

4.5 SUMMARY AND CONCLUSIONS

Sections 4.1 through 4.4 above provide a detailed discussion on the potential salinity changes in the Delta under Freeport Regional Water Project alternatives and their possible effects on beneficial uses. Historical hydrology is used to represent the variety of conditions that the alternatives could be operating under. The results serve as an indicator of the performance of the alternatives if they are to be implemented. Each alternative has been analyzed using two sets of comparison, one at the 2001 level of development (LoD), or existing conditions, and at 2020 LoD, or future (cumulative) conditions.

Results from a number of salinity models of different complexity are analyzed to estimate the range of potential changes. Model results are generally consistent, providing similar qualitative comparisons between alternatives. Potential changes estimated by the two numerical models FDM and DSM2 differ in magnitude by within a factor of three in most cases. In addition to differences in formulations and assumptions between the two models, differences between model results are also due to the conversion between salinity parameters (electrical conductivity and chloride concentration).

The amount of water proposed for diversion in the Project alternatives is small compared to the magnitude of flows and export demands on Delta water. Simulated changes in Delta salinity are small (of the order of 1% difference from the “No Action” case) in the long-term averages and are commensurate with the magnitude of the Project diversion relative to that of the system. However, there are months in which the potential changes are larger. In many cases, these larger differences are direct consequences of changes in the timing of Delta inflows and exports within a period of two to five months. The assumptions and approximations in CALSIM II that might lead to these timing changes are discussed in Sections 3.4.9 and §3.5.9. Even though these changes in hydrology make little or no differences in the overall water supply (in terms of upstream reservoir releases and Delta exports), they could lead to changes in Delta salinity. These changes are discussed in §4.4.1 and §4.4.4 on potential salinity changes at Martinez and in Rock Slough, respectively. In the comparison between Rock Slough salinity under Alts.2-5 and Alt.1 at 2001 LoD, the largest increases are less than 10% of the Alt.1 salinity based on FDM results.

A detailed discussion on potential Project effects on drinking water beneficial uses of Delta water is provided in §4.4.4 because of their sensitivity to salinity changes. Specifically, potential changes in the levels of disinfection by-products in treated Delta water and volume-weighted salinity in State Water Project exports and Contra Costa Water District diversions are quantified. Salinity in Rock Slough, the Delta intake subjected to the largest potential changes, is used in estimating disinfection by-products formation. Potential increases in bromate concentration under all Project alternatives would be a fraction of measurement resolution in all 277 quarterly reports of running annual averages. Potential increases in total trihalomethanes concentration under all Project alternatives average much less than 1 µg/L. Actual Project effects on Delta agencies would be even smaller – agencies using water exported from Clifton Court would be subjected to smaller salinity changes, and the source water salinity at Contra Costa Water District’s water treatment plants would be subjected to smaller variations in salinity than in Rock Slough because of blending releases from the Los Vaqueros Reservoir.¹ Long-term changes in

¹ Operations of the Contra Costa Water District are discussed in Sections 4.1.2.1.3, 4.3.4, and 4.4.4.3. Section 4.4 (see in particular Tables 4.4.5-16 through 4.4.5-18 and Tables 4.4.6-16 through 4.4.6-18) shows

the (volume-)weighted salinity of export water at Banks Pumping Plant under all Freeport alternatives are less than 1%, and the increase under Alts.2-5 is about half that under Alt.6. Weighted salinity at Contra Costa Water District's water intakes also increases by a small percentage.

The analysis performed above is designed according to the specific nature of Freeport Project alternatives² and is the most detailed practicable at this time. As discussed in Sections 4.2.8 and 4.2.9, more complex analyses, for example by analyzing daily variations or using multi-dimensional models, would not provide additional insights or be appropriate. Quantitative estimates of all potential changes discussed in §4.4 are small, typically 1% or less in long-term averages. Significance criteria used in recent Environmental Impact Statements or Environmental Impact Reports help put the magnitude of these changes into perspective. CALFED estimates modeling uncertainty at 10% and identify all impacts below this magnitude as less-than-significant (CALFED, 2000, Section 5.3.5). For other projects of comparable size, Contra Costa Water District's Los Vaqueros Project (CCWD, 1993) focuses on monthly changes and assumes all impacts under 5% or less than 5 mg/L in chloride concentration (or 20 µS/cm) as clearly small and removes from further consideration, unless base salinity is within 95% of applicable standards, and determine a significant impact only if these larger impacts are frequent, seasonal, or consistent. Metropolitan Water District of Southern California's Eastside Reservoir Project (MWDSC, 1991) and Department of Water Resources' Kern Water Bank Project (DWR, 1990) did not quantify potential impacts on Delta water quality

that many of the larger salinity increases occur when Delta salinity is high (e.g. September 1929, September 1930 in Table 4.4.5-17) when CCWD's diversion from Rock Slough is relatively low. The potential effects on the level of disinfection products would be smaller than simulated.

² Freeport Project alternatives would affect Delta salinity only through changes in Delta inflows and exports, and consequently the Delta outflow, and their operations would vary at a relatively long (monthly) time scale. These considerations determine the modeling tools and assumptions used and are discussed in Sections 4.1.3, 4.2.7 through 4.2.9, and 4.3.1 through 4.3.3.

4.6 REFERENCES

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