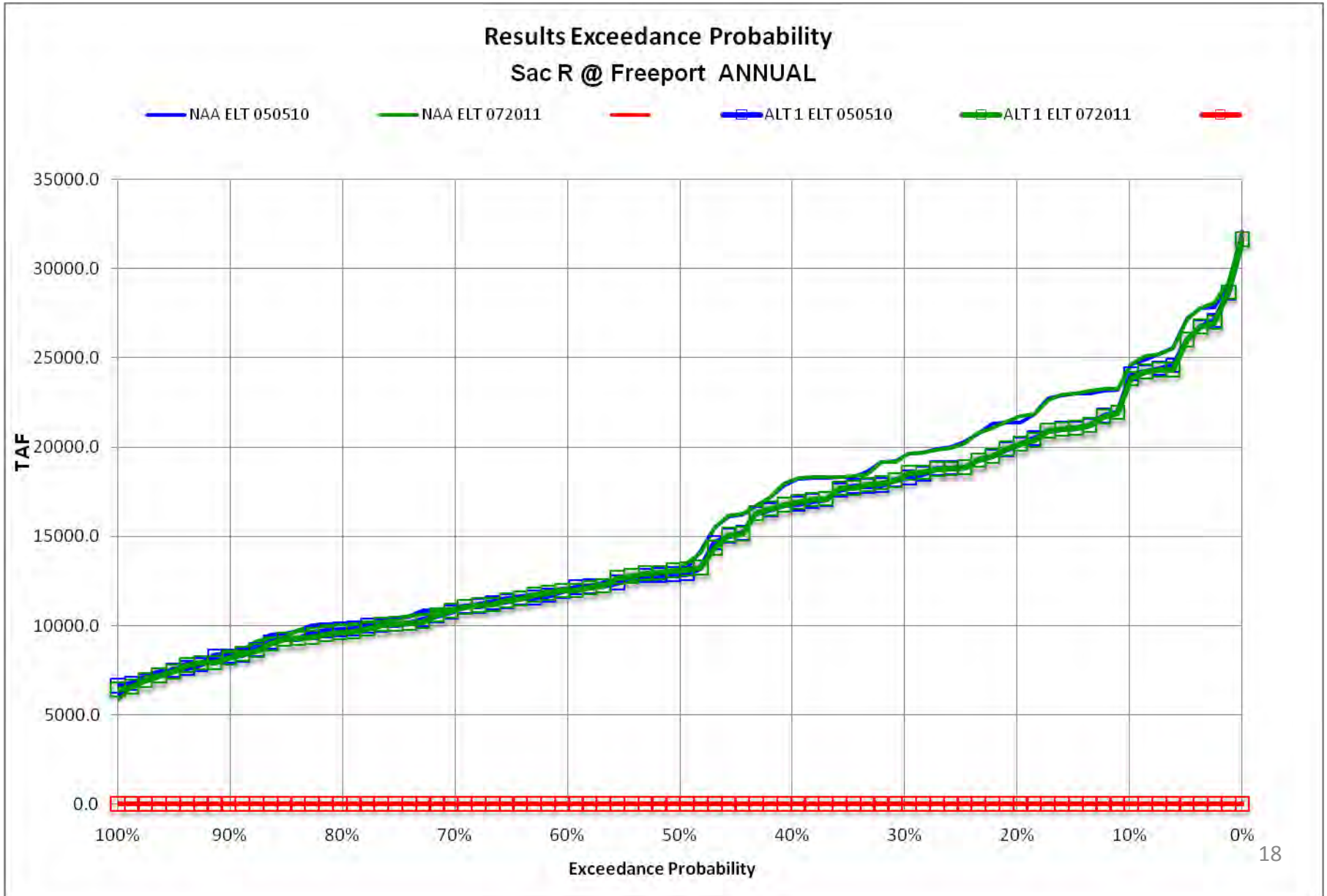
Annual Average North and South Distribution

Long-Term Annual Distribution of SWP and CVP Delta Exports



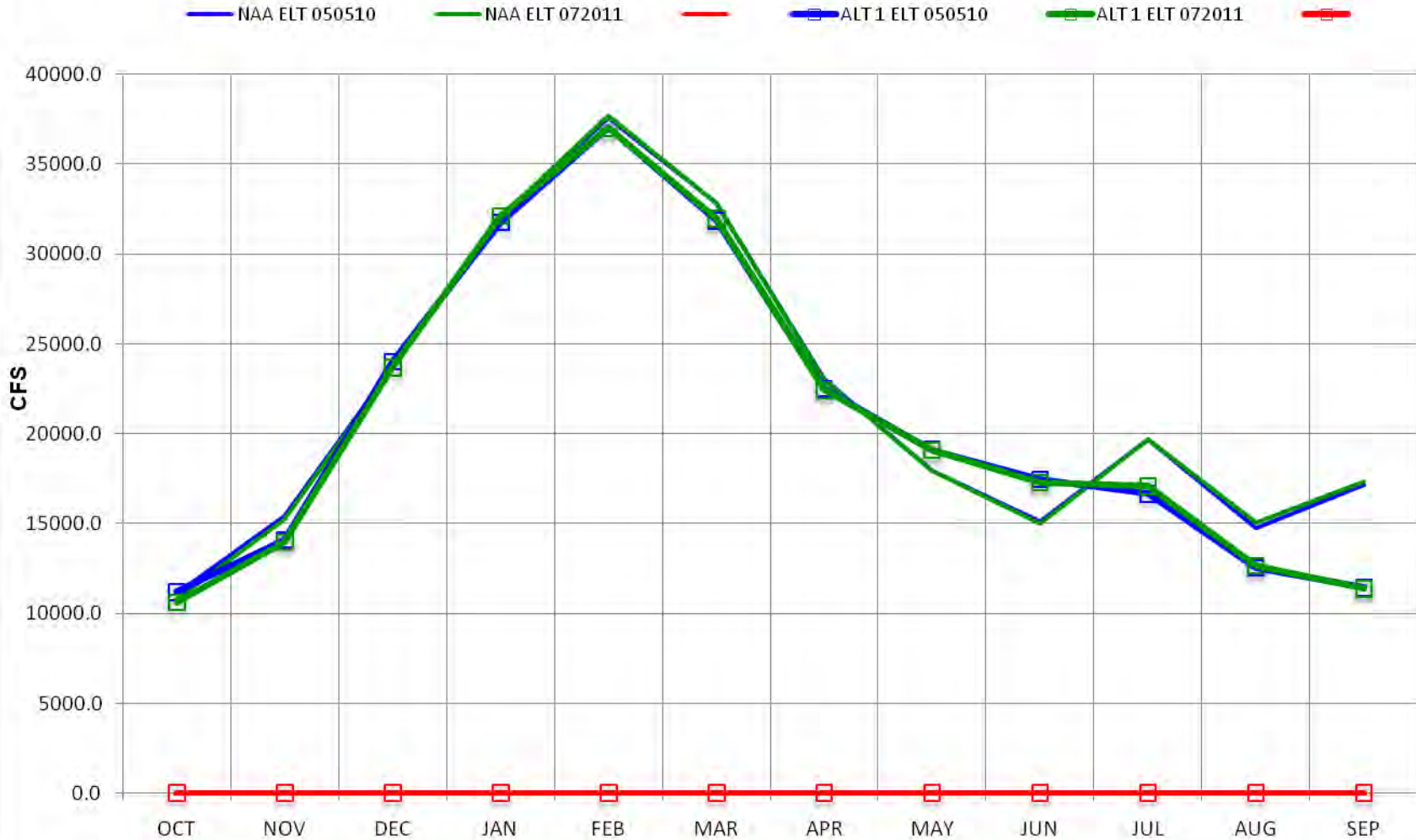
SACRAMENTO RIVER FLOW AT FREEPORT

Sacramento River Flow at Freeport



PRELIMINARY – NOT FOR DISTRIBUTION
Sacramento River Flow at Freeport
Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Sac R @ Freeport

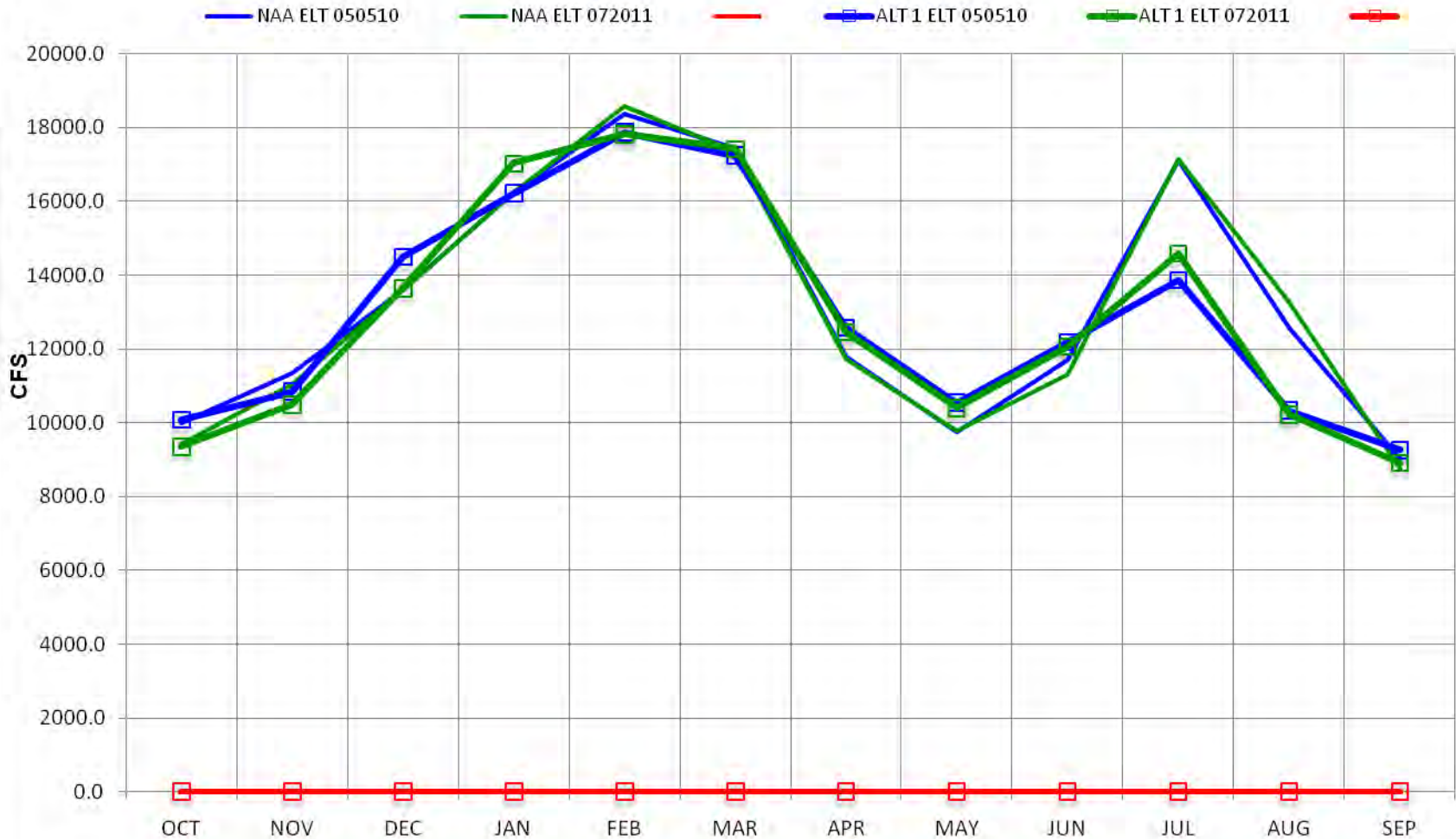


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Sacramento River Flow at Freeport
Dry and Critical Year Average

Multi Study Comparison - Monthly Avg Results - Dry and CRITICAL Years

Sac R @ Freeport

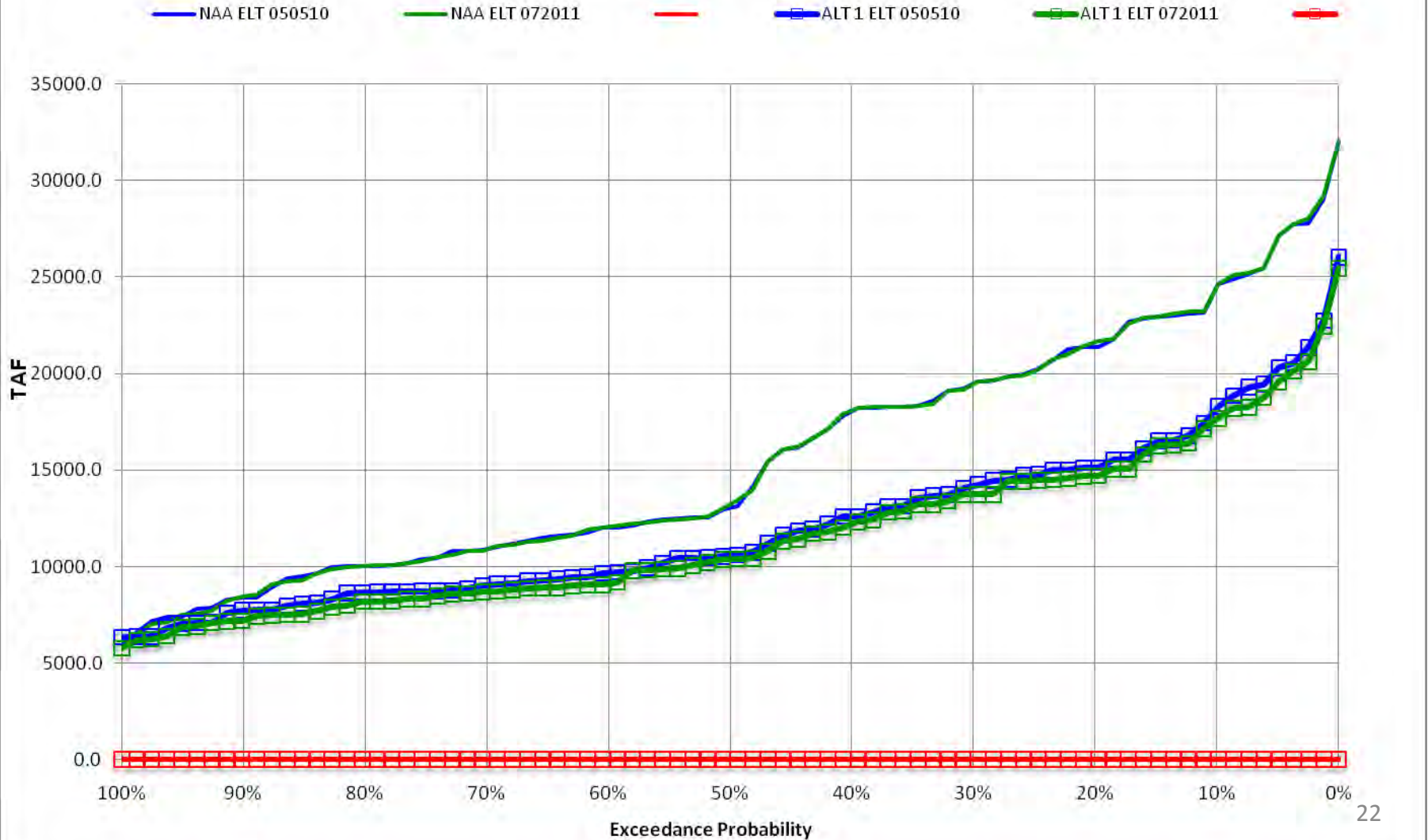
Water Year Classification: SAC 40-30-30



SACRAMENTO RIVER FLOW D/S OF NORTH DELTA DIVERSION

Sacramento River Flow d/s of North Delta Diversion

Results Exceedance Probability
Sac R d/s ND Diversion ANNUAL

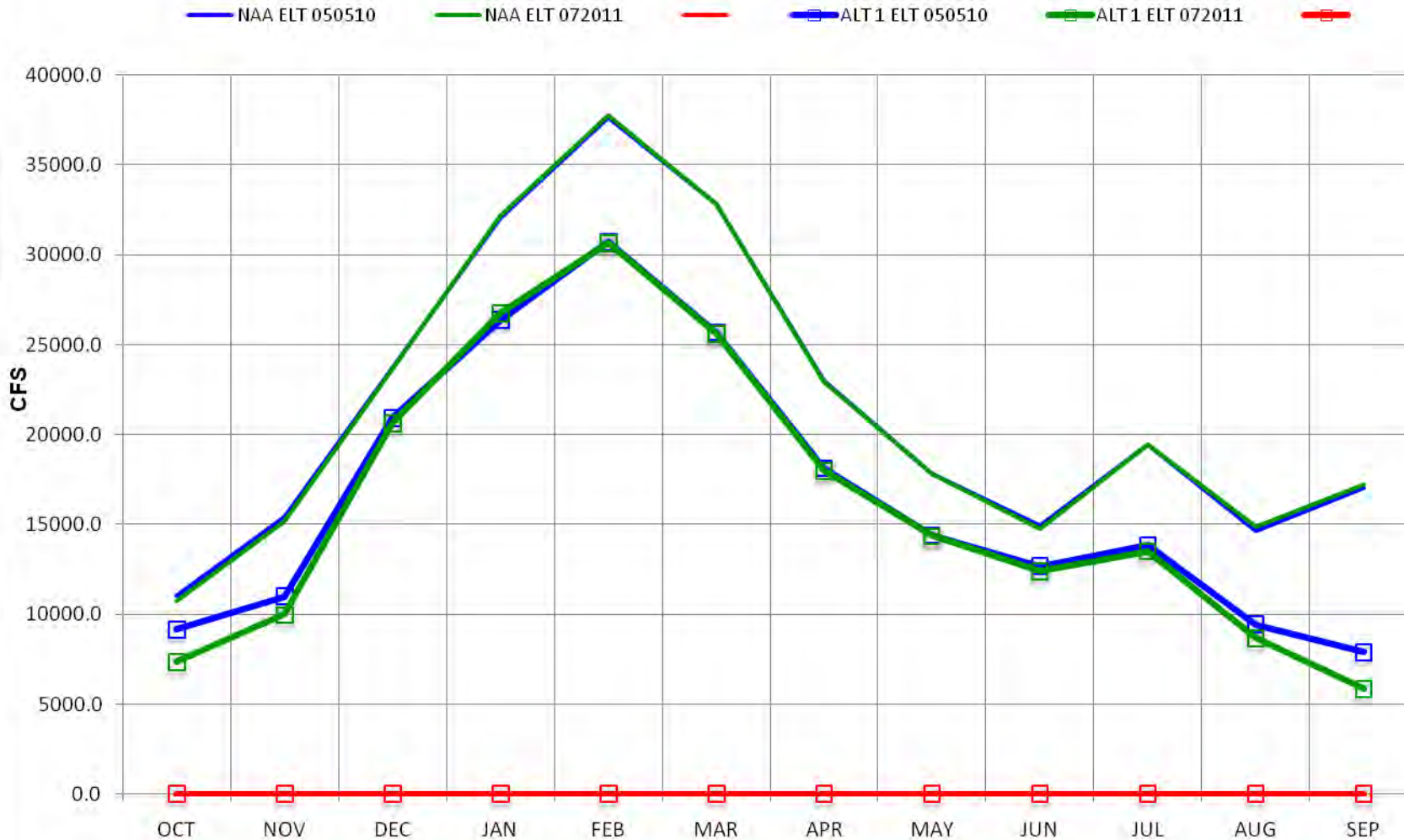


PRELIMINARY – NOT FOR DISTRIBUTION

Sacramento River Flow d/s of North Delta Diversion

Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Sac R d/s ND Diversion



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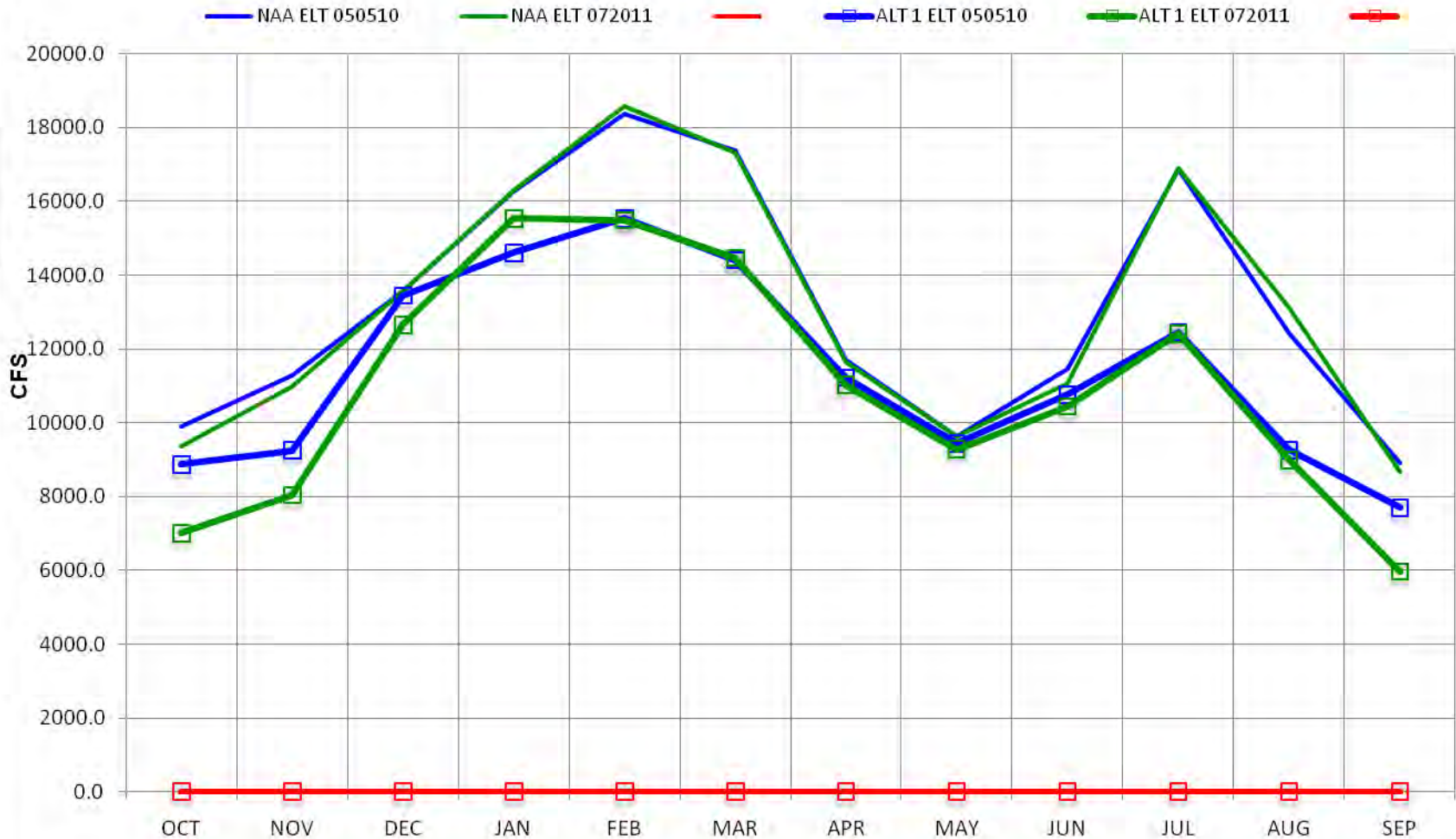
Sacramento River Flow d/s of North Delta Diversion

Dry and Critical Year Average

Multi Study Comparison - Monthly Avg Results - Dry and CRITICAL Years

Sac R d/s ND Diversion

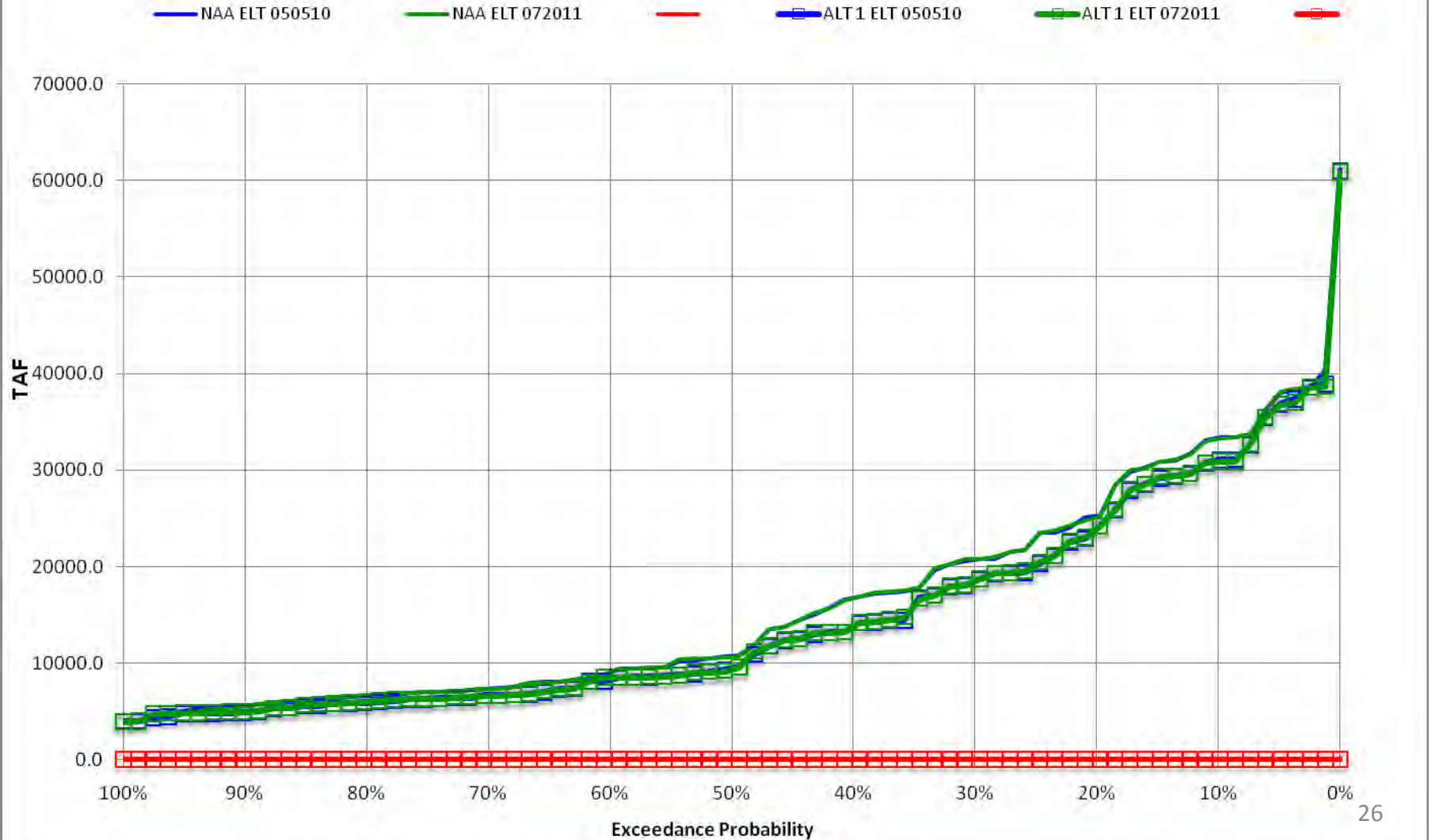
Water Year Classification: SAC 40-30-30



DELTA OUTFLOW

Delta Outflow

Results Exceedance Probability
Delta Outflow ANNUAL

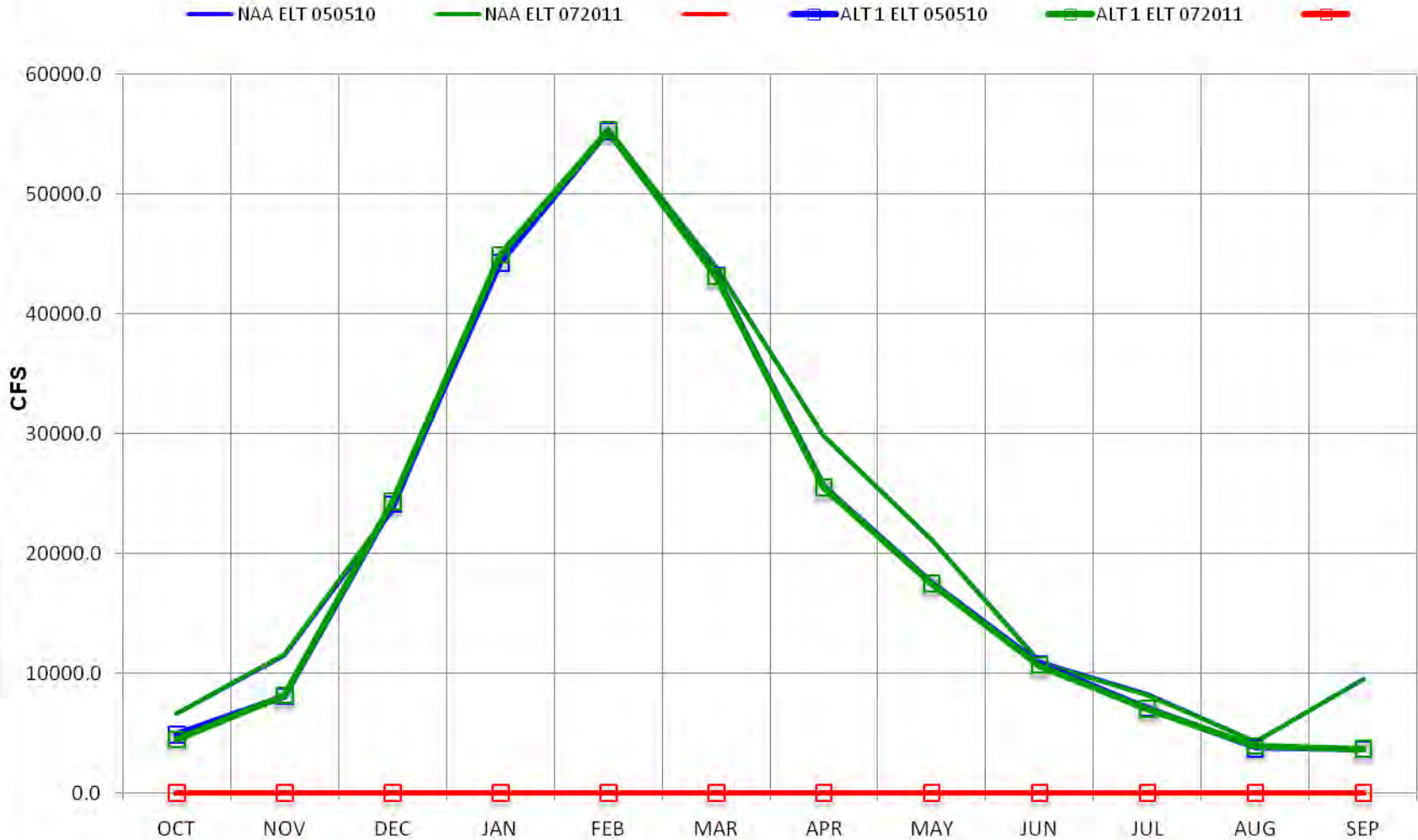


PRELIMINARY – NOT FOR DISTRIBUTION

Delta Outflow

Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Delta Outflow



PRELIMINARY – NOT FOR DISTRIBUTION

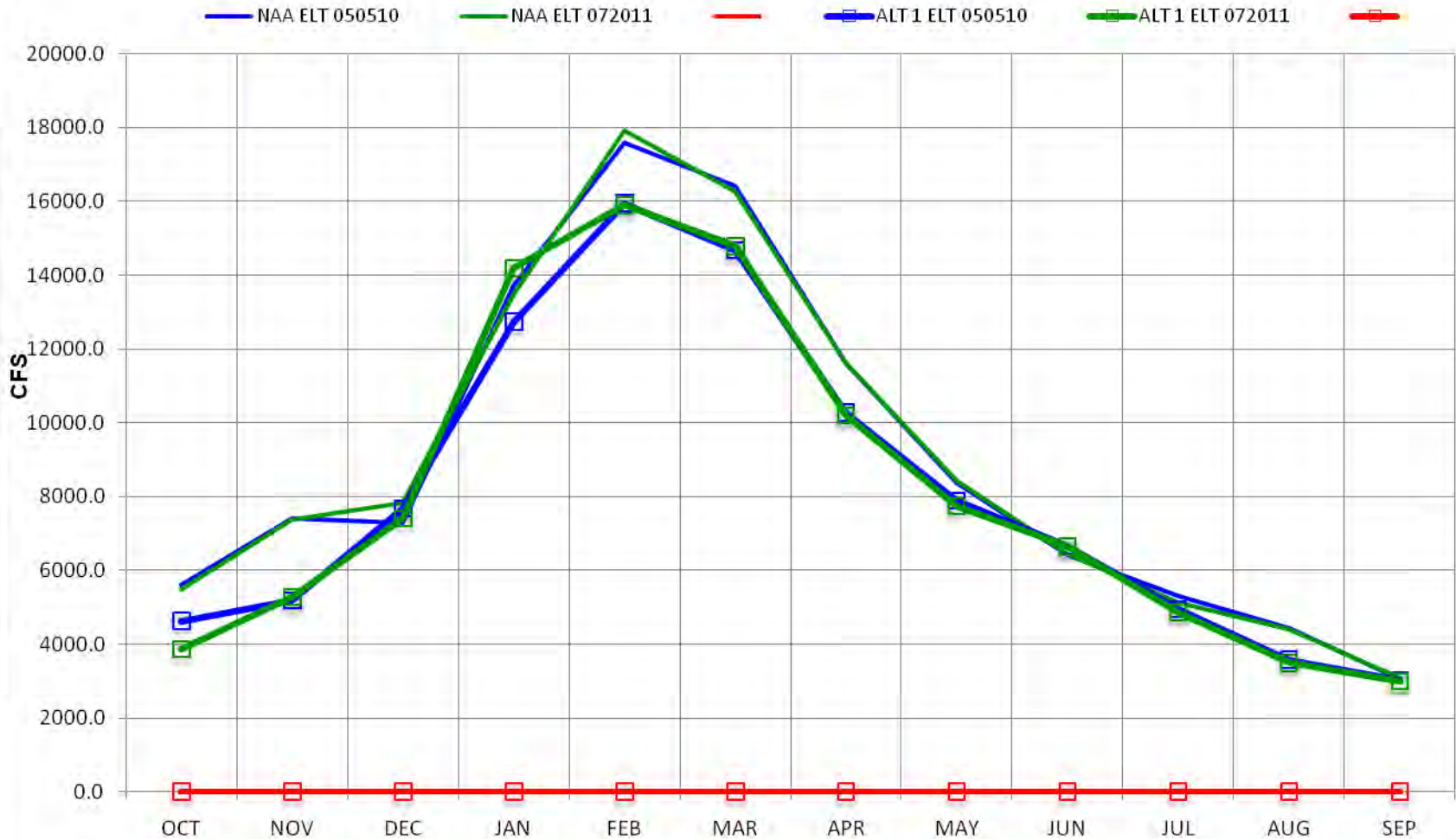
Delta Outflow

Dry and Critical Year Average

Multi Study Comparison - Monthly Avg Results - Dry and CRITICAL Years

Delta Outflow

Water Year Classification: SAC 40-30-30



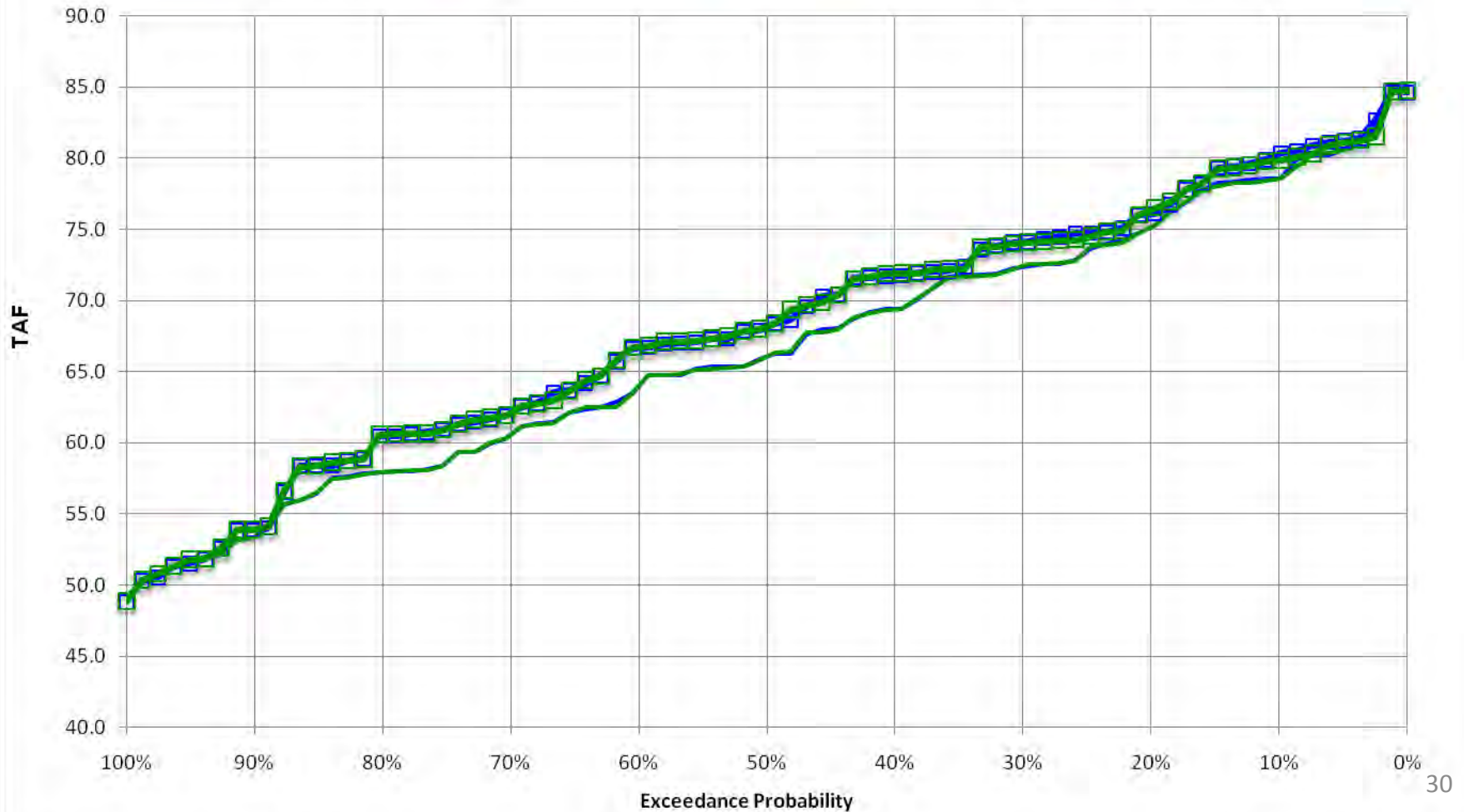
X2

Spring X2

Results Exceedance Probability

X2 Position (Prev Month) MAR-JUL period average

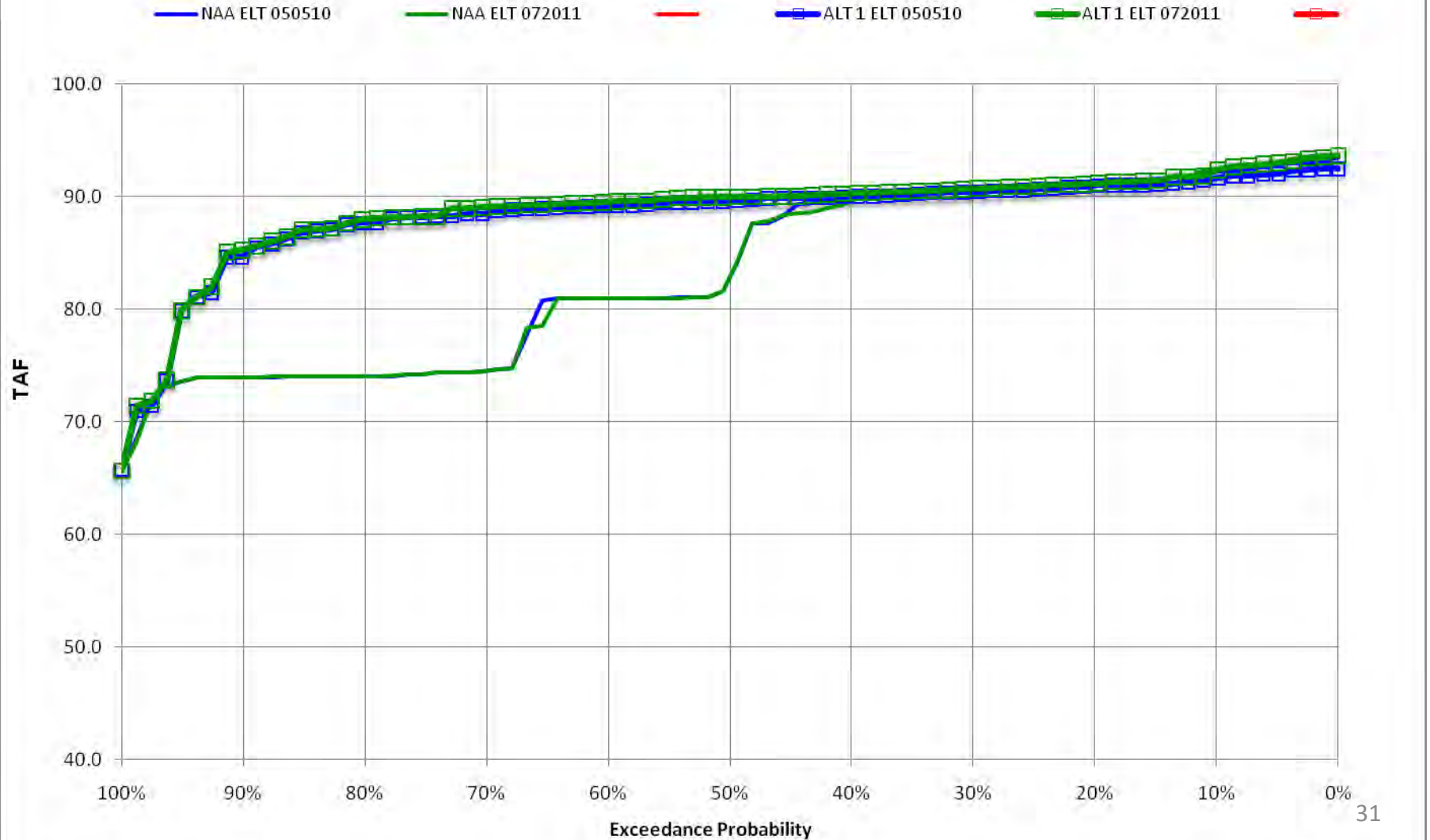
NAA ELT 050510 NAA ELT 072011 ALT 1 ELT 050510 ALT 1 ELT 072011



Fall X2

Results Exceedance Probability

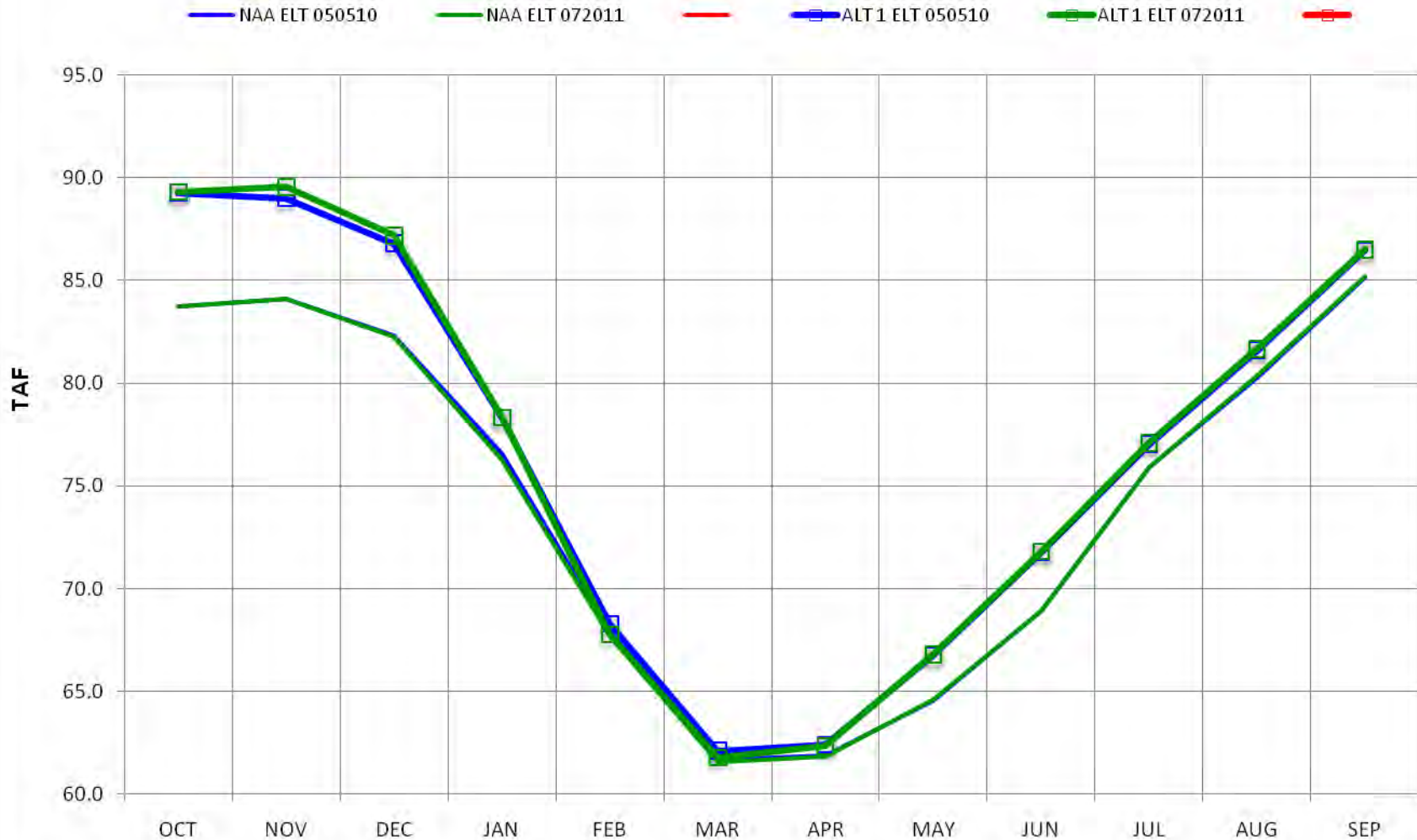
X2 Position (Prev Month) OCT-DEC period average



X2

Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
X2 Position (Prev Month)

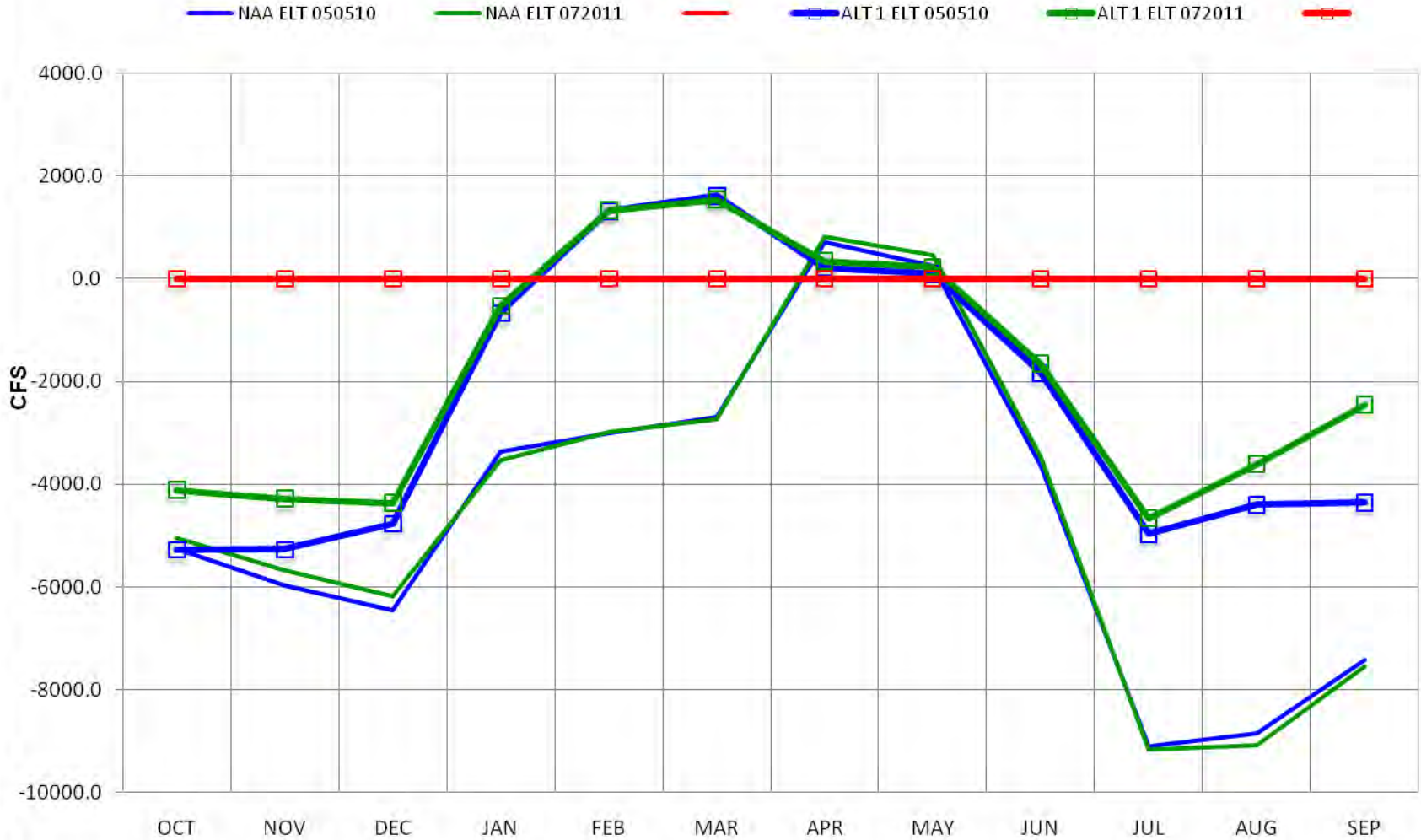


OMR

OMR

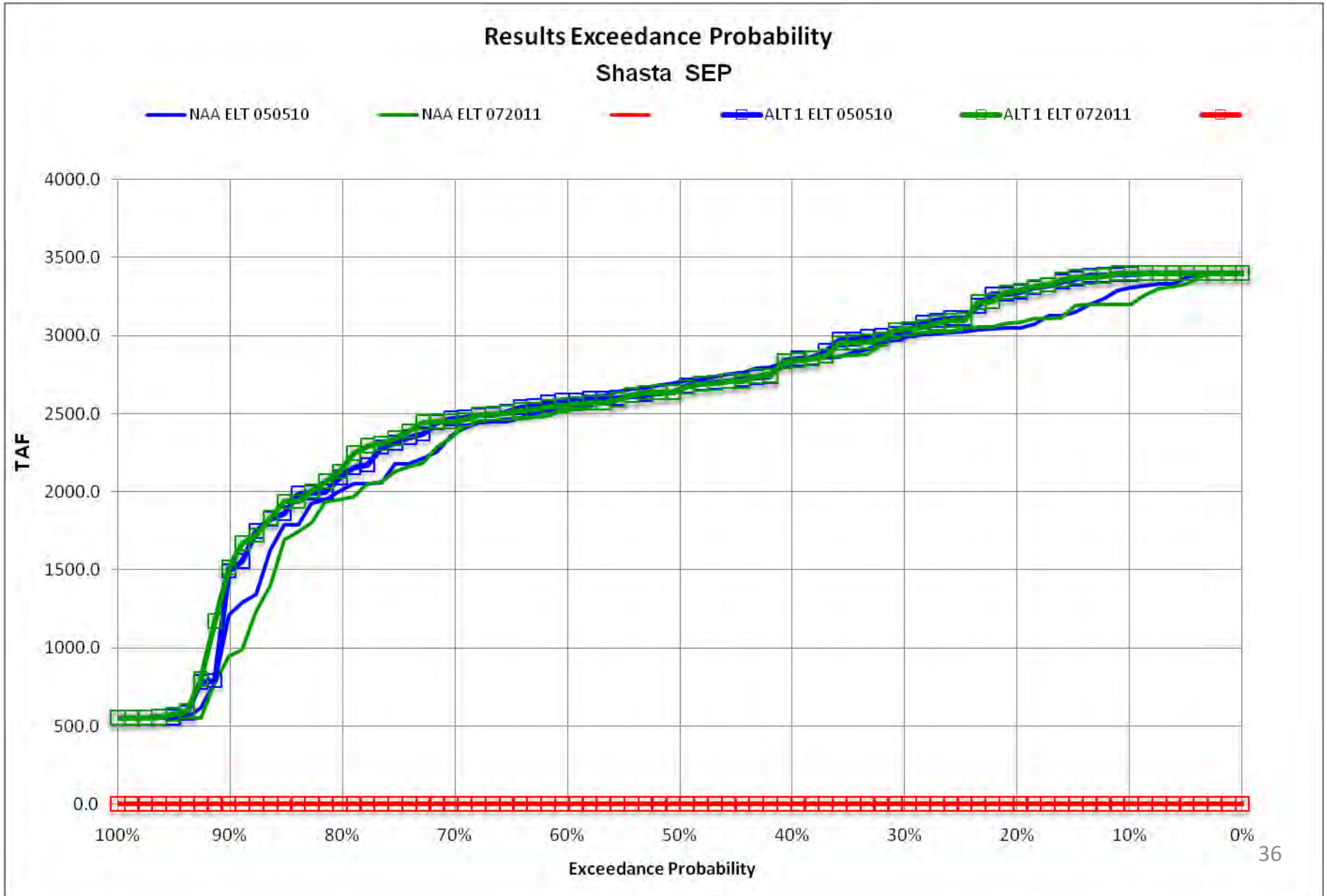
Long Term Average

Multi Study Comparison - Long Term Monthly Average Results
Old & Middle River (OMR) Flow

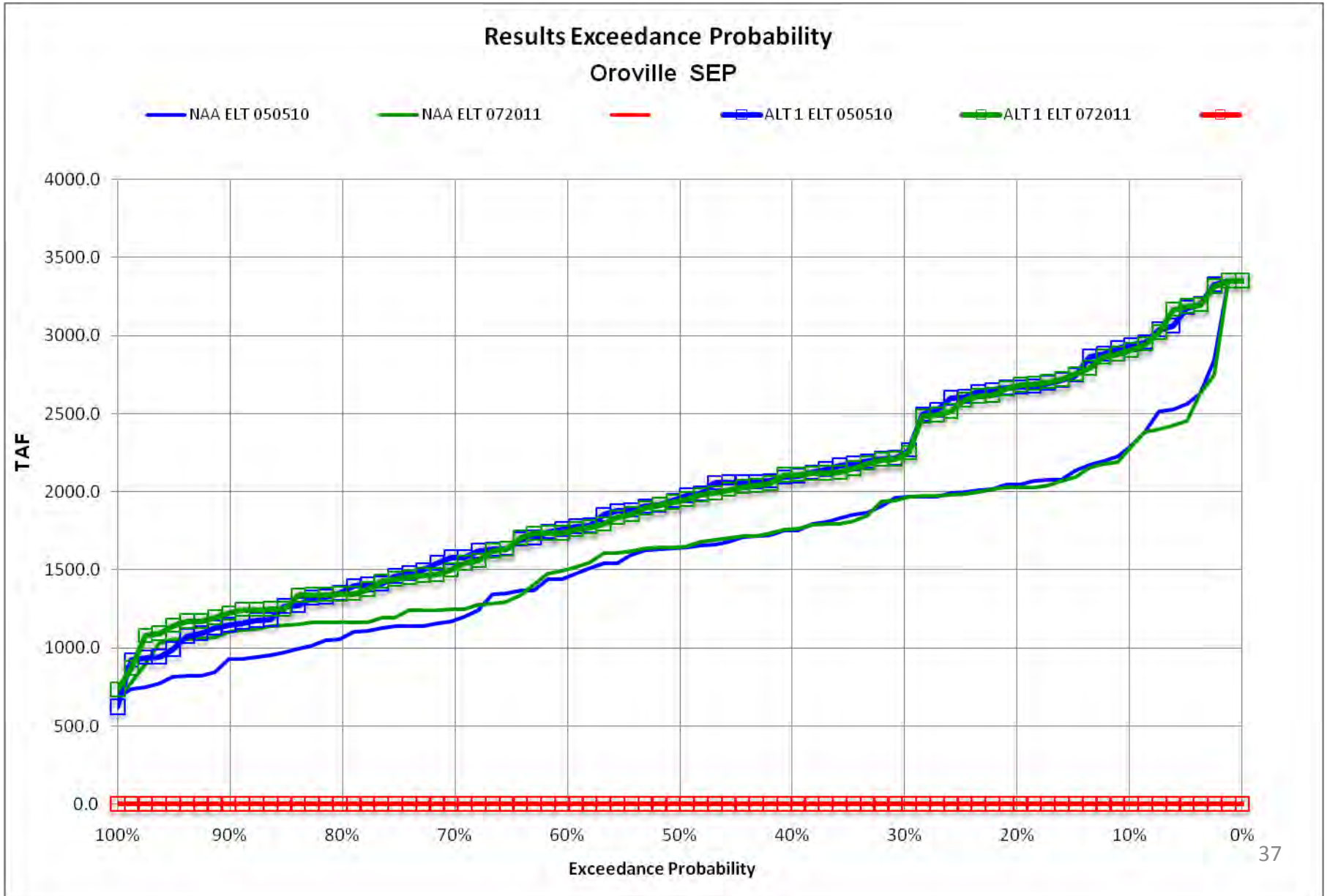


STORAGE

SHASTA

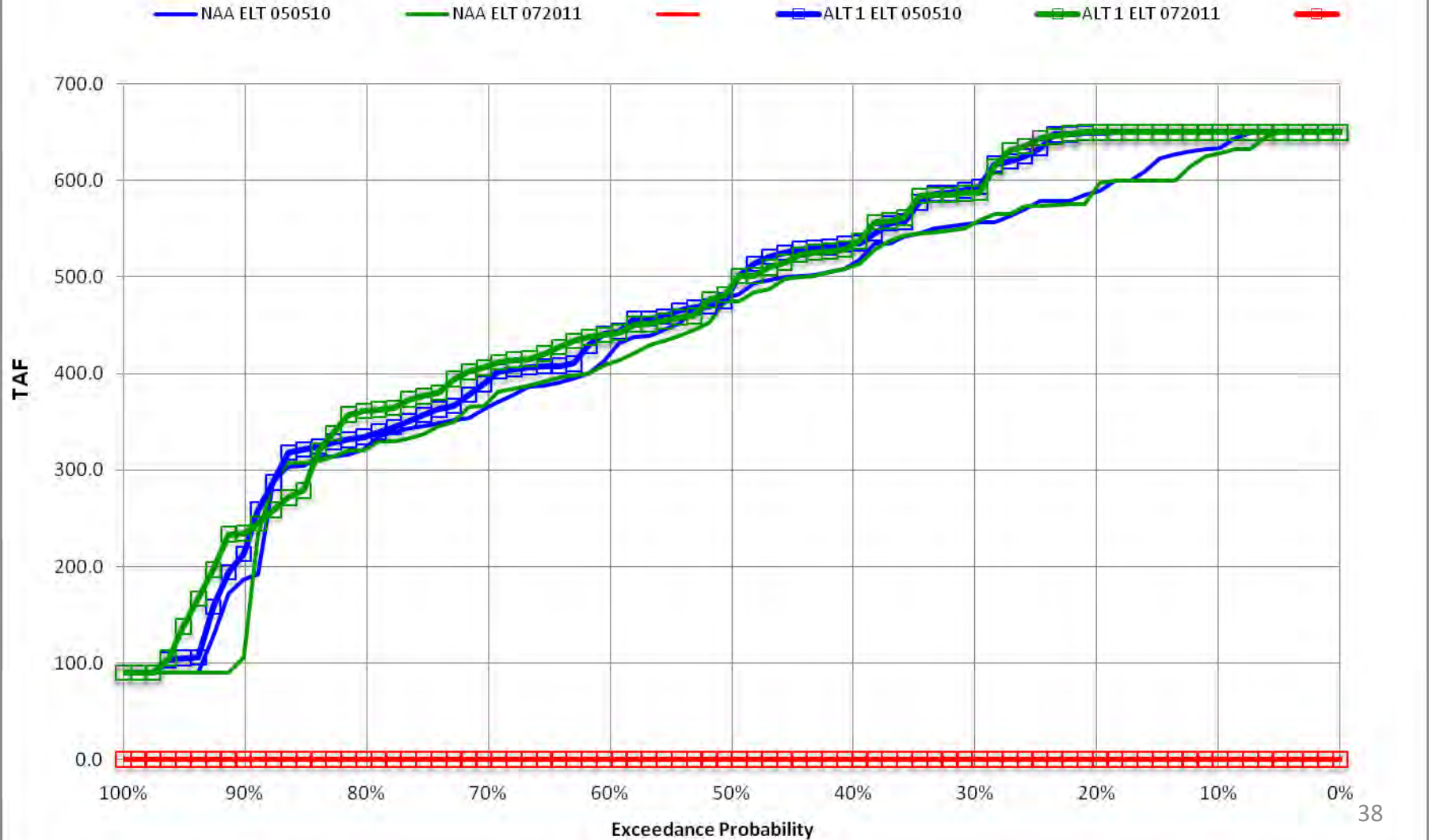


OROVILLE

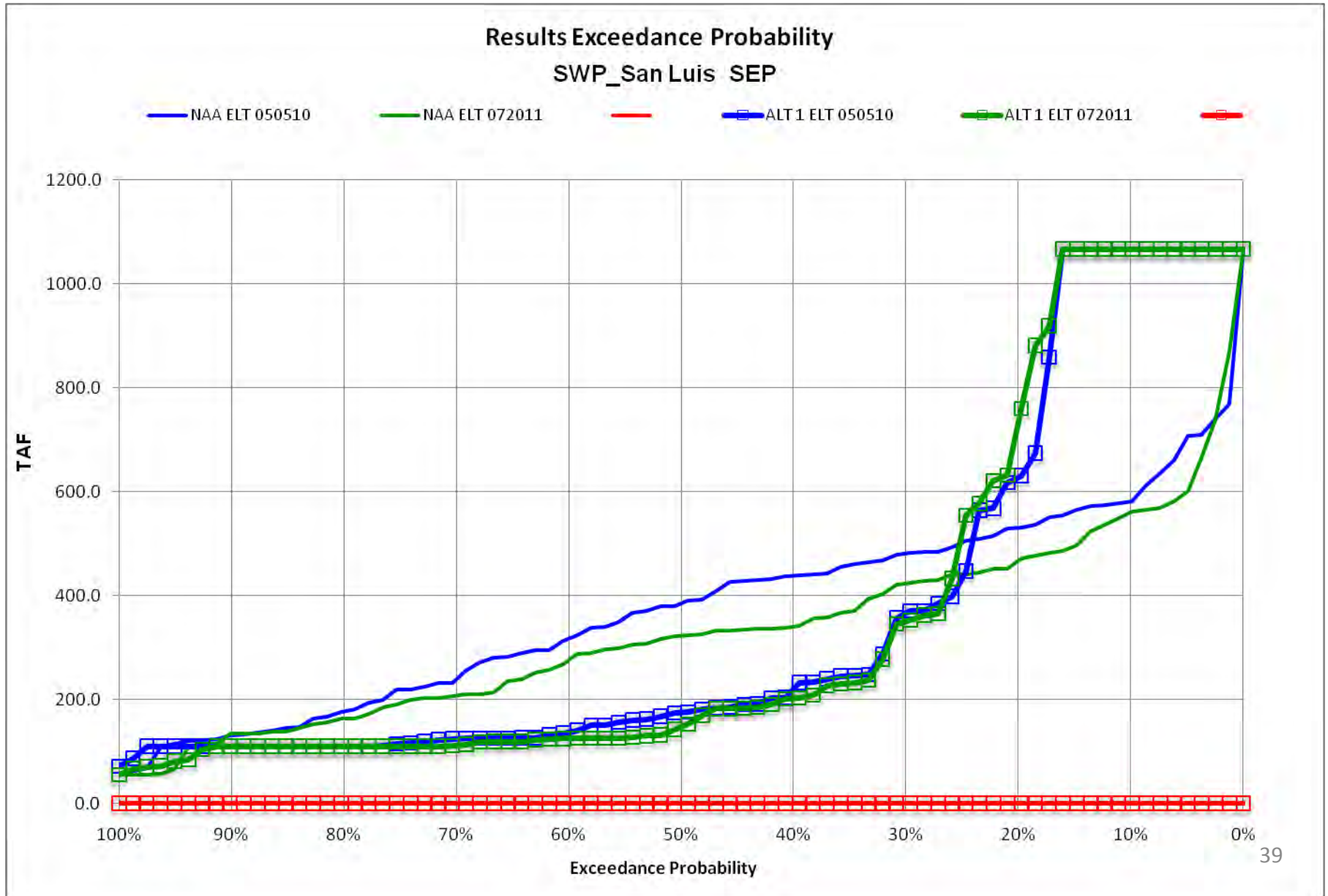


FOLSOM

Results Exceedance Probability
Folsom SEP

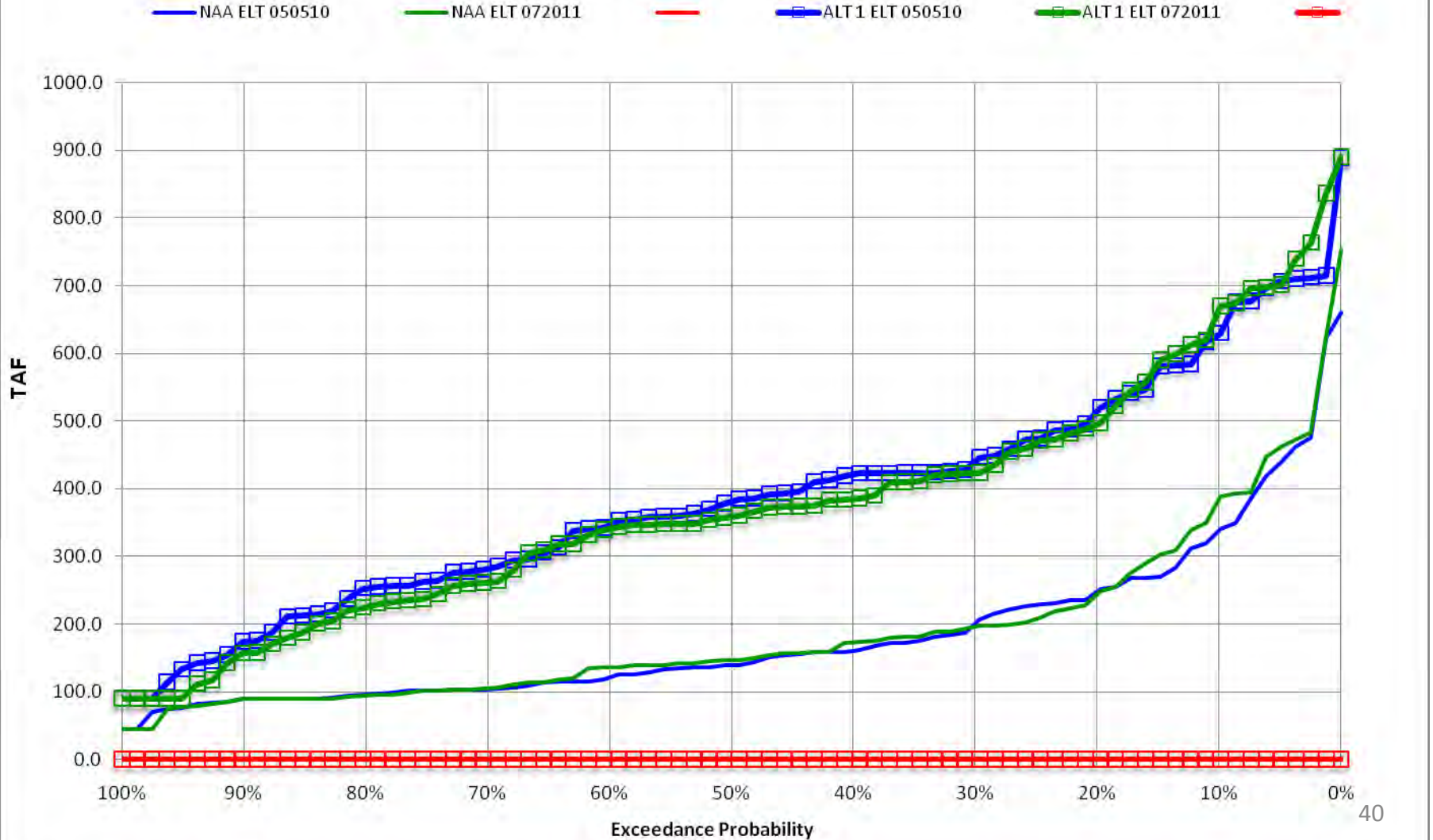


SWP SAN LUIS



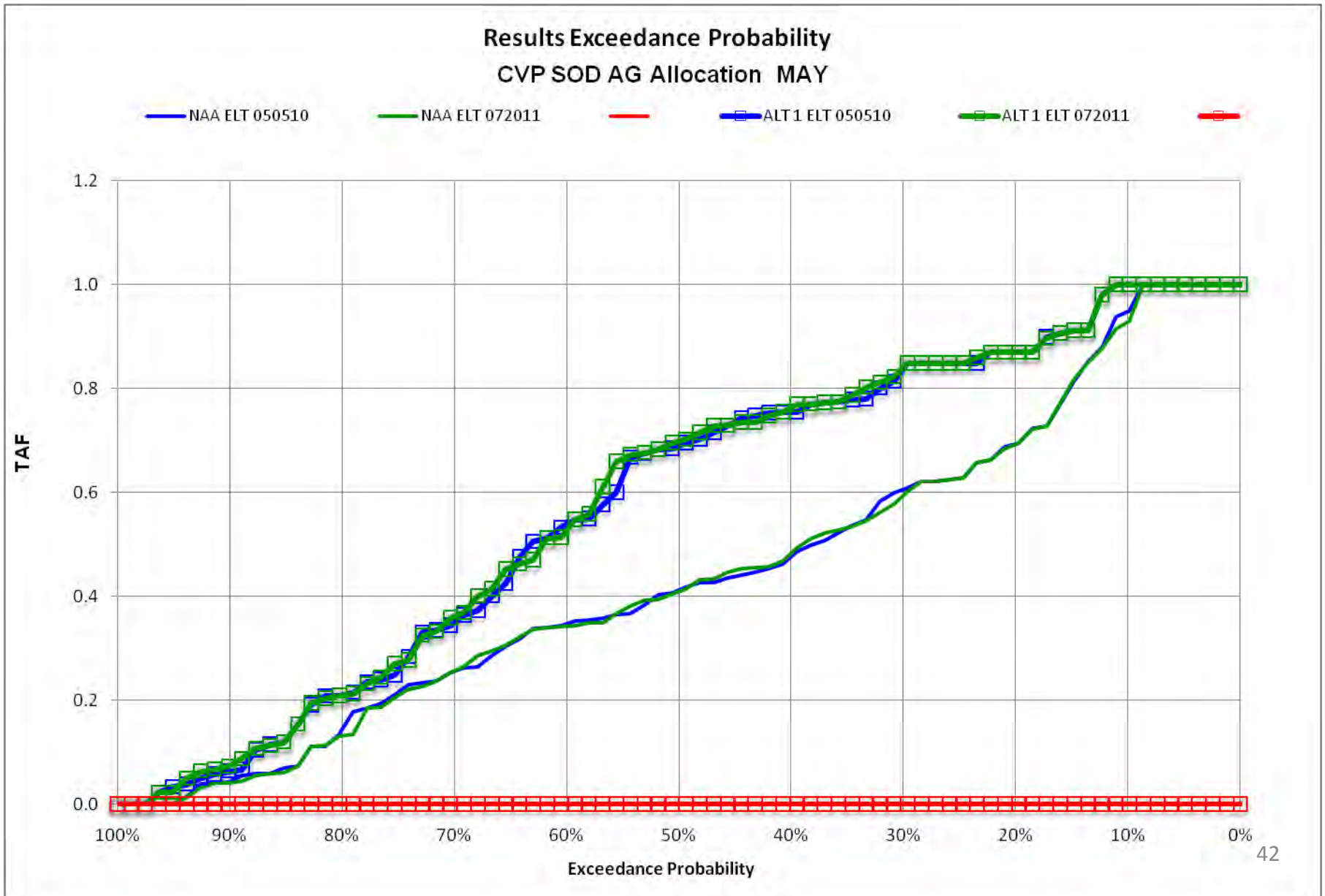
CVP SAN LUIS

Results Exceedance Probability
CVP San Luis SEP



ALLOCATIONS

CVP SOD AG ALLOCATION



SWP SOD ALLOCATION

