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Exhibit STKN-27



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STKN-027

Impacts of California WaterFix on the City of Stockton's Intake Facility

WaterFix Proceedings Exhibit STKN-27

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Outline

- Opinion 1: DWR did not evaluate water quality at Stockton's intake. Water quality impacts as evaluated by DWR at Buckley Cove are not representative of the impacts that will occur at Stockton's intake.
- Opinion 2: Contrary to DWR's assertions, Exponent's analysis shows that the proposed WaterFix Project will result in significant water quality impacts at Stockton's intake.
- Opinion 3: Water quality will be harmed at the City's intake whether or not D-1641 water quality objectives are met.
- Opinion 4: Long-term averages cannot be used to determine the impacts of the WaterFix Project on Stockton. When model results are evaluated using daily or sub-daily timesteps, water quality impacts are significant.
- Opinion 5: WaterFix operations are not clearly defined, and as such it is not possible to determine and understand the impacts of the proposed WaterFix Project.
- Opinion 6: DWR does not use appropriate Delta baseline conditions.

OPINION 1: DWR DID NOT EVALUATE WATER QUALITY AT STOCKTON'S INTAKE

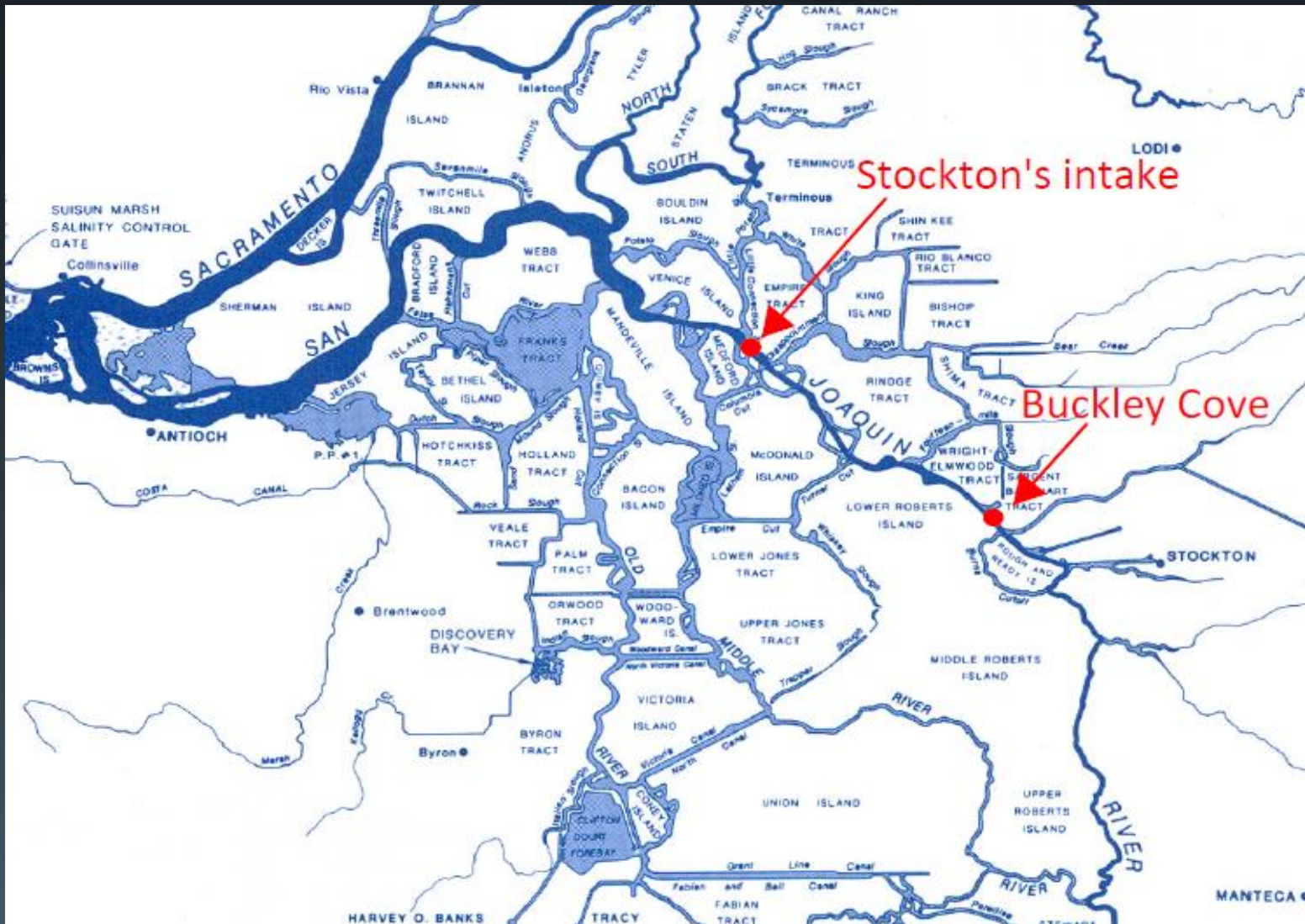
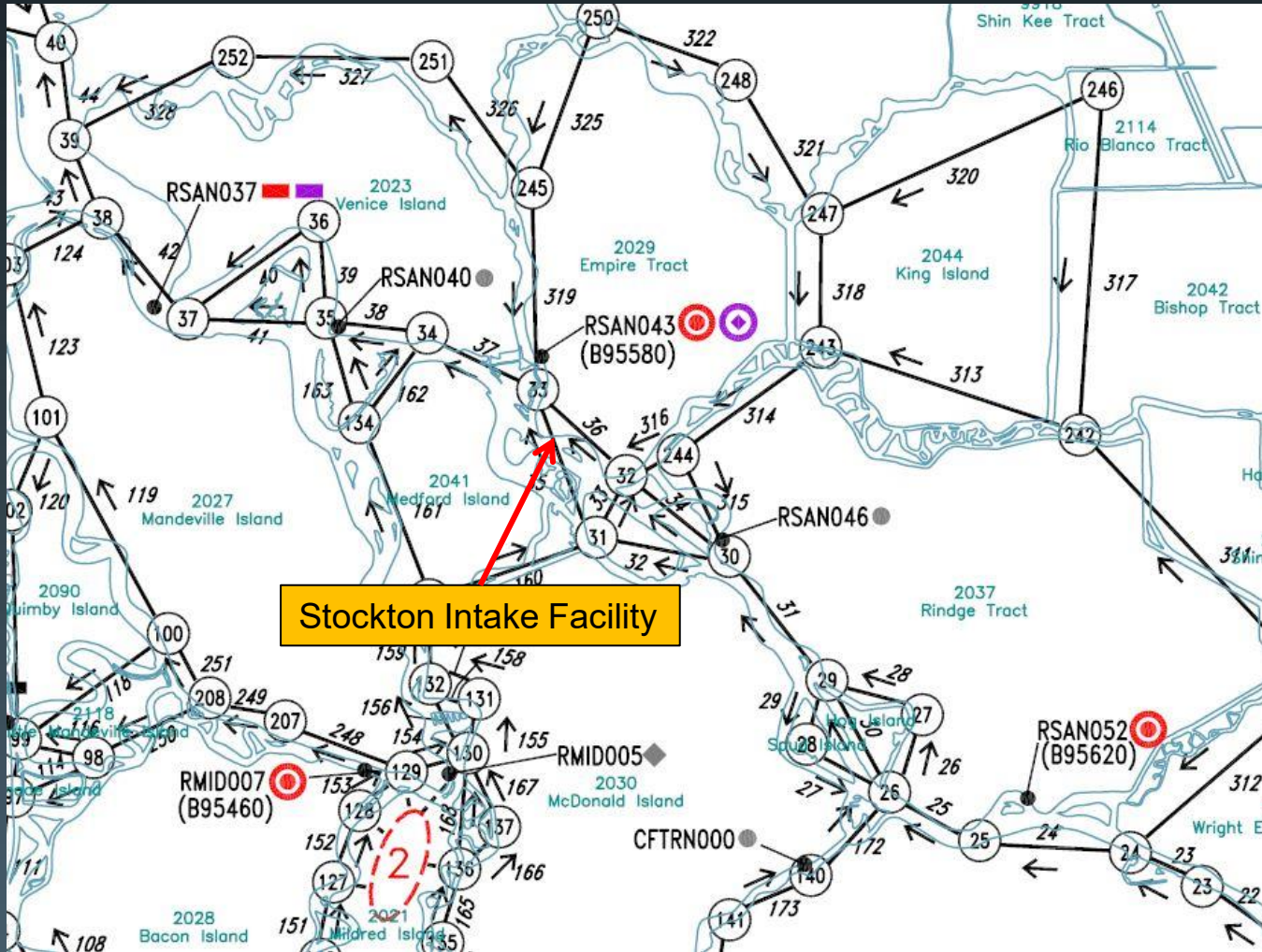
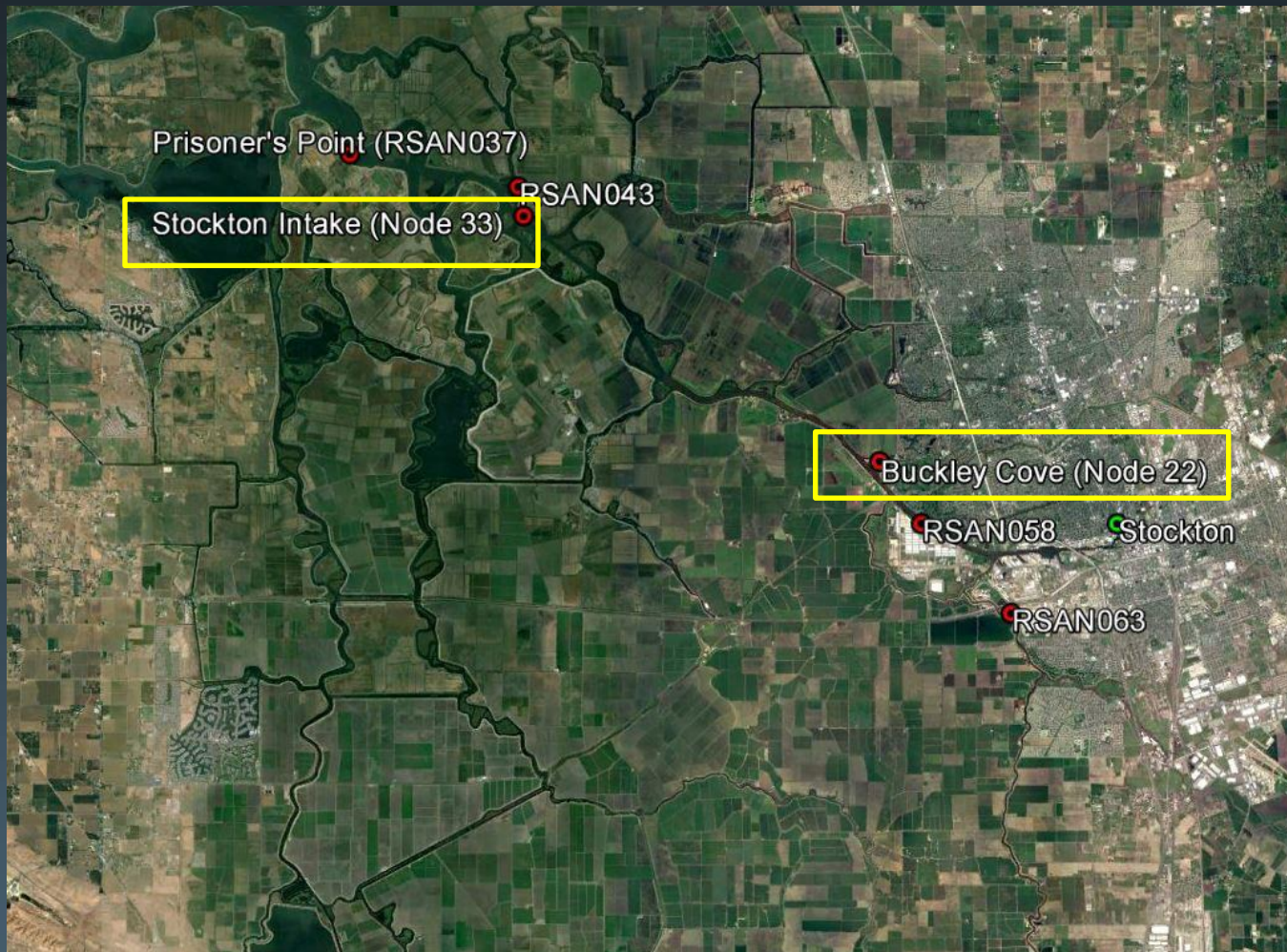


Figure 1 Location of Buckley Cove and City of Stockton's water intake. Map adapted from DWR Sacramento-San Joaquin Delta Atlas (1995), available at <http://baydeltaoffice.water.ca.gov/DeltaAtlas/>

DSM2 Grid



DSM2 modeling nodes for City's intake and Buckley Cove



Source water fingerprints show different sources of water at Buckley Cove and Stockton's intake

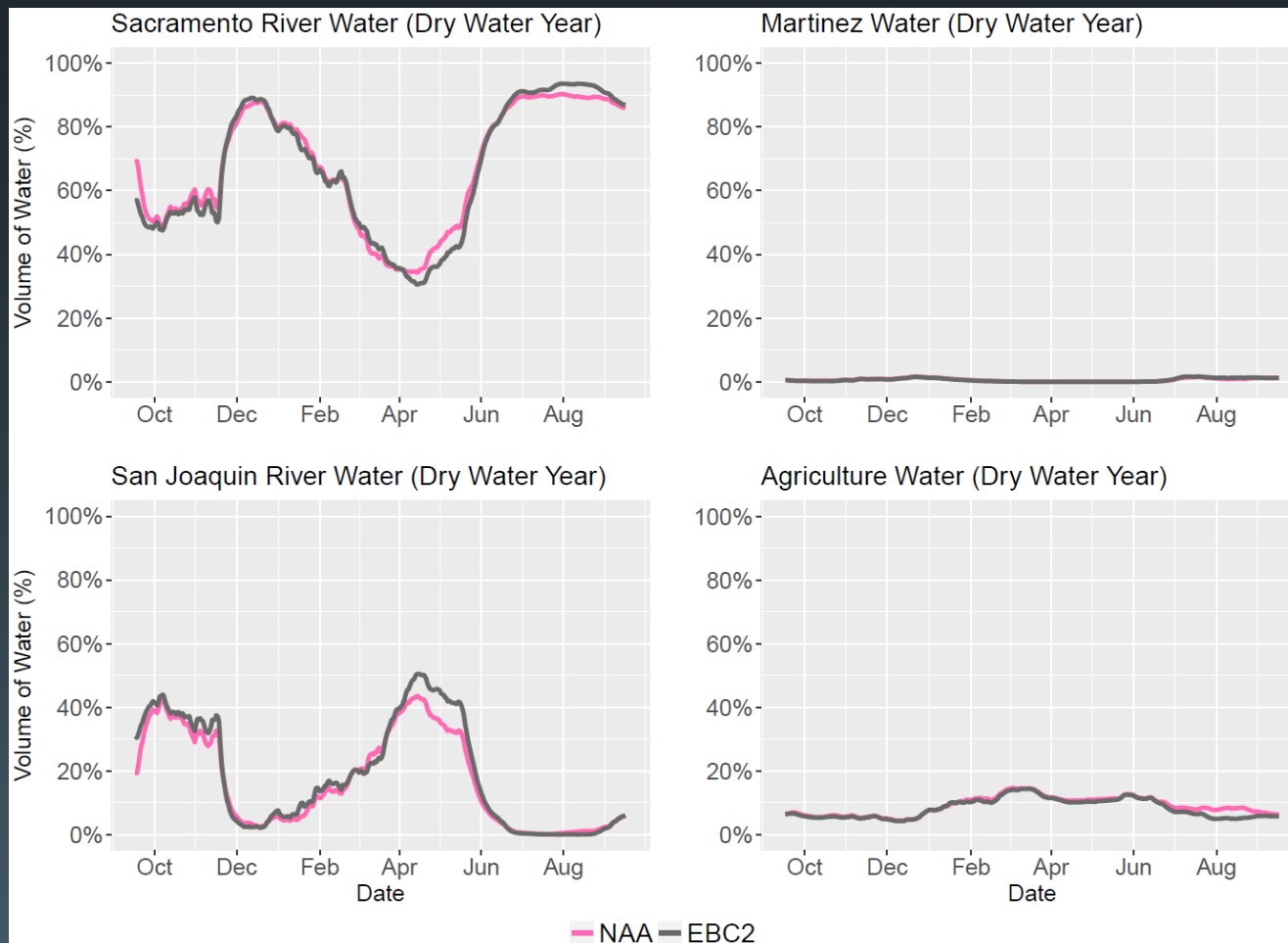


Figure 4. Source water fingerprint at Stockton's intake under the NAA and EBC2 baseline conditions during dry water years (average)

Source water fingerprints show different sources of water at Buckley Cove and Stockton's intake

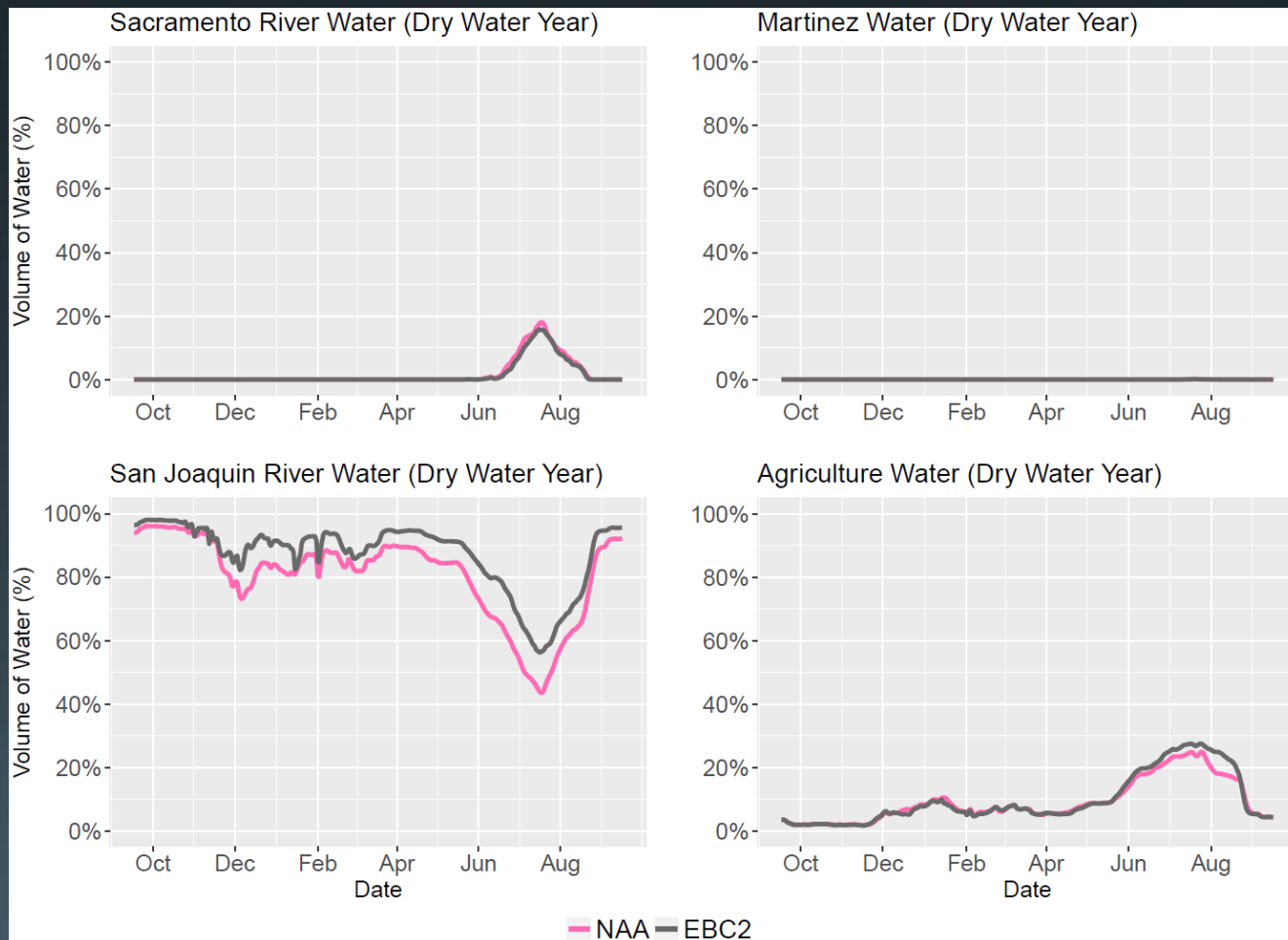


Figure 5. Source water fingerprint at Buckley Cove under the NAA and EBC2 baseline conditions during a dry water year

Source water fingerprints show different sources of water at Buckley Cove and Stockton's intake

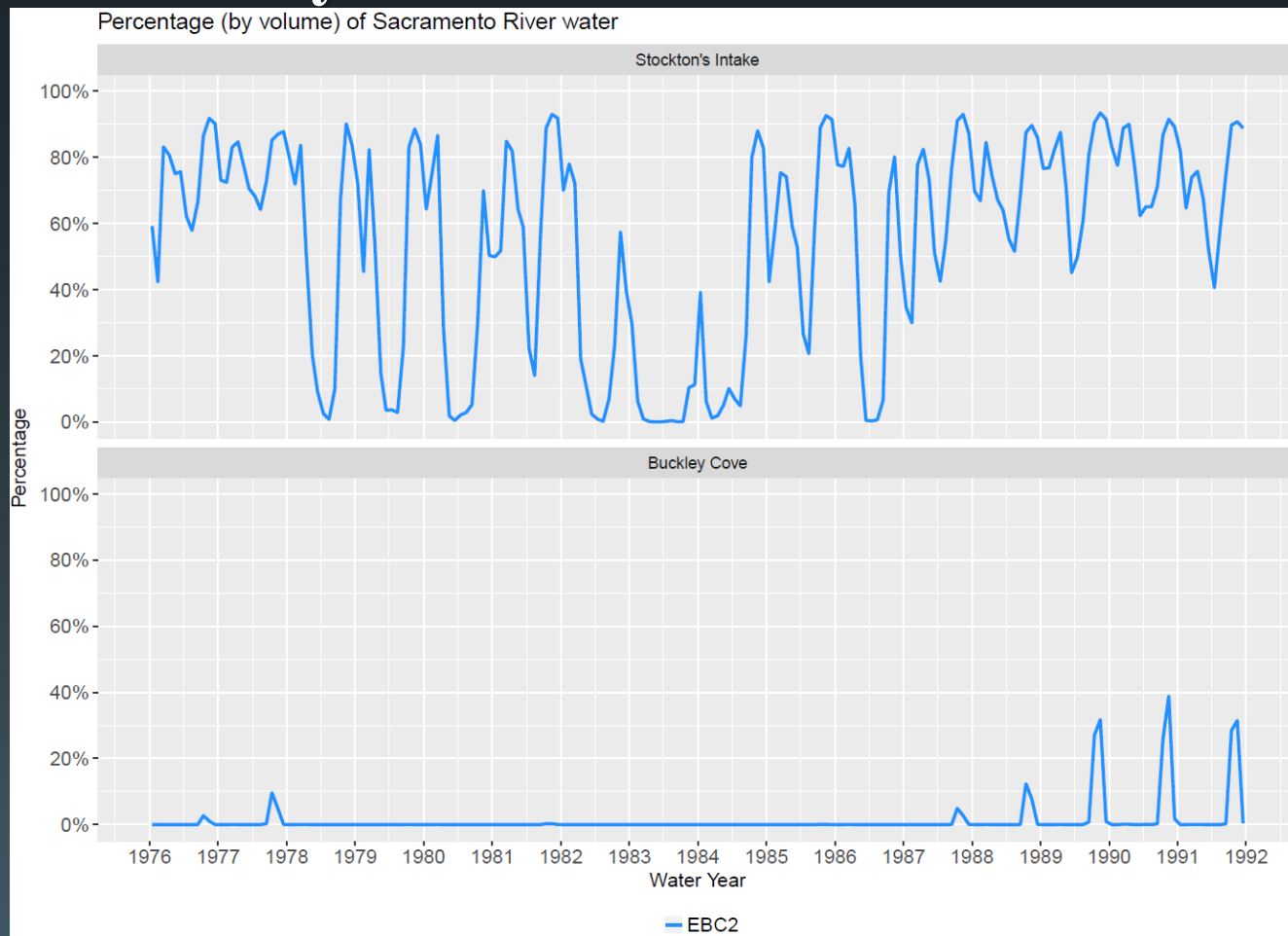


Figure 6. Percentage (by volume) of Sacramento River water at Stockton's intake (top panel) and Buckley Cove (bottom panel) from 1976 to 1991 under existing conditions (EBC2)

Salinity is substantially different at Buckley Cove and Stockton's intake

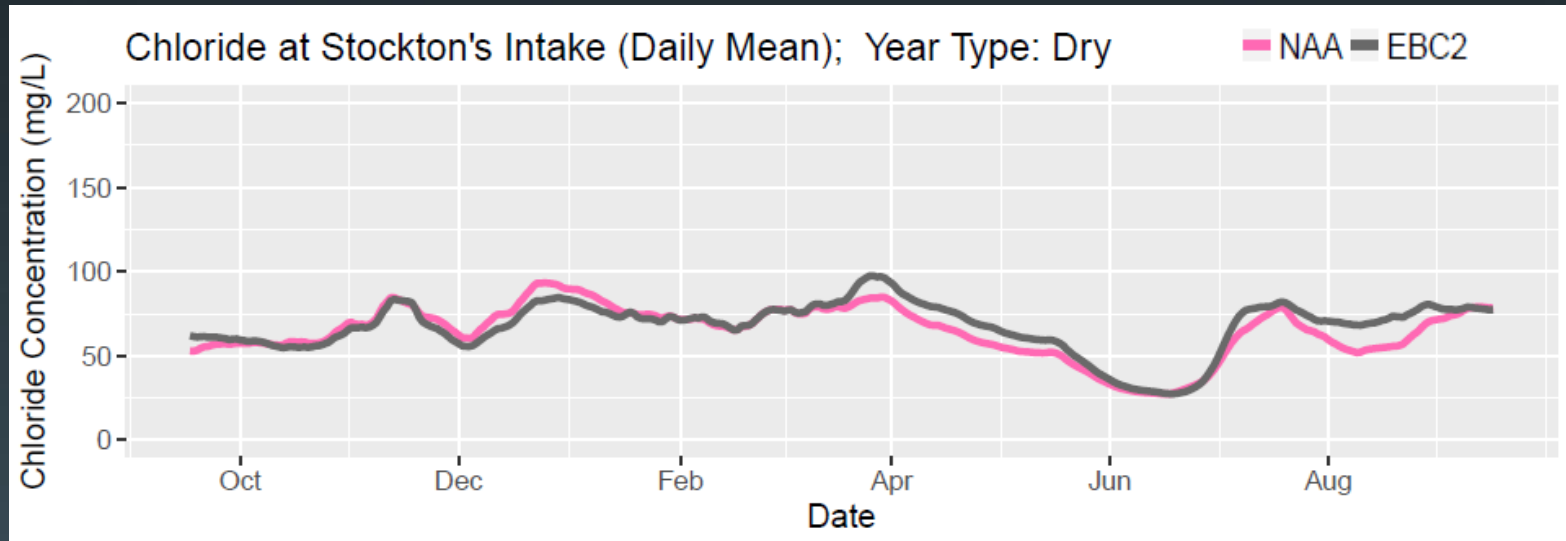


Figure 7. Simulated daily concentration of chloride at Stockton's intake during dry water years under baseline conditions NAA and EBC2

Salinity is substantially different at Buckley Cove and Stockton's intake

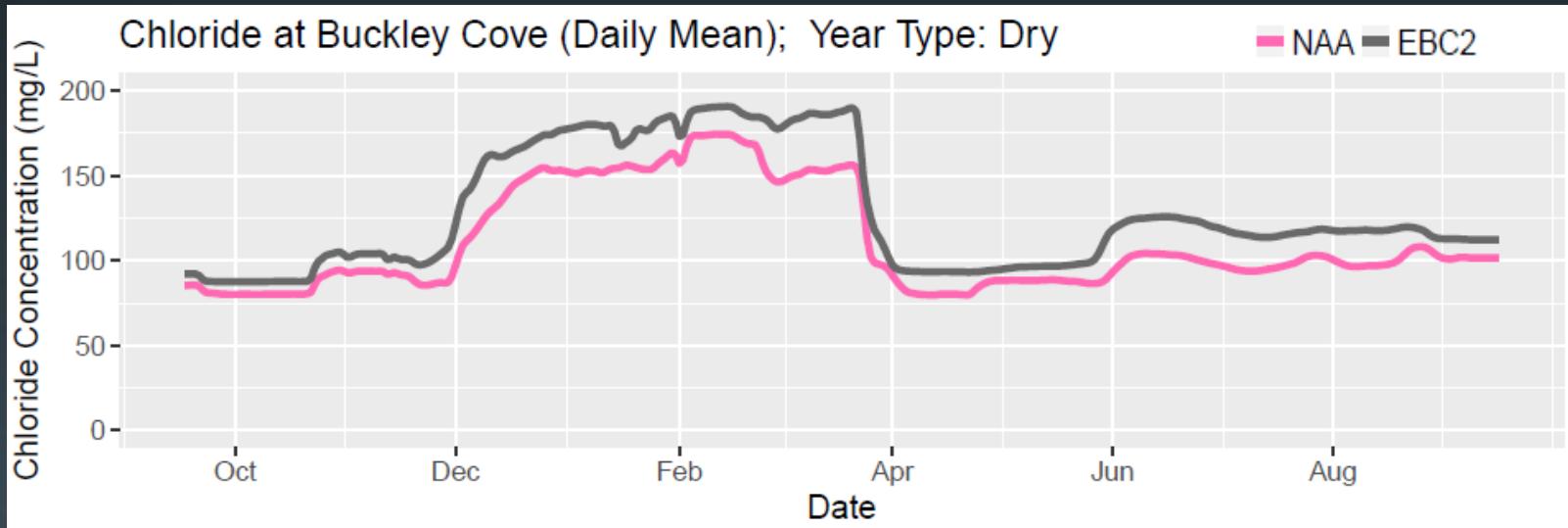


Figure 8. Concentration of daily chloride at the Buckley Cove during a dry water year under baseline conditions NAA and EBC2

**OPINION 2: THE PROPOSED WATERFIX
PROJECT WILL RESULT IN
SIGNIFICANT WATER QUALITY
IMPACTS AT STOCKTON'S INTAKE**

Source water fingerprinting shows large shifts in source water at the City's intake for different operational scenarios

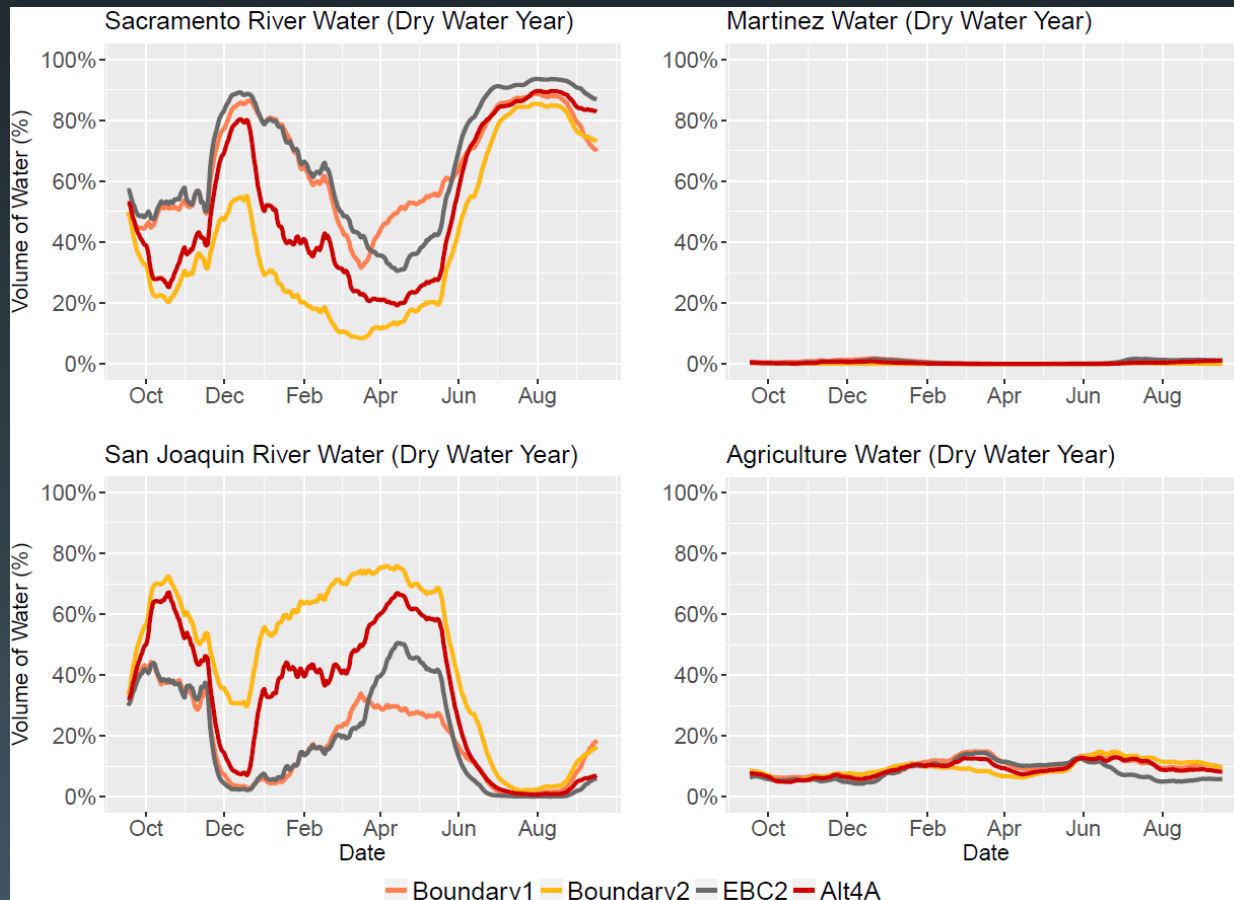


Figure 9. Source water fingerprint at Stockton's intake under the proposed California WaterFix Project scenarios during dry water year years (1981, 1985, 1987, and 1989)

Scenarios Boundary 1, Boundary 2, and Alternative 4A result in higher salinity at the City's intake

Table 3. Number of equivalent days per year that water at Stockton's intake exceeds 110 mg/L chloride under various modeled baseline scenarios according to water year type

Water Year Type	No. of days per year water at Stockton's intake exceeds chloride threshold of 110 mg/L					Percentage increase from EBC2 to B1	Percentage increase from EBC2 to B2	Percentage increase from EBC2 to Alt4A
	EBC2	NAA	B1	B2	Alt 4A			
Critical	35	50	47	75	53	35%	112%	52%
Dry	31	36	46	77	58	49%	151%	87%
Normal	36	44	57	18	32	60%	-49%	-11%
Wet	11	11	8	4	2	-28%	-61%	-79%

Scenarios Boundary 1, Boundary 2, and Alternative 4A result in higher salinity at the City's intake

Table 4. Number of equivalent days per year that water at Stockton's intake exceeds 110 mg/L chloride under various modeled baseline scenarios for each water year between 1976 and 1991

Water year	Water Year Type	Total Days	No. of days per year water at Stockton's intake exceeds chloride threshold of 110 mg/L					Percentage increase from EBC2 to B1	Percentage increase from EBC2 to B2	Percentage increase from EBC2 to Alt4A
			EBC2	NAA	B1	B2	Alt 4A			
1976	Critical	366	25	0	11	87	25	-55%	248%	-1%
1977	Critical	365	9	76	56	71	57	513%	685%	526%
1978	Normal	365	45	82	105	24	72	131%	-46%	60%
1979	Normal	365	12	29	33	31	18	171%	150%	45%
1980	Normal	366	50	23	34	1	6	-32%	-98%	-88%
1981	Dry	365	12	14	5	82	38	-58%	602%	223%
1982	Wet	365	20	23	30	4	4	49%	-82%	-81%
1983	Wet	365	0	0	0	0	0	NA	NA	NA
1984	Wet	366	0	0	0	0	0	NA	NA	NA
1985	Dry	365	7	1	7	76	42	-8%	921%	469%
1986	Wet	365	26	20	4	15	7	-86%	-42%	-74%
1987	Dry	365	11	6	63	81	44	465%	627%	291%
1988	Critical	366	15	10	18	88	22	19%	487%	44%
1989	Dry	365	93	125	109	71	107	17%	-24%	15%
1990	Critical	365	54	24	11	57	37	-79%	5%	-32%
1991	Critical	365	75	139	143	72	129	92%	-3%	72%
Summary	(all)		455	572	627	759	606	38%	67%	33%

Scenarios Boundary 1, Boundary 2, and Alternative 4A result in higher salinity at the City's intake

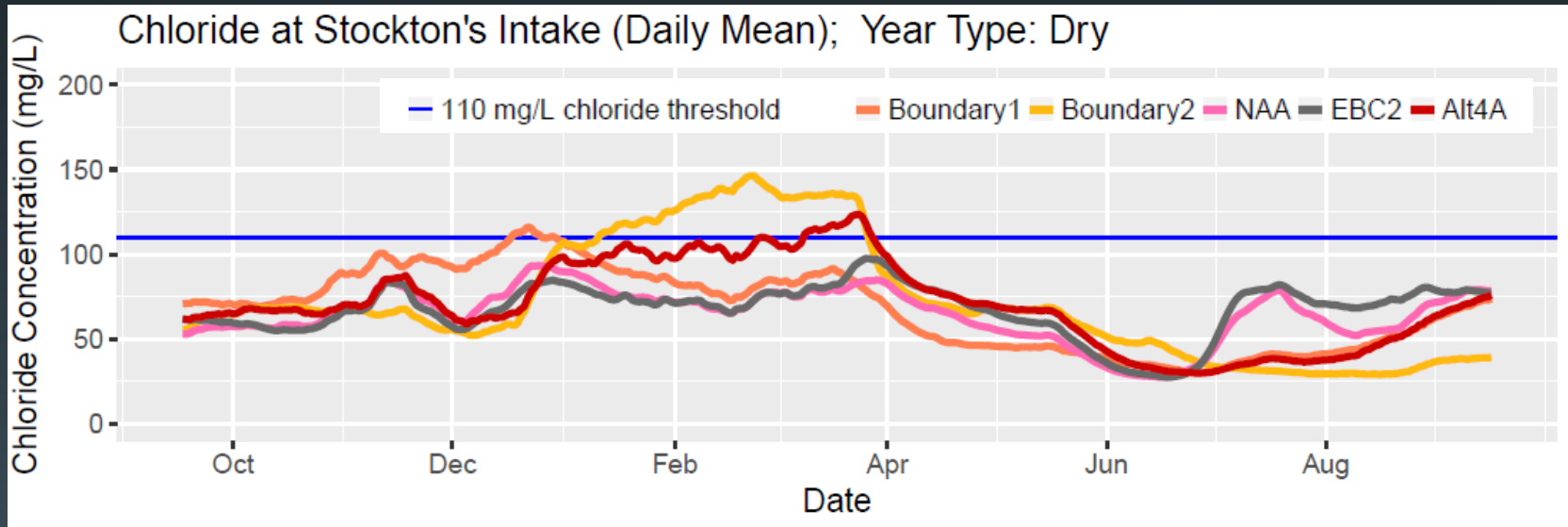


Figure 10. Concentration of chloride at Stockton's intake under various operational scenarios during dry water years (1981, 1985, 1987, and 1989).

Longer water residence times will occur in the Delta under all operational scenarios relative to the existing condition and no action alternatives

Table 5. Residence times of inflows to the Delta under a dry water year

Month	Monthly average residence time (days)					Percent increase from EBC2 to B1	Percent increase from EBC2 to B2	Percent increase from EBC2 to Alt4A
	EBC2	NAA	B1	B2	Alt 4A			
October	28	26.6	35.8	34.4	31.6	28%	23%	13%
November	32.3	32.3	36.5	40.2	38.6	13%	24%	20%
December	27.6	28.3	30.8	32.3	31.3	12%	17%	13%
January	31	31.7	32.9	35.9	34.2	6%	16%	10%
February	27.3	26.9	28.9	29.3	30.7	6%	7%	12%
March	24.2	24	26.4	26.1	27	9%	8%	12%
April	22.3	22.8	24.9	24.9	24.9	12%	12%	12%
May	38.2	39.3	37.1	40	39.2	-3%	5%	3%
June	36.4	36.9	37.9	40.1	37.8	4%	10%	4%
July	27.7	28.7	34.4	35.6	34.2	24%	29%	23%
August	23.2	26.7	31.1	31.8	30.9	34%	37%	33%
September	27.8	31.2	36.3	35.1	34.3	31%	26%	23%

OPINION 3: WATER QUALITY WILL BE HARMED AT THE CITY'S INTAKE WHETHER OR NOT D-1641 WATER QUALITY OBJECTIVES ARE MET.

**OPINION 4: LONG-TERM AVERAGES
AND CUMULATIVE PROBABILITY
DIAGRAMS CANNOT BE USED TO
DETERMINE THE IMPACTS OF THE
WATERFIX PROJECT ON STOCKTON.**

DWR's long-term averages mask project impacts and do not provide the level of detail needed for the City to plan for the future

DWR's evaluation of monthly average changes in chloride concentration at Buckley Cove

- 1 Table CI-70. Period average change in chloride concentrations (mg/L) for Alternative 4A ELT relative to existing conditions and the No Action Alternative ELT.
- 2 Calculation of chloride concentrations was based on EC-chloride relationship.

Chloride	Location	Period ¹	OCT		NOV		DEC		JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		Annual Avg. Change		
			Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	Ex. Cond.	No Act. ELT	
Delta Interior	Moke. R. (SF) at Staten Island	ALL	0 (3%)	0 (3%)	0 (3%)	0 (2%)	0 (1%)	0 (1%)	1 (5%)	1 (4%)	1 (4%)	1 (4%)	1 (5%)	1 (4%)	1 (3%)	0 (0%)	0 (1%)	0 (0%)	0 (1%)	0 (3%)	0 (3%)	0 (2%)	0 (1%)	0 (1%)	0 (1%)	0 (1%)	0 (1%)	0 (3%)	0 (2%)
		DROUGHT	0 (2%)	0 (2%)	0 (1%)	0 (1%)	0 (-0%)	0 (1%)	1 (4%)	1 (3%)	0 (1%)	1 (3%)	0 (1%)	1 (3%)	0 (1%)	0 (0%)	0 (1%)	0 (0%)	0 (1%)	0 (1%)	1 (5%)	1 (4%)	0 (2%)	0 (-1%)	0 (1%)	0 (0%)	0 (1%)	0 (0%)	0 (1%)
	SJR at Buckley Cove	ALL	-8 (-8%)	0 (0%)	-12 (-11%)	-1 (-1%)	-22 (-15%)	4 (4%)	-21 (-13%)	3 (3%)	-13 (-9%)	8 (5%)	-10 (-7%)	5 (4%)	-18 (-18%)	-6 (-7%)	-8 (-12%)	1 (2%)	-6 (-5%)	4 (5%)	-7 (7%)	7 (-10%)	-11 (6%)	6 (-10%)	-12 (6%)	-1 (-11%)	-1 (-11%)	-12 (-11%)	2 (2%)
		DROUGHT	-14 (-11%)	0 (0%)	-18 (-15%)	-1 (-1%)	-33 (-20%)	2 (2%)	-32 (-15%)	6 (4%)	-14 (-6%)	12 (6%)	-12 (-5%)	9 (5%)	-32 (-19%)	-12 (-8%)	-14 (-12%)	3 (3%)	22 (17%)	7 (7%)	-11 (-9%)	15 (17%)	-15 (-12%)	18 (20%)	-17 (-12%)	-17 (-12%)	0 (-11%)	-20 (-13%)	5 (4%)
	Franks Tract	ALL	-60 (-32%)	-41 (-24%)	-125 (-54%)	-97 (-43%)	-67 (-32%)	-44 (-24%)	-32 (-24%)	-30 (-23%)	-10 (-16%)	-6 (-10%)	2 (5%)	3 (8%)	5 (15%)	5 (16%)	2 (5%)	3 (9%)	3 (8%)	2 (5%)	-49 (-36%)	-32 (-28%)	-44 (-29%)	-32 (-23%)	-29 (-15%)	-20 (-11%)	-20 (-11%)	-34 (-28%)	-24 (-22%)
		DROUGHT	-38 (-17%)	-52 (-21%)	-98 (-36%)	-112 (-39%)	-41 (-15%)	-40 (-15%)	-22 (-12%)	-35 (-18%)	-11 (-15%)	-15 (-20%)	2 (6%)	1 (1%)	5 (18%)	6 (19%)	7 (22%)	5 (14%)	9 (22%)	9 (11%)	-88 (-42%)	-51 (-33%)	-55 (-24%)	-24 (-12%)	31 (13%)	18 (7%)	18 (-16%)	-25 (-17%)	
	Old R. at Rock Slough	ALL	-35 (-23%)	-22 (-16%)	-93 (-51%)	-76 (-45%)	-60 (-33%)	-40 (-25%)	-26 (-21%)	-29 (-21%)	-7 (-10%)	-2 (-4%)	4 (9%)	7 (15%)	2 (4%)	4 (9%)	-1 (-2%)	2 (4%)	5 (12%)	5 (13%)	-36 (-35%)	-23 (-26%)	-39 (-31%)	-28 (-25%)	-22 (-14%)	-17 (-11%)	-26 (-24%)	-18 (-16%)	
		DROUGHT	-15 (-8%)	-25 (-13%)	-75 (-35%)	-92 (-40%)	-37 (-16%)	-34 (-15%)	-16 (-9%)	-33 (-18%)	-12 (-13%)	-13 (-14%)	2 (4%)	5 (8%)	5 (9%)	8 (16%)	7 (18%)	7 (17%)	9 (24%)	4 (8%)	-80 (-43%)	-49 (-35%)	-64 (-28%)	-29 (-17%)	20 (10%)	12 (6%)	-18 (-14%)	-20 (-15%)	

Figure 2. Excerpt of Table CI-70 from Appendix 8G of the FEIR/EIS (p. 8G-84) showing the change in average chloride concentration under Alternative 4A relative to the NAA and EBC1 baselines at Buckley Cove.

When model results are evaluated using daily or sub-daily timesteps, water quality impacts are significant.

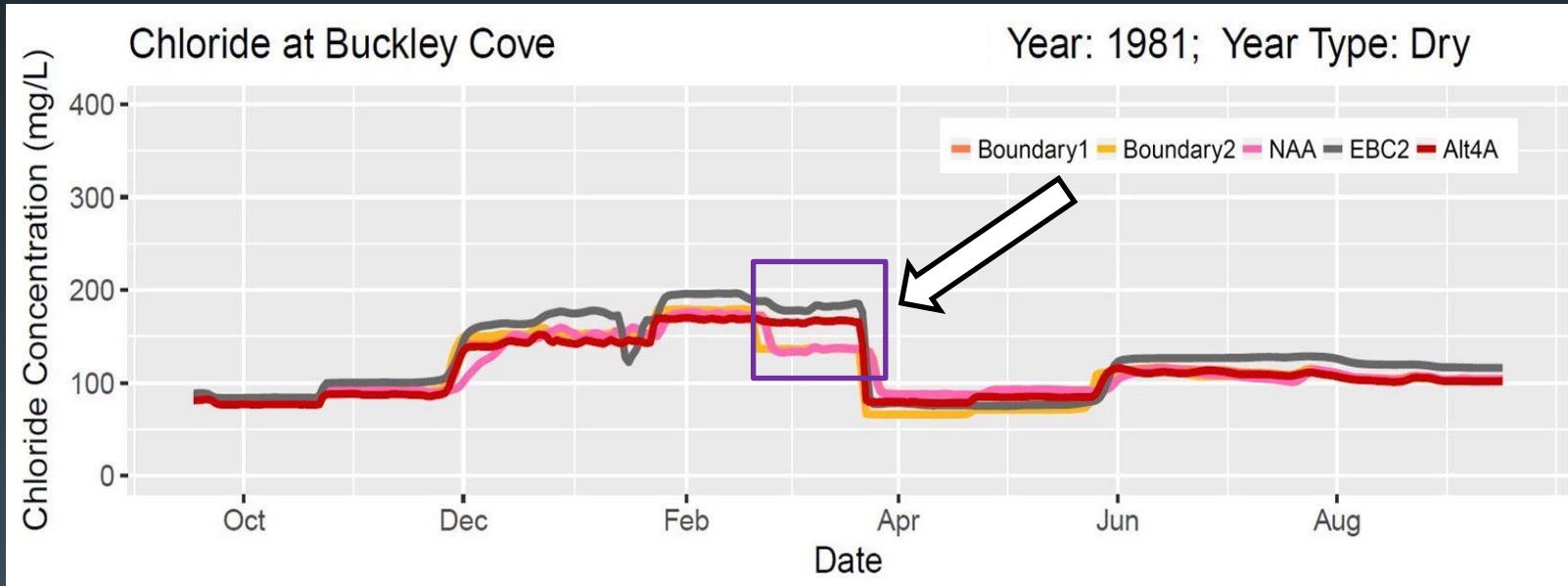


Figure 3. Daily mean concentration of chloride at Buckley Cove under various operational scenarios during water year 1981

OPINION 5: WATERFIX OPERATIONS ARE NOT CLEARLY DEFINED, AND AS SUCH IT IS NOT POSSIBLE TO DETERMINE AND UNDERSTAND THE IMPACTS OF THE PROPOSED WATERFIX PROJECT.

**OPINION 6: DWR DOES NOT USE
APPROPRIATE DELTA BASELINE
CONDITIONS.**

WaterFix does not use the appropriate Delta baseline condition or accurately describe the existing condition

Table 1. Number of days per year that water at Stockton’s intake exceeds 110 mg/L chloride under three modeled baseline scenarios according to water year type

Water Year Type	No. of days per year that water at Stockton’s intake <i>exceeds</i> a chloride threshold of 110 mg/L		
	EBC1 Existing Condition Does not include Fall X2 No sea-level rise	EBC2 Existing Condition Includes Fall X2 No sea-level rise	NAA baseline condition Includes Fall X2 15-cm sea-level rise
Critical	50	35	50
Dry	58	31	36
Normal	44	36	44
Wet	11	11	11

DWR Did Not Fully Characterize the Entire Range of Expected Project Operations or Associated Water Quality Impacts.

Table 2. Exponent’s record of model files released by the California Department of Water Resources in support of the California WaterFix Project

Accompanying Document	Model Files Acquired by Exponent
March 2013 Revised Administrative Draft BDCP	EBC1, EBC2, NAA (ELT, LLT), all Project alternatives, including Alternative 4 (H1, H2, H3, H4) at LLT and ELT
2013 Draft EIR/EIS	EBC1, NAA (ELT, LLT), all Project alternatives, including Alternative 4 (H1, H2, H3, H4) at LLT and ELT
2015 RDEIR/SDEIS	Updated 2013 Draft EIR/EIS model files and sensitivity analyses released. Alternative 4A (or H3+) introduced as the preferred alternative but not modeled. NAA evaluated as ELT and LLT.
Draft BA model files (released January 2016, before document release)	NAA (ELT), Preferred Alternative (Alternative 4A)
Final FEIR/EIS model files (released March 2016, before document release)	NAA (ELT), Alternative 2D, Alternative 4A, Alternative 5A
WaterFix Petition (May 2016)	B1, B2, NAA, H1, H2, H3, H4