

4.4.7. An alternative analysis based on empirical significance criteria

During the scoping process for the FRWP EIR/EIS, comments were received from interested parties regarding significance thresholds for the water quality analysis. These comments recommended that the FRWA should adopt threshold significance criteria that are consistent with criteria used for certain Delta water projects. Specifically mentioned were criteria used by Contra Costa Water District in the EIR/EIS for the Los Vaqueros Reservoir Project. The comment stated that the Los Vaqueros Reservoir EIR/EIS considered water quality impacts as potentially significant and requiring further analysis if the increase in chloride concentration exceeded 5 mg/l or 5%, whichever is larger. This statement does not completely capture the significance criteria used in that EIR/EIS. The specific criteria (modified slightly to be consistent with the current regulatory framework) are provided below.

It should also be noted that FRWA reviewed a large number of other EIRs and EISs that addressed Delta water quality. There was no consistent methodology or approach that could be identified; nearly every analysis used different methods and significance thresholds.

4.4.7.1 Contra Costa Water District's Los Vaqueros Reservoir Project EIR/EIS significance criteria

The discussion below is excerpted from Chapter 5 (pages 5-9 and 5-10) of the Los Vaqueros Reservoir Project EIR/EIS Salinity differences were compared at 10 Delta stations using the Fischer Delta Model (FDM). Differences were considered for more detailed impact analysis if they met either of the following screening criteria:

Step 1 – Screening Criterion 1

- Salinity differences for the project alternative were greater than 5% of the base condition, and
- Salinity differences between project alternatives and the base case were greater than 5 mg/l chloride or 20 micromhos per centimeter.

Step 1 – Screening Criterion 2

- For Delta locations where Delta Water Quality Control Plan standards apply, when base salinity levels were greater than 95% of the applicable standard and the alternative caused *any* increase in salinity levels. This criterion recognized potential significance of project operations when Delta salinity approaches regulatory limits.

Salinity increases or decreases of less than 5% of base conditions were considered insignificant because changes of this magnitude are clearly smaller than the uncertainty in field measurements and the modeling methods. The additional 5 mg/l or 20 micromhos per centimeter criterion removed from consideration very small changes under low salinity conditions.

The second criterion was established to ensure that all increases were reviewed when calculated salinity levels approached regulatory limits. CCWD did not consider this to mean that the salinity

levels would in fact approach regulatory limits. CCWD considered it important to note that the simulations were based on estimated hydrology, monthly average flows, and 19-year mean tides. The initial screening procedure was considered by CCWD to eliminate changes that were clearly insignificant. Individual changes that passed (i.e., exceeded) the screening criteria were not necessarily significant, however. Conclusions of significance were reached after CCWD reviewed the changes in terms of frequency, magnitude, and duration of salinity increases and decreases.

CCWD also recognized that efforts are continuously underway to modify water quality standards. CCWD's position was that it is not possible to determine what possible future standards might be in sufficient detail to conduct a meaningful analysis of impacts. In addition, CCWD noted, until new standards are actually adopted, the existing standards remain in place.

Step 2 – Criteria for Conclusions of Significance

CCWD identified a number of criteria by which to evaluate the significance of water quality changes. These criteria stated that significant adverse impacts were determined using the following criteria:

- Results met either of the initial screening criteria; and
- Review of results meeting the screening criteria showed distinct periodic or seasonal trends or continuous increases throughout a substantial portion of the simulation period; or
- The frequency of salinity increases of the period of record was substantially greater than the frequency of salinity decreases (e.g., salinity levels predicted to increase 70% of the time and decrease 30% of the time); or
- The frequency, magnitude, and duration of salinity increases were consistent during certain water-year types or Delta conditions (e.g., consistent increases during critical dry years); or
- Trends in salinity increases are consistent at several Delta stations or over well-defined geographic areas; or
- Salinity changes have the potential to affect beneficial uses or CCWD operations.

4.4.7.2 Approach to supplemental water quality analysis

FRWA and its member agencies believe that the approach and methods used in the FRWP EIR/EIS to assess Delta water quality impacts are appropriate and thoroughly address the intent and spirit of CEQA and NEPA. However, in response to comments received during scoping, FRWA has elected to undertake this supplemental water quality analysis to address scoping comments. As part of this analysis, FRWA has examined water quality modeling results in a manner consistent with the CCWD Los Vaqueros Reservoir Project EIR/EIS. This analysis is focused on potential water quality changes at the locations of most concern to those parties who provided scoping comments; Rock Slough entrance, West Canal at Clifton Court Forebay (Clifton Court Forebay), and the DMC at the Tracy Pumping Plant (Tracy Pumping Plant). The

analysis presents the results and also compares those results to the significance criteria used in the Los Vaqueros Reservoir Project EIR/EIS.

4.4.7.3 Results of supplemental analysis

4.4.7.3.1 Alternatives 2-5

Figures 4.4.7.3.1-1 through 4.4.7.3.1-4 present scatter plots and summary statistics of this supplemental analysis for individual monthly tabulated chloride concentration and differences simulated for the FRWP alternative and no action condition. Tables 4.4.7.3.1-1 through 4.4.7.3.1-4 present the supporting tabular data and reflect the seasonal patterns of simulated differences. Figures 4.4.7.3.1-1 through 4.4.7.3.1-3 and Tables 4.4.7.3.1-1 through 4.4.7.3.1-3 show those simulated chloride differences at Rock Slough, Clifton Court Forebay, and the Tracy Pumping Plant that were greater than 5 mg/l and greater than 5% above no action conditions. Table 4.4.7.3.1-4 and Figure 4.4.7.3.1-4 show those changes at Rock Slough that were simulated when the base salinity levels were greater than 95% of the applicable water quality standard. Based on the methodology used by CCWD, other changes that did not meet these initial screening criteria are not addressed further in this analysis. An example of results not discussed further include FDM results for chloride concentrations at the southern Delta locations (West Canal and DMC Tracy) that generally do not approach the daily salinity standard of 250 mg/L.

Listed below are the specific significance criteria used by CCWD, along with a discussion regarding whether the results indicate that these criteria would be exceeded or not.

Step 2 – Specific Significance Criteria

Step 2 Specific Criterion – Review of results meeting the screening criteria showed distinct periodic or seasonal trends or continuous increases throughout a substantial portion of the simulation period

The following general pattern of observed simulation results are evident at all three locations analyzed (Rock Slough, Clifton Court Forebay, and Tracy Pumping Plant). As shown in Tables 4.4.7.3.1-1 through 4.4.7.3.1-4, there are no discernable trends in salinity increases. There is an overall seasonal trend of the observed changes in that all changes occur between the months of September through December. However, increases are scattered throughout those months, and do not occur throughout a substantial portion of the simulation period (0.8% of the months or less depending on location). This clear lack of distinct pattern exists for changes greater than 5 mg/L and 5% (Tables 4.4.7.3.1-1 through 4.4.7.3.1-3) and those changes when the No Action condition is near the standard (Table 4.4.7.3.1-4).

Step 2 Specific Criterion – The frequency of salinity increases of the period of record was substantially greater than the frequency of salinity decreases (e.g., salinity levels predicted to increase 70% of the time and decrease 30% of the time)

Summary counts of the observed changes shown Figures 4.4.7.3.1-1 through 4.4.7.3.1-4 indicate that the frequency of salinity increases was slightly greater than the frequency of salinity decreases. However, the total frequency of increases that exceeded the 5 mg/l and 5% threshold was extremely small at all locations (i.e., no more than 7 months out of a total 896 months). If all

months in the modeling period are taken into account, there is no substantial difference in the frequency of increases as compared to decreases.

Step 2 Specific Criterion – The frequency, magnitude, and duration of salinity increases were consistent during certain water-year types or Delta conditions (e.g., consistent increases during critical dry years)

As shown in Figures 4.4.7.3.1-1 through 4.4.7.3.1-3 for changes that are larger than normal model error, there is not a discernible pattern of the increases or decreases by year type or Delta conditions. The increases and decreases occur across all year types and are relatively equally distributed. For example, at Rock Slough three increases occur in critical and dry years, while four increases occur in above normal and wet years. For changes that occur when background conditions are within 95% of the standards (Figure 4.4.7.3.1-4), there are slightly more months with increased salinity but the average of the increases is only 2.6 mg/l, while the average of the decreases is 3.3 mg/l.

Step 2 Specific Criterion – Trends in salinity increases are consistent at several Delta stations or over well-defined geographic areas

The pattern in the magnitude of increases and decreases are not necessarily consistent between the three Delta locations. Very few changes occur at any location.

Step 2 Specific Criterion – Salinity changes have the potential to affect beneficial uses or CCWD operations

As described in the Chapter 4 of the FRWP EIR/EIS, salinity changes do not have the potential to affect beneficial uses of the Delta. Most notably, there are no project-related changes in the periods of compliance with the 150 mg/L standard. All observed chloride increases are within 95% of the 250 mg/L objective and all are within the limits of model error (<5%). In addition, the pattern of increases and decreases for all screening criteria values are equally distributed with respect to magnitude. While effects on CCWD operations are considered in the FRWP analysis, this specific criteria was more appropriately considered as part of CCWD's Los Vaqueros Reservoir Project EIR/EIS. CCWD is not considered differently than other users in the FRWP EIR/EIS analysis.

4.4.7.3.2 Alternative 6

Figure 4.4.7.3.2-1 and Table 4.4.7.3.2-1 show those simulated changes for Rock Slough that were greater than 5 mg/l and greater than 5% above base conditions. Figure 4.4.7.3.2-2 and Table 4.4.7.3.2-2 show those changes at Rock Slough that were simulated when the base salinity levels were greater than 95% of the applicable water quality standard. The analysis is focused on simulated Rock Slough chloride conditions because a review of the results indicate that it is representative of the pattern and relative magnitude of change that would be expected to occur at the southern Delta locations (Clifton Court Forebay and Tracy Pumping Plant).

Step 2 – Specific Significance Criteria

Step 2 Specific Criterion – Review of results meeting the screening criteria showed distinct periodic or seasonal trends or continuous increases throughout a substantial portion of the simulation period

As shown in Table 4.4.7.3.2-1, there are no discernable trends in salinity increases. There are a greater number of months with changes that exceed the screening criteria under this alternative. There is an overall seasonal trend of the observed changes in that all changes occur between the months of September through December. However, increases are scattered throughout those months, and do not occur throughout a substantial portion of the simulation period (2.5% of the months). This clear lack of distinct pattern exists for changes greater than 5 mg/L and 5% (Table 4.4.7.3.2-1) and those changes when the No Action condition is near the standard (Table 4.4.7.3.2-2).

Step 2 Specific Criterion – The frequency of salinity increases of the period of record was substantially greater than the frequency of salinity decreases (e.g., salinity levels predicted to increase 70% of the time and decrease 30% of the time)

Summary counts of the observed changes shown in Figure 1 indicate that the frequency of salinity increases was greater than the frequency of salinity decreases. However, the total frequency of increases that exceeded the 5 mg/l and 5% threshold was small at all locations (i.e., 22 months out of a total 896 months). If all months in the modeling period are taken into account, there is no substantial difference in the frequency of increases as compared to decreases.

Step 2 Specific Criterion – The frequency, magnitude, and duration of salinity increases were consistent during certain water-year types or Delta conditions (e.g., consistent increases during critical dry years)

As shown in Figure 4.4.7.3.2-1, for changes that are larger than normal model error, there is a discernible pattern of the increases or decreases by year type or Delta conditions. The increases and decreases occur primarily in wet years. For example, at Rock Slough three increases occur in dry years, while 19 increases occur in above normal and wet years. For changes that occur when background conditions are within 95% of the standards (Figure 4.4.7.3.2-2), there are slightly more months with increased salinity but the average of the increase of the increases is only 1.5 mg/l, while the average of the decreases is 3.1 mg/l.

Step 2 Specific Criterion – Trends in salinity increases are consistent at several Delta stations or over well-defined geographic areas

Although for this alternative only Rock Slough was considered, it is reasonable to assume that the pattern of changes would be similar to the pattern described above for Alternatives 2-5.

Step 2 Specific Criterion – Salinity changes have the potential to affect beneficial uses or CCWD operations

As described in the Chapter 4 of the FRWP EIR/EIS, salinity changes do not have the potential to affect beneficial uses of the Delta. Most notably, there are no project-related changes in the periods of compliance with the 150 mg/L standard. All observed chloride increases are with 95% of the 250 mg/l objective and all are well within the limits of model error (<5%). In addition, the

pattern of increases and decreases for all screening criteria values are fairly equally distributed with respect to magnitude, with the magnitude of decreases being slightly higher than increases. A number of the increases identified under this alternative occurred when Delta salinity was low. These increases may have the potential to affect CCWD's operation in terms of filling Los Vaqueros Reservoir. While effects on CCWD operations are considered in the FRWP analysis, this specific criteria was more appropriately considered as part of CCWD's Los Vaqueros Reservoir Project EIR/EIS. CCWD is not considered differently than other users in the FRWP EIR/EIS analysis.

**Table 4.4.7.3.1-1. Rock Slough Chloride (No Action/Change) for Alternatives 2-5
Fisher Delta Model: Changes >5% of No Action and > 5mg/L**

Water Year	Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	AN												
1923	BN												
1924	C												
1925	D												
1926	D												
1927	W												
1928	AN												
1929	C												
1930	D												200 / 13
1931	C												182 / 16
1932	D												
1933	C												
1934	C												
1935	BN												
1936	BN												
1937	BN												
1938	W												
1939	D												
1940	AN												
1941	W												
1942	W		87 / 5										
1943	W												
1944	D												
1945	BN												
1946	BN												
1947	D												
1948	BN												
1949	D												
1950	BN												
1951	AN												
1952	W												
1953	W												
1954	AN		110 / 6	129 / 11									
1955	D												
1956	C												
1957	AN												
1958	W												
1959	BN												
1960	D												
1961	D												
1962	BN												
1963	W												
1964	D												
1965	W												
1966	BN												
1967	W												
1968	BN												
1969	W												
1970	W												
1971	W												
1972	BN												
1973	AN												
1974	W	194 / 16											
1975	W												
1976	C												
1977	C												
1978	AN												
1979	BN												
1980	AN												
1981	D												
1982	W												
1983	W												
1984	W												
1985	D												
1986	W												
1987	D												
1988	C												
1989	D												
1990	C												
1991	C												154 / 16

**Table 4.4.7.3.1-2. Clifton Court Forebay Chloride (No Action/Change) for
 Alternatives 2-5
 Fisher Delta Model: Changes >5% of No Action and > 5mg/L**

Water Year	Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	AN												
1923	BN												
1924	C												
1925	D												
1926	D												
1927	W												
1928	AN												
1929	C						80 / 8						130 / 7
1930	D	188 / 11											178 / 11
1931	C												
1932	D												
1933	C												
1934	C												
1935	BN										79 / 8		
1936	BN												
1937	BN												
1938	W												
1939	D												
1940	AN												
1941	W												
1942	W												
1943	W												
1944	D												
1945	BN												
1946	BN												
1947	D												
1948	BN												
1949	D												
1950	BN												
1951	AN												
1952	W												
1953	W												
1954	AN			86 / 7									
1955	D												
1956	C												
1957	AN												
1958	W												
1959	BN												
1960	D												
1961	D												
1962	BN												
1963	W												
1964	D												
1965	W												
1966	BN												
1967	W												
1968	BN												
1969	W												
1970	W												
1971	W												
1972	BN												
1973	AN												
1974	W	130 / 9											
1975	W												
1976	C												
1977	C												
1978	AN												
1979	BN												
1980	AN												
1981	D												
1982	W												
1983	W												
1984	W												
1985	D												
1986	W												
1987	D												
1988	C												
1989	D												
1990	C												
1991	C			128 / 8									

**Table 4.4.7.3.1-3. Tracy Pumping Plant Chloride (No Action/Change) for
Alternatives 2-5
Fisher Delta Model: Changes >5% of No Action and > 5mg/L**

Water Year	Year	Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	1922	AN												
1923	1923	BN												
1924	1924	C												
1925	1925	D												
1926	1926	D												
1927	1927	W												
1928	1928	AN												
1929	1929	C												
1930	1930	D												
1931	1931	C												
1932	1932	D												
1933	1933	C												
1934	1934	C												
1935	1935	BN												
1936	1936	BN												
1937	1937	BN												
1938	1938	W												
1939	1939	D												
1940	1940	AN												
1941	1941	W												
1942	1942	W												
1943	1943	W												
1944	1944	D												
1945	1945	BN												
1946	1946	BN												
1947	1947	D												
1948	1948	BN												
1949	1949	D												
1950	1950	BN												
1951	1951	AN												
1952	1952	W												
1953	1953	W												
1954	1954	AN												
1955	1955	D												
1956	1956	C												
1957	1957	AN												
1958	1958	W												
1959	1959	BN												
1960	1960	D												
1961	1961	D												
1962	1962	BN												
1963	1963	W												
1964	1964	D												
1965	1965	W												
1966	1966	BN												
1967	1967	W												
1968	1968	BN												
1969	1969	W												
1970	1970	W												
1971	1971	W												
1972	1972	BN												
1973	1973	AN												
1974	1974	W												
1975	1975	W												
1976	1976	C												
1977	1977	C												
1978	1978	AN												
1979	1979	BN												
1980	1980	AN												
1981	1981	D												
1982	1982	W												
1983	1983	W												
1984	1984	W												
1985	1985	D												
1986	1986	W		130 / 0										
1987	1987	D							135 / .12					
1988	1988	C												
1989	1989	D												
1990	1990	C												
1991	1991	C												

**Table 4.4.7.3.1-4. Rock Slough Chloride (No Action/Change) for Alternatives 2-5
Fisher Delta Model: Changes when No Action is >95% of Standards**

Water Year	Year	Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
	1922	AN												
	1923	BN												
	1924	C												263 / 3
	1925	D	265 / -2	243 / -7										
	1926	D												
	1927	W	240 / -1											
	1928	AN												
	1929	C												
	1930	D	291 / 12	287 / -1										
	1931	C	243 / 3											270 / 1
	1932	D	312 / 1											
	1933	C	246 / 1											
	1934	C	292 / -1	296 / -5										241 / 5
	1935	BN	296 / 2											
	1936	BN												
	1937	BN												
	1938	W	243 / 0											
	1939	D												
	1940	AN												
	1941	W												
	1942	W												
	1943	W												
	1944	D												258 / 0
	1945	BN												
	1946	BN												
	1947	D												
	1948	BN												
	1949	D												
	1950	BN												
	1951	AN												
	1952	W												
	1953	W												
	1954	AN												
	1955	D												
	1956	C												
	1957	AN												
	1958	W												
	1959	BN												
	1960	D												
	1961	D												
	1962	BN												
	1963	W												
	1964	D												
	1965	W												
	1966	BN												
	1967	W												
	1968	BN												
	1969	W												
	1970	W												
	1971	W												
	1972	BN												
	1973	AN												
	1974	W												
	1975	W												
	1976	C												276 / 1
	1977	C	296 / 2	239 / -9										266 / -5
	1978	AN	311 / -1	242 / 1										
	1979	BN												
	1980	AN												
	1981	D												
	1982	W												
	1983	W												
	1984	W												
	1985	D												
	1986	W												
	1987	D												265 / 2
	1988	C												
	1989	D	296 / 4											
	1990	C												251 / 1
	1991	C	287 / 0		241 / -9									

**Table 4.4.7.3.2-1. Rock Slough Chloride (No Action/Change) for Alternative 6
Fisher Delta Model: Changes >5% of No Action and > 5mg/L**

Water Year	Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	AN												
1923	BN												
1924	C												
1925	D												
1926	D												
1927	W												
1928	AN												
1929	C												
1930	D												
1931	C												
1932	D												
1933	C												
1934	C												
1935	BN												
1936	BN												
1937	BN												
1938	W												
1939	D												
1940	AN												
1941	W												
1942	W	84 / 15	87 / 23	88 / 8									85 / 6
1943	W	83 / 7	41 / 12	29 / 11									90 / 8
1944	D												
1945	BN												
1946	BN												
1947	D												
1948	BN												
1949	D												
1950	BN												
1951	AN												
1952	W												
1953	W												
1954	AN												
1955	D												
1956	C												
1957	AN												
1958	W												
1959	BN												
1960	D												
1961	D												
1962	BN												
1963	W												
1964	D												
1965	W												
1966	BN												
1967	W												
1968	BN												
1969	W												
1970	W												
1971	W												
1972	BN												
1973	AN												
1974	W	194 / 22	58 / 6										
1975	W												
1976	C												
1977	C												
1978	AN												
1979	BN												
1980	AN												
1981	D												
1982	W												
1983	W												
1984	W												
1985	D												
1986	W												
1987	D	129 / 11											
1988	C												
1989	D												
1990	C												
1991	C												

**Table 4.4.7.3.2-2. Rock Slough Chloride (No Action/Change) for Alternative 6
Fisher Delta Model: Changes when No Action is >95% of Standards**

Water Year	Year Type	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1922	AN												
1923	BN												
1924	C												
1925	D	295 / -4	243 / -9										263 / 1
1926	D												
1927	W	240 / -2											
1928	AN												
1929	C												
1930	D	291 / 1	287 / -1										
1931	C	243 / 1											270 / 2
1932	D	312 / 1											
1933	C	246 / 1											
1934	C	292 / 1	296 / 1										281 / 4
1935	BN	296 / 0											
1936	BN												
1937	BN												
1938	W	243 / 2											
1939	D												
1940	AN												
1941	W												
1942	W												
1943	W												
1944	D												299 / 0
1945	BN												
1946	BN												
1947	D												
1948	BN												
1949	D												
1950	BN												
1951	AN												
1952	W												
1953	W												
1954	AN												
1955	D												
1956	C												
1957	AN												
1958	W												
1959	BN												
1960	D												
1961	D												
1962	BN												
1963	W												
1964	D												
1965	W												
1966	BN												
1967	W												
1968	BN												
1969	W												
1970	W												
1971	W												
1972	BN												
1973	AN												
1974	W												
1975	W												
1976	C												276 / 4
1977	C	286 / -4	239 / -7										266 / 1
1978	AN	311 / 1	242 / 1										
1979	BN												
1980	AN												
1981	D												
1982	W												
1983	W												
1984	W												
1985	D												
1986	W												
1987	D												265 / 3
1988	C												
1989	D	286 / 2											
1990	C												261 / -3
1991	C	287 / 0		241 / -1									