

Evaluation of North Delta Intake Locations

BDCP Steering Committee

July 29, 2010

Separate Analyses

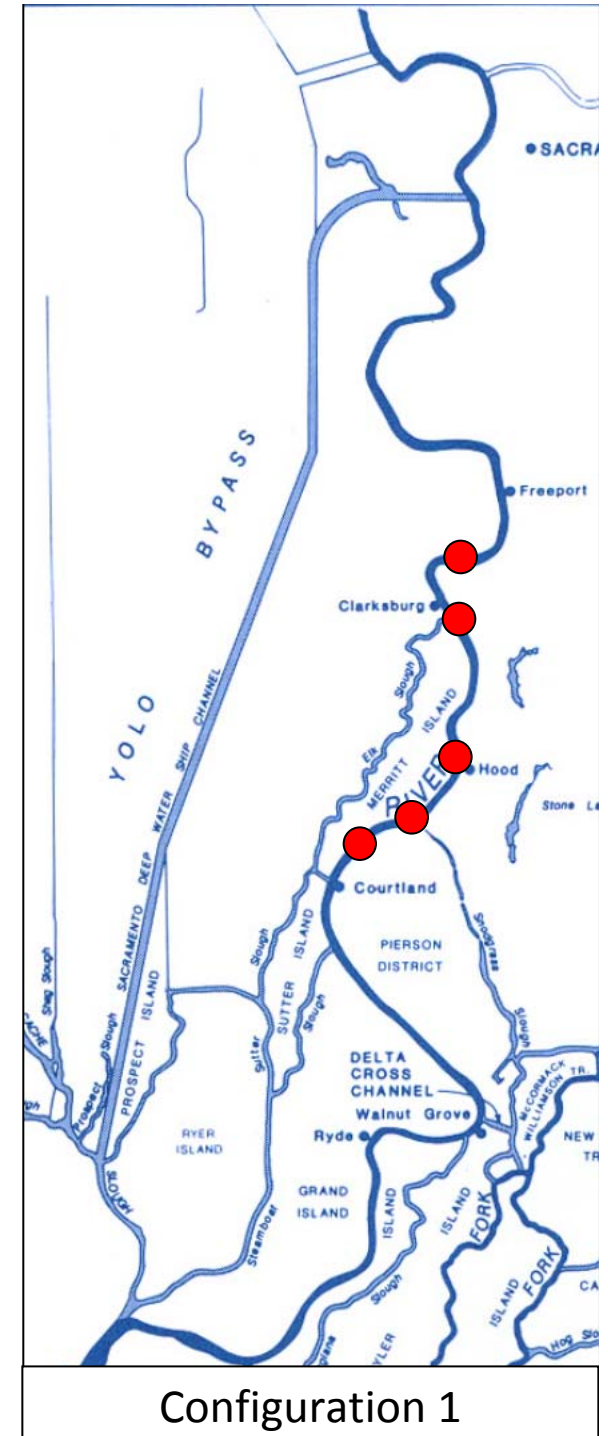
- Separate analyses designed to provide information to Steering Committee
- Separate Analyses
 - *North delta intake sizing sensitivity analysis
 - *North delta intake location sensitivity
 - *Delta levee failure and sea level rise
 - North delta bypasses evaluation summary
 - San Joaquin inflow sensitivity
 - Old River corridor integration

Objectives

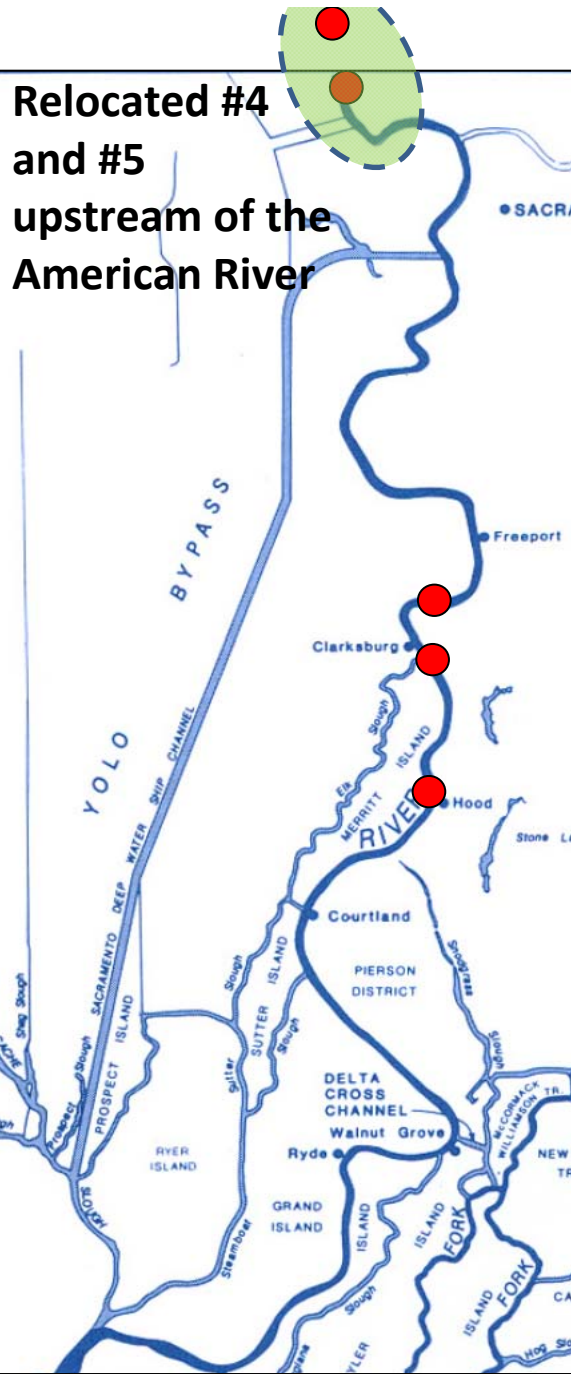
- Evaluate various configurations of north Delta diversion intake locations in terms of
 - Availability of water for diversion
 - Ability to divert at each intake
 - Impacts to Other Diverters/Dischargers
 - Exposure to Intakes
 - Migration Corridor
 - Water Quality
 - Cost
- High level, preliminary analysis to provide information

Intake Configurations

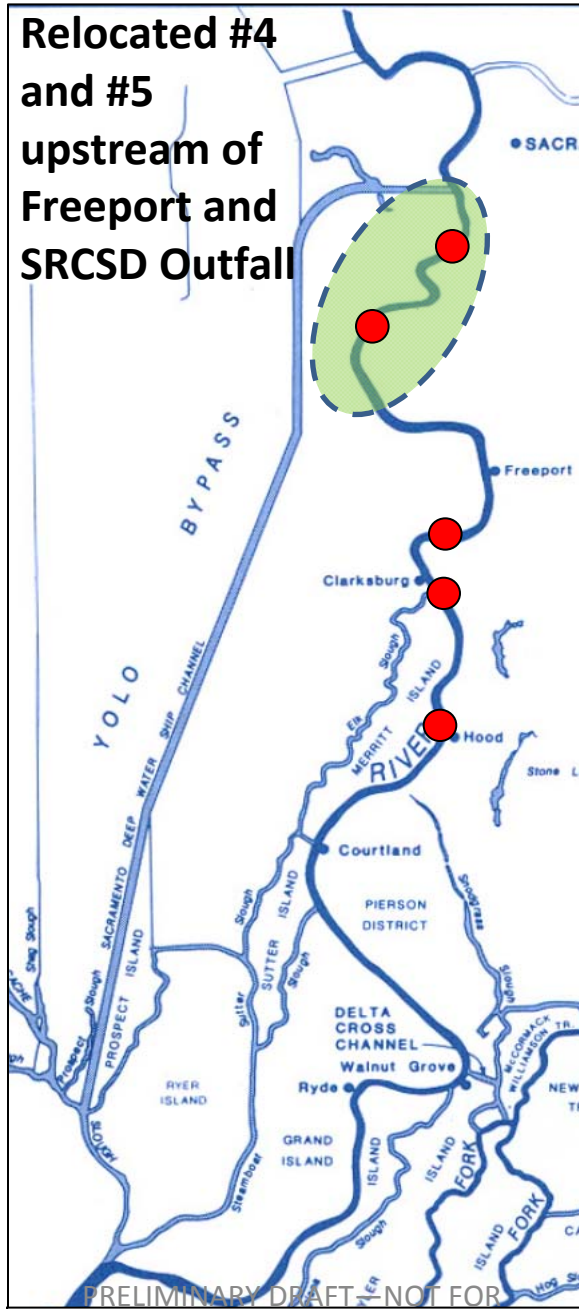
- Current locations analyzed have intakes between Freeport and Courtland
- Interest in assessing more geographically dispersed intake locations
- Four (4) configurations considered in this analysis
 - Configuration 1: Current Proposed Project
 - Configuration 2: Intakes #4 and #5 moved upstream of Sacramento-American River confluence
 - Configuration 3: Intakes #4 and #5 moved upstream of Freeport Regional Water Authority (FRWA) intake and downstream of Sacramento-American River confluence
 - Configuration 4: Intakes #4 and #5 moved downstream of Steamboat Slough and upstream of Delta Cross Channel



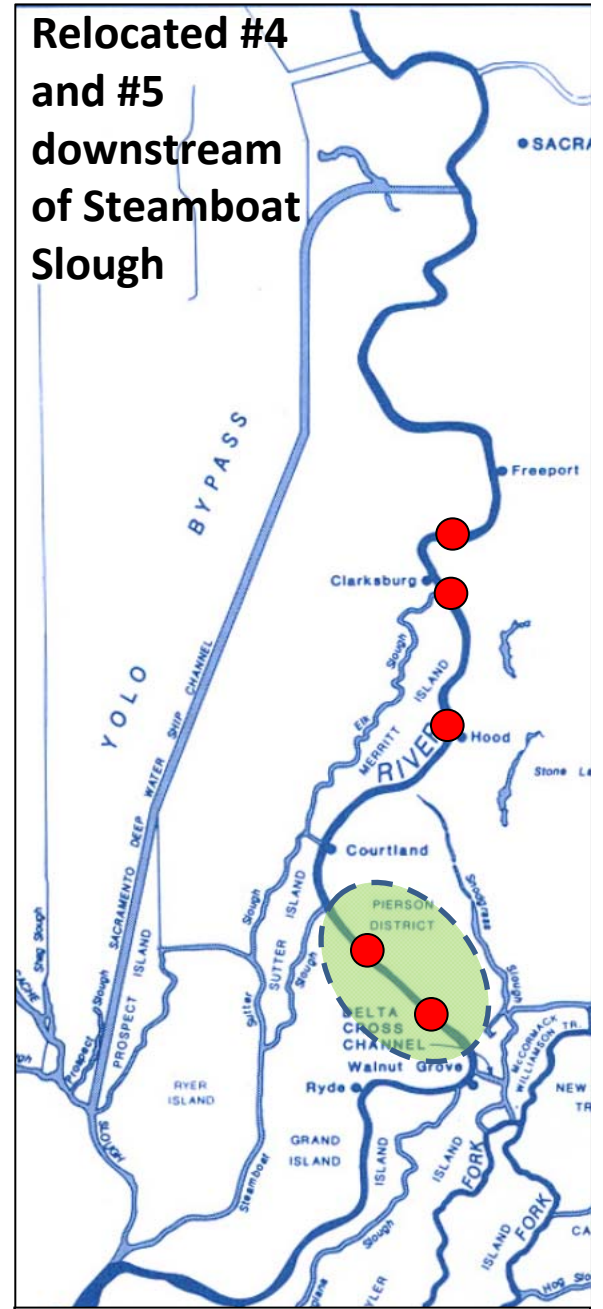
PRELIMINARY DRAFT—NOT FOR
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Configuration 2



Configuration 3



Configuration 4

PRELIMINARY DRAFT - NOT FOR DISTRIBUTION

Methodology

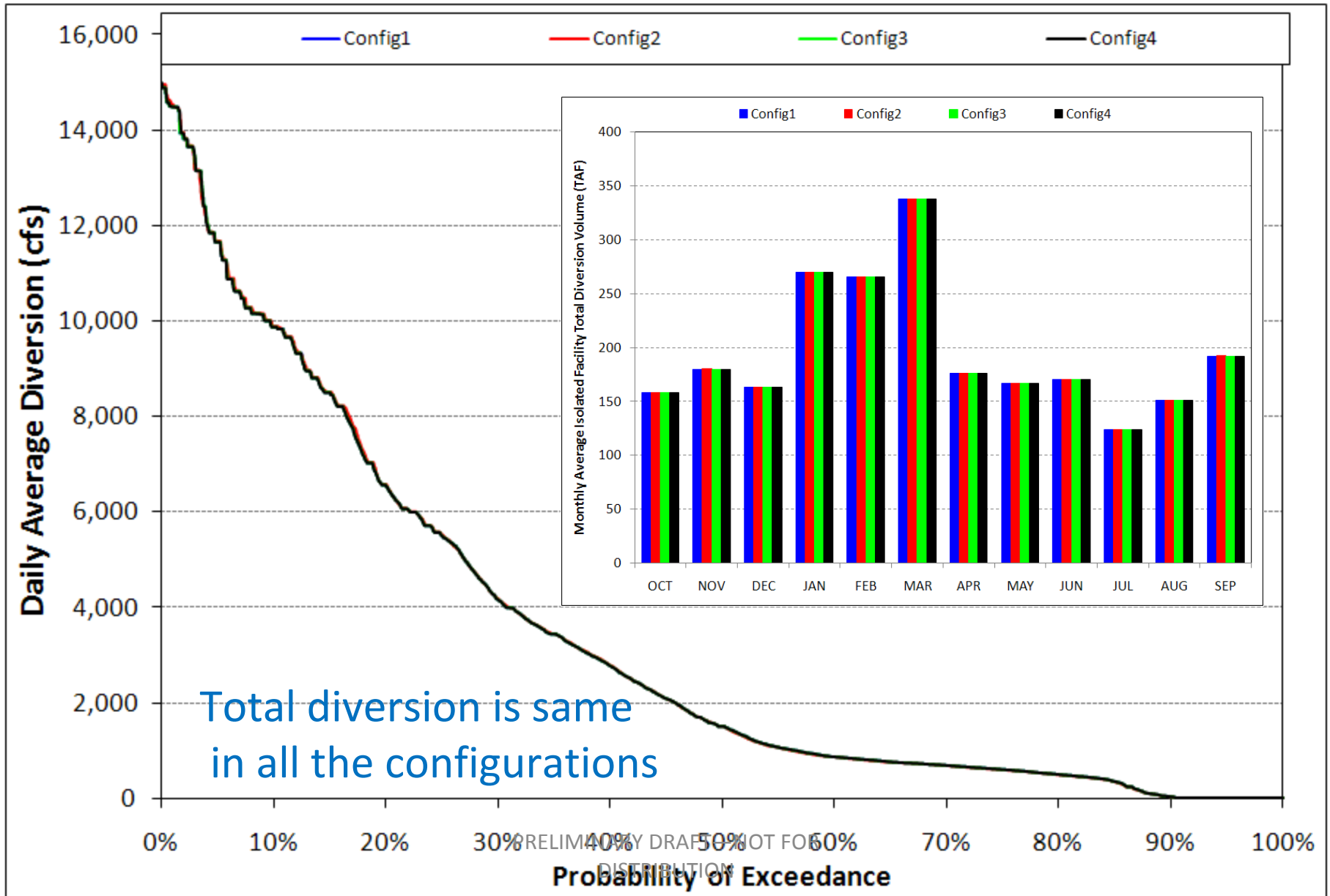
- Proposed Project (Early Long-Term) CALSIM II results used as the boundary conditions for all configurations
- 16-year DSM2 HYDRO simulation
- PTM was simulated for three periods and four insertion locations
 - Sac R at Sacramento, Sac R at Sutter Sl, Sac R at Ryde and Steamboat Sl at Sutter Sl

Particle Insertion Periods used in the Analysis

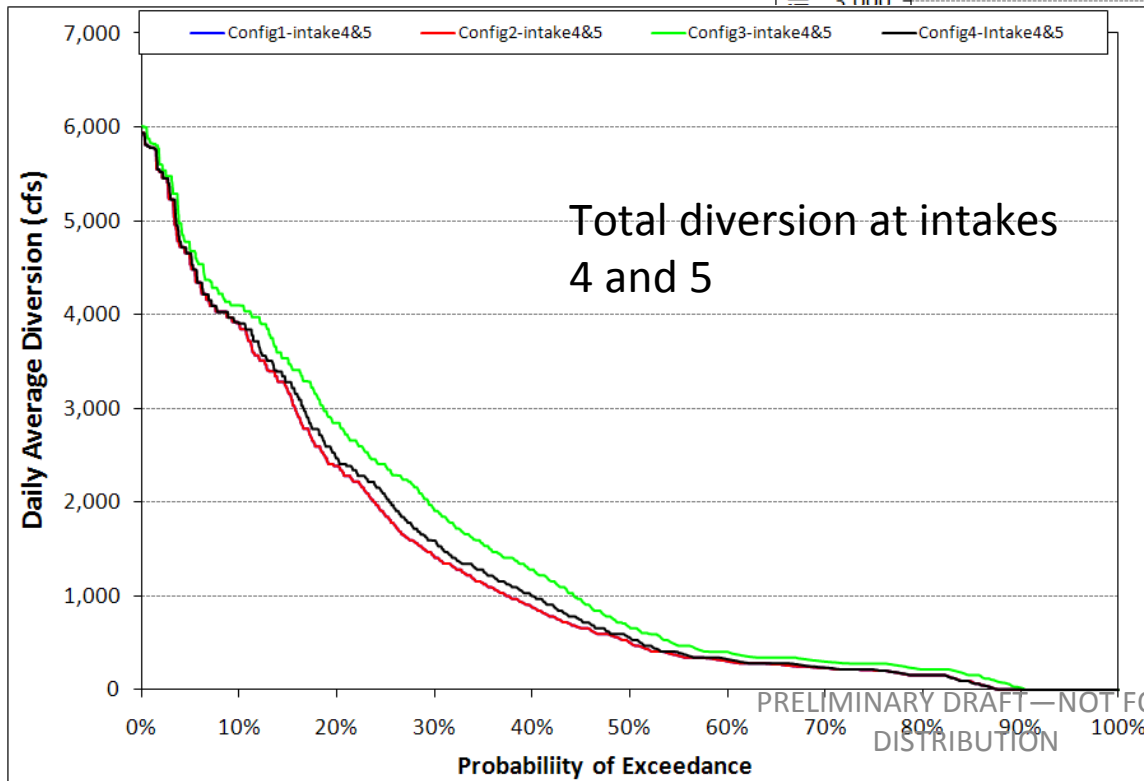
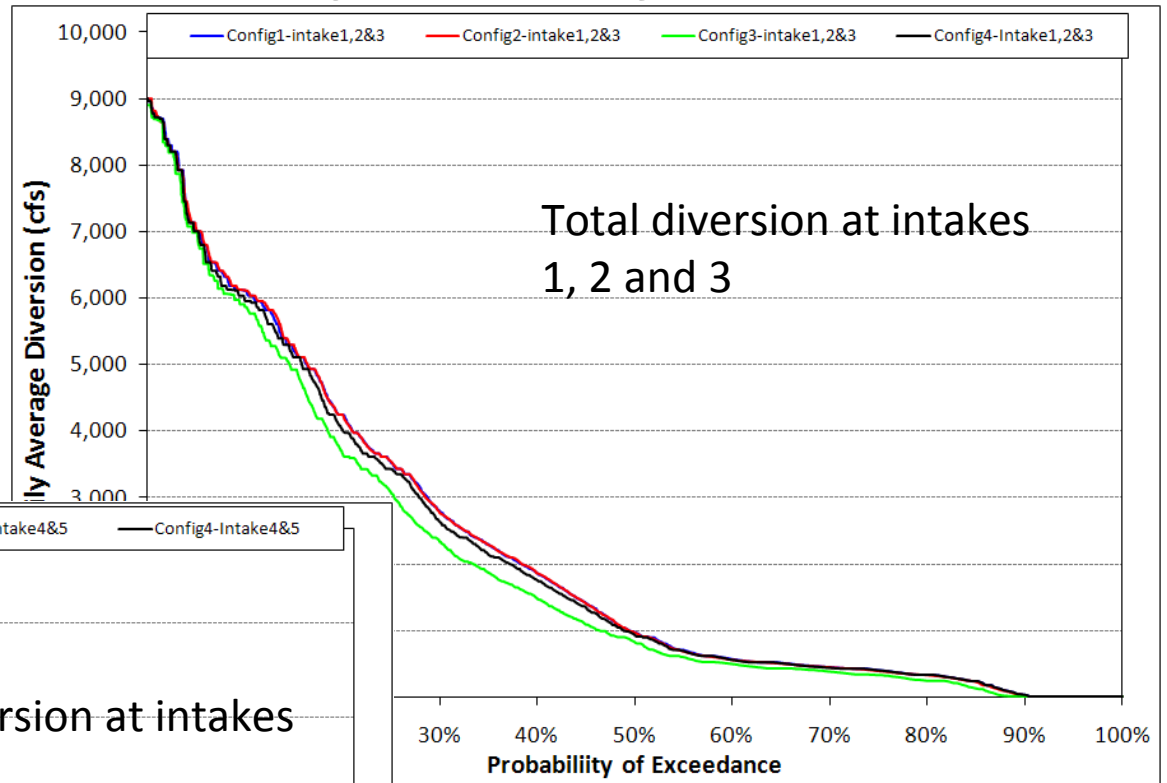
Period Selected	Sacramento River Inflow (cfs)	IF Diversion (cfs)
Apr 1929 (Low)	9,298	558
Mar 1961 (Med)	17,753	3,218
Feb 1940 (High)	56,698	14,540

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Diversion Capability



Diversion Capability

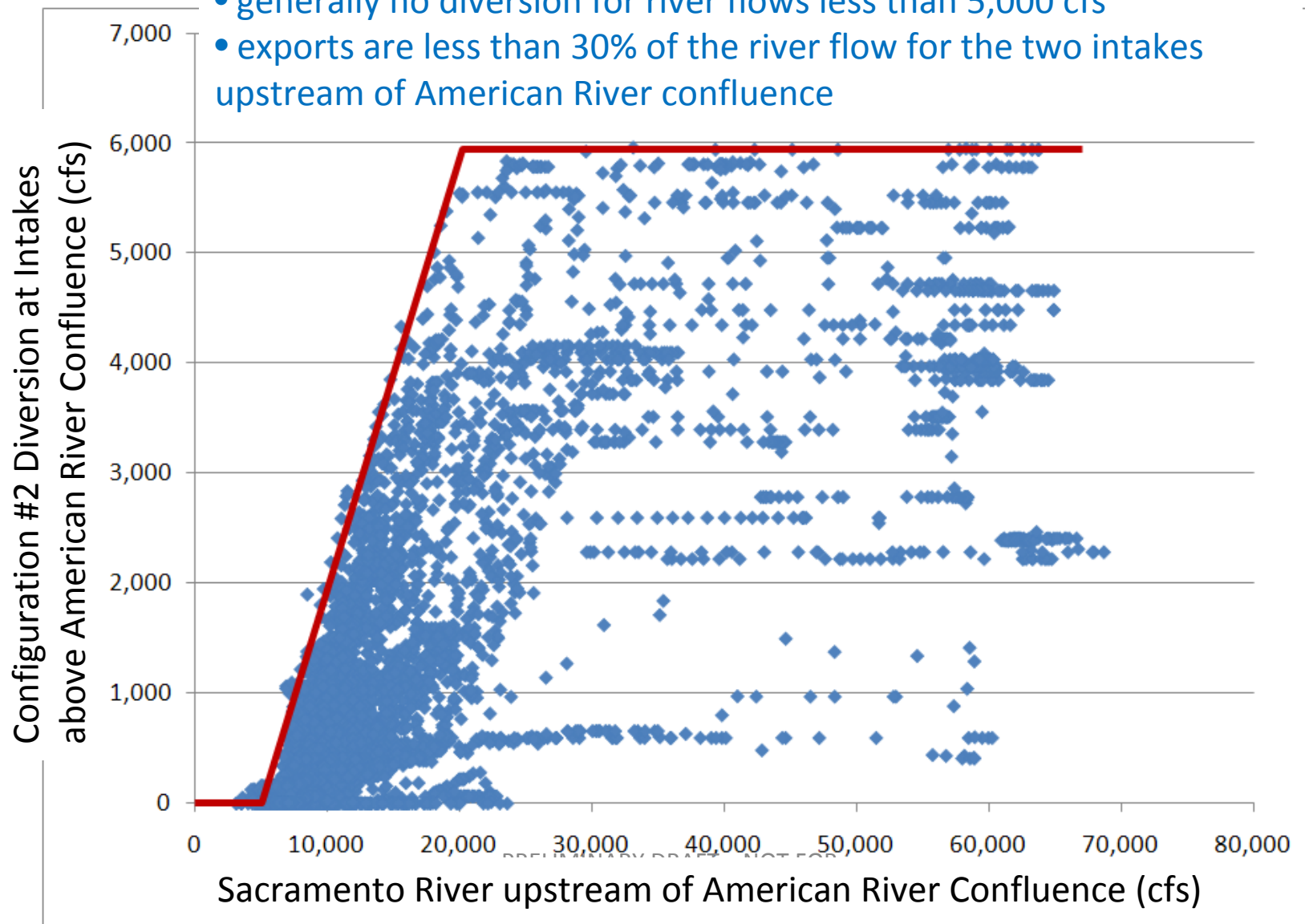


Distribution of diversion
changed primarily due to
operational preference

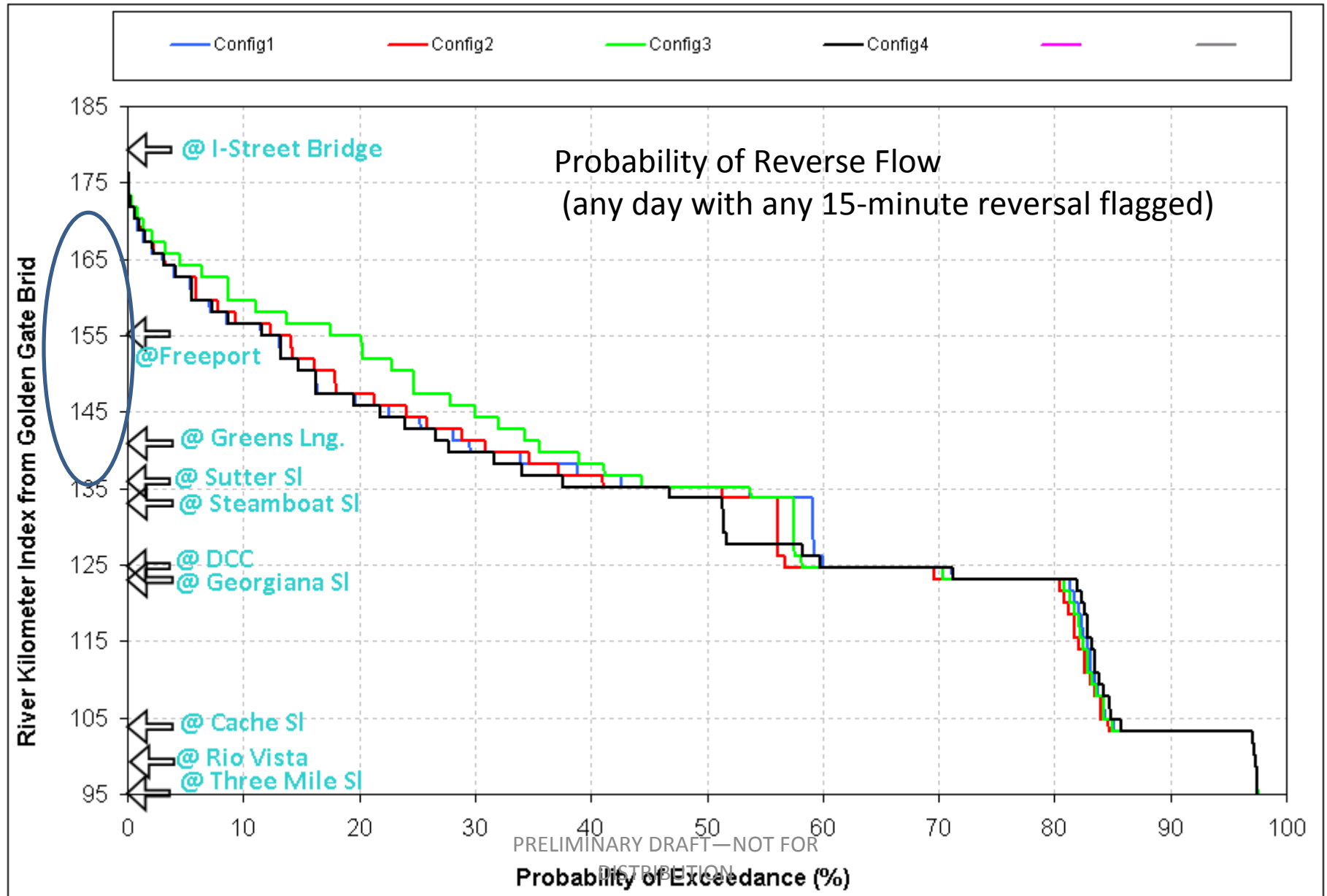
Availability of Water for Diversion

For Configuration 2 (Sac R diversions u/s of American),

- generally no diversion for river flows less than 5,000 cfs
- exports are less than 30% of the river flow for the two intakes upstream of American River confluence

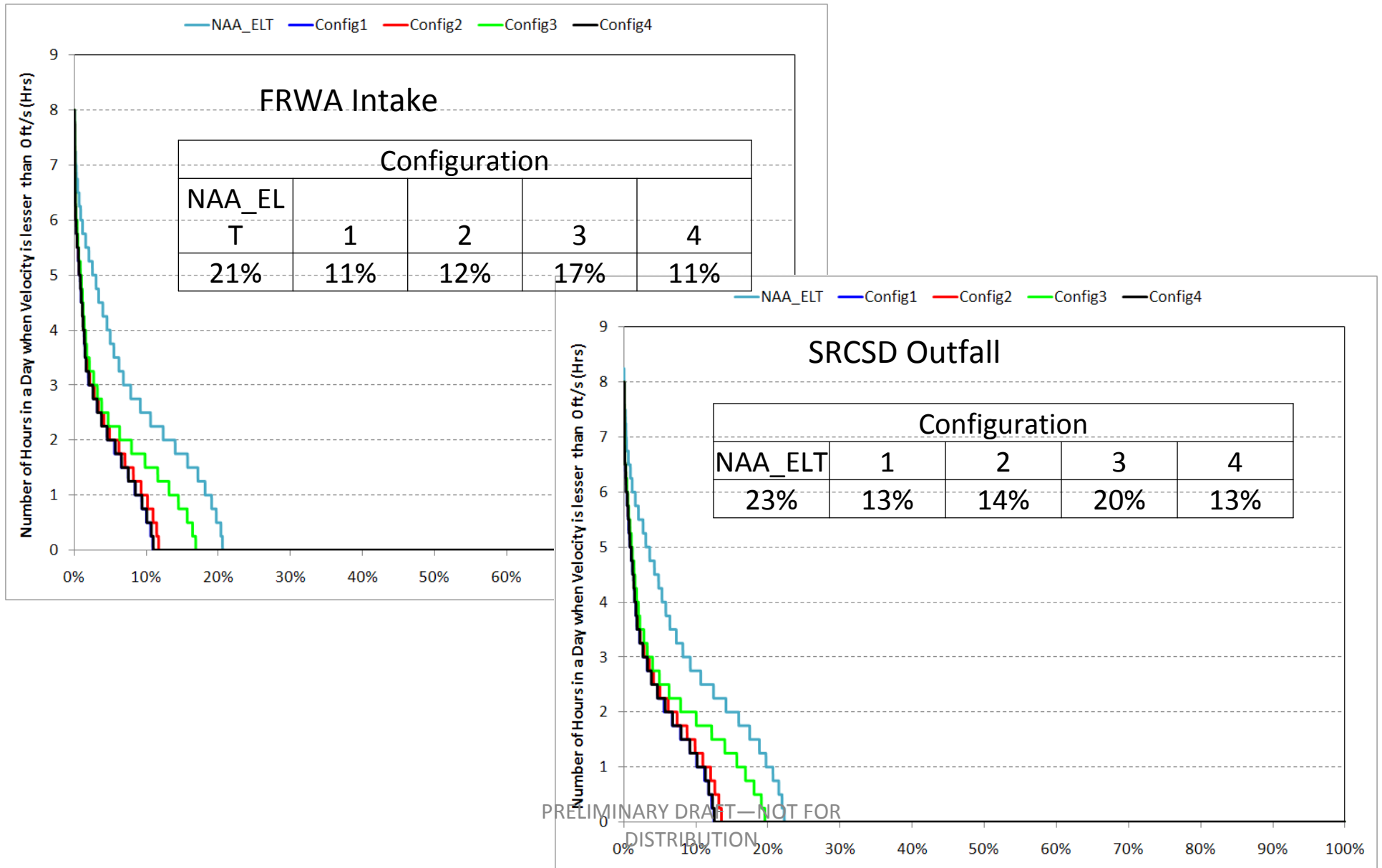


Impacts to Other Diverters/Dischargers



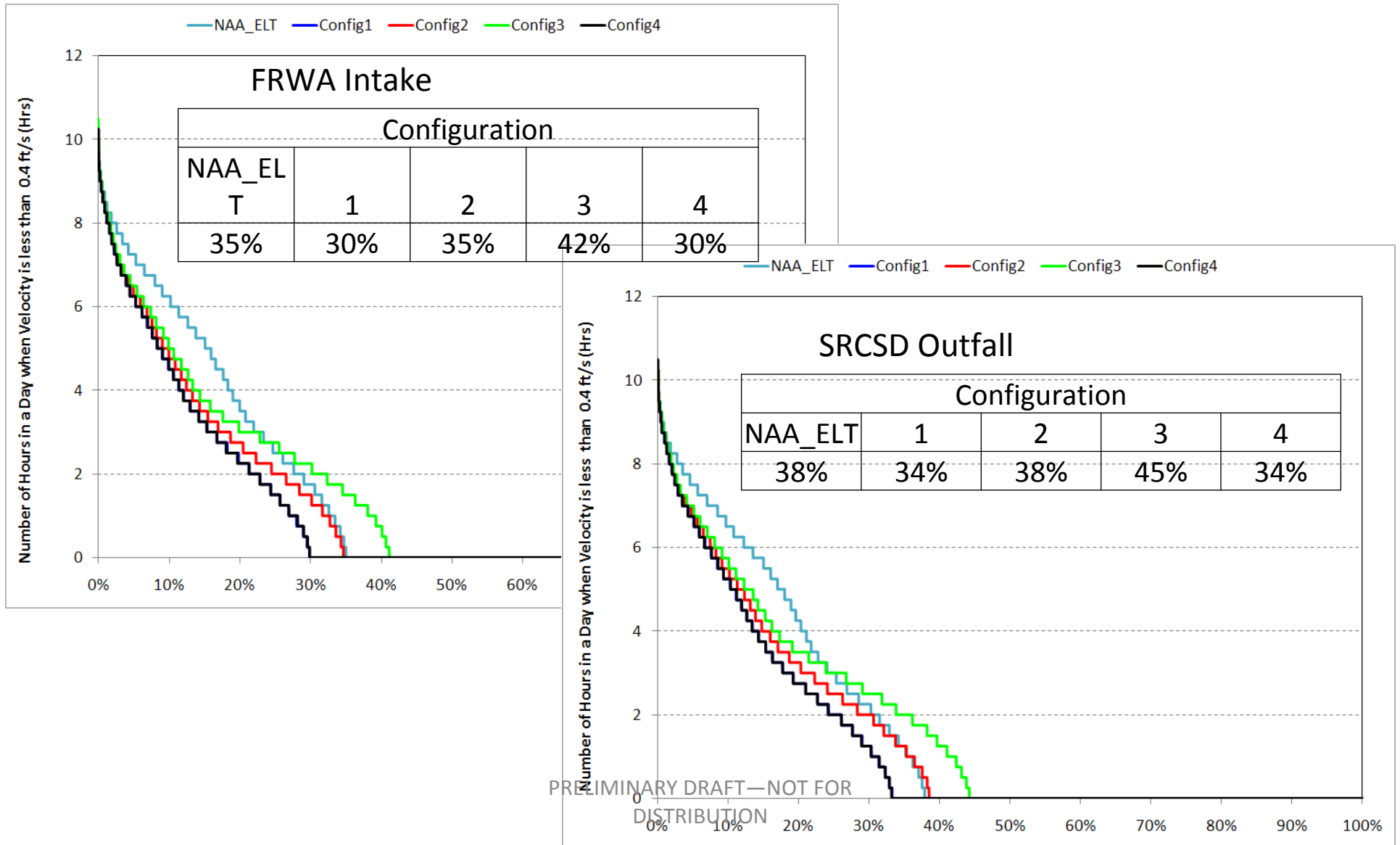
Impacts to Other Diversers/Dischargers

Number of Days with a Flow Reversal

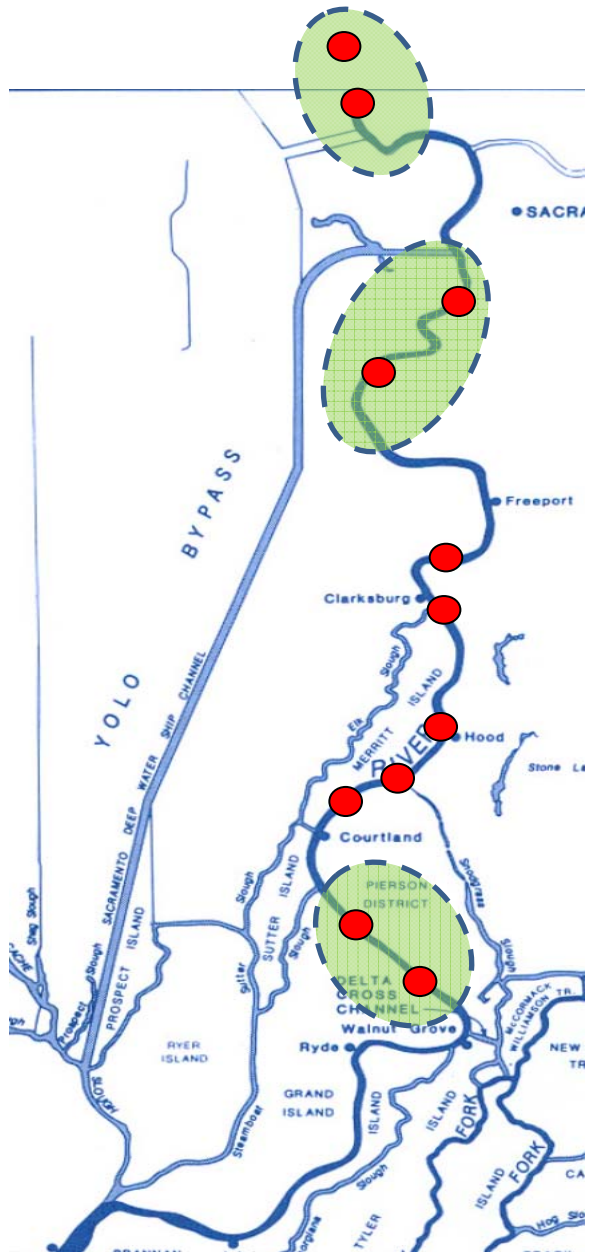


Impacts to Other Diverters/Dischargers

Number of Days with Velocity < 0.4 fps



Outmigrant Exposure to Intakes



Intakes in the reach u/s of American River

Origin of Fish	Configuration			
	1	2	3	4
Sacramento River	0%	100%	0%	0%
American River	0%	0%	0%	0%

Intakes in the reach d/s of American River and u/s of FRWA intake

Origin of Fish	Configuration			
	1	2	3	4
Sacramento River	0%	0%	100%	0%
American River	0%	0%	100%	0%

Intakes in the reach d/s of SRCSD outfall and u/s of Sutter Slough

Origin of Fish	Configuration			
	1	2	3	4
Sacramento River	100%	100%	100%	100%
American River	100%	100%	100%	100%

Intakes in the reach d/s of Steamboat Slough

Origin of Fish	Configuration			
	1	2	3	4
Sacramento River	0%	0%	0%	55%
American River	0%	0%	0%	55%

Summary of Exposure to Intakes

Sacramento River Fish

Intake #	Configuration			
	1	2	3	4
1	100%	100%	100%	100%
2	100%	100%	100%	100%
3	100%	100%	100%	100%
4	100%	100%	100%	55%
5	100%	100%	100%	55%

Delta Smelt

Intake #	Configuration			
	1	2	3	4
1	Low	Low	Low	Low
2	Low	Low	Low	Low
3	Low	Low	Low	Low
4	Moderate	Negligible	Low	Moderate -High
5	Moderate	Negligible	Low	Moderate -High

American River Fish

Intake #	Configuration			
	1	2	3	4
1	100%	0%	100%	100%
2	100%	0%	100%	100%
3	100%	100%	100%	100%
4	100%	100%	100%	55%
5	100%	100%	100%	55%

Migration Corridors

- Analysis using particle tracking to identify shifts in the pathways

To Sutter and Steamboat Sloughs

SacR Flow	To Sutter and Steamboat			
	Config1	Config2	Config3	Config4
Low	44%	44%	45%	45%
Mid	46%	47%	47%	44%
High	47%	48%	46%	44%

To DCC and Georgiana Sloughs

SacR Flow	To DCC and Georgiana			
	Config1	Config2	Config3	Config4
Low	19%	20%	19%	19%
Mid	19%	18%	19%	21%
High	15%	15%	15%	15%

- Particles inserted just downstream of American River confluence on the Sacramento River
- No substantial change in any configurations
- Minor reduction in the percent of particles into Sutter and Steamboat under high flow conditions

Export Water Quality

- Salinity risk for configurations
 - Salt propagation near the intake configurations does not appear to be a significant concern under extreme sea level rise
 - all configurations appear to have same salinity levels at the intake locations based on RMA modeling
- Nutrients from the SRCSD treated effluent
 - Configurations 2 and 3 have two intakes upstream of the outfall; three intakes downstream
 - Configurations 1 and 4 have all the intakes exposed to the treated discharge
 - Unknown implications

Summary

- Diversion capability appears insensitive to the intake configurations considered
- Operations and operational preference are more important than location of the intakes for effects on tidal dynamics
- Intake locations primarily influence exposure risk and but to a lesser extent migration pathways