Chapter 8
Water Quality

8.0 Readers' Guide

8.0.5 Organization of the Effects and Mitigation Approaches Discussion (Section 8.3.3)

The Effects and Mitigation Approaches section (Section 8.3.3) contains the analysis of the impacts and mitigation on water quality constituents for each alternative. The section begins with an analysis of the No Action Alternative and is then followed by the action alternatives. A discussion of cumulative effects is included as a standalone section (Section 8.3.4) after Alternative 9.

Each alternative begins with a brief description of the alternative itself, including the capacity of the North Delta intake structures, the operational scenario, and any other major aspects of the alternative. Following this is the "Effects of the Alternative on Hydrodynamics" section, which includes a brief discussion of how water quality constituents would be expected to change in general due to changes in Delta hydrodynamics, the general changes in hydrodynamics due to the alternative, and the types of water quality changes seen in the alternative.

To the extent there are similarities between the No Action Alternative or Alternative 1A and the other alternatives, the subsequent alternative analyses refer back to either the No Action Alternative or the Alternative 1A analysis. This approach allows the analysis of Alternative 1A and Alternatives 1B through Alternative 9 to minimize redundancy and emphasize those aspects of the alternatives that are different from the No Action Alternative or Alternative 1A. Hence, readers wishing to gain a better understanding of the impacts and mitigation for Alternatives 1B through 9 should first become familiar with the presentation of impacts and mitigation for the No Action Alternative and Alternative 1A. Alternatives ending in 'B' or 'C' are different from the corresponding 'A' variant of the alternatives. The difference is the physical type and/or location of water conveyance infrastructure. In all other respects, including water operations, the 'B' and 'C' variants are identical to the corresponding 'A' variant. For example Alternative 1B is different from Alternative 1A in that Alternative 1A would convey water from the north Delta to the south Delta through pipelines/tunnels, while Alternative 1B would convey water through a surface canal. The effects on water quality do not differ otherwise, so the analysis of the 'B' and 'C' alternatives is condensed and refers the reader back to the corresponding 'A' alternative for specific details.

Restoration and Other Conservation Measures are the same among all but two of the alternatives. The exceptions are Alternatives 5 and 7. Under Alternative 5, 25,000 acres of tidal habitat would be restored, compared to 65,000 acres for Alternative 1A. Under Alternative 7, there would be 20,000 acres of seasonally inundated floodplain and 40 miles of channel enhancement, versus 10,000 acres of seasonally inundated floodplain and 20 miles of channel margin enhancement under Alternative 1A. However, these differences do not substantially affect water quality impact conclusions discussed in this chapter, and thus for Alternatives 1B through 9, the reader is referred back to Alternative 1A for details. To help guide the reader, bookmark their location in the chapter, and maintain consistency with Alternative 1A, the impact headers are retained in these other water). High nutrient content can support aquatic plant and algae growth, which in turn generates oxygen through photosynthesis and consumes oxygen through respiration and decomposition.

Effects of the alternatives on temperature in the Delta relative to the No Action alternative were not considered in the DO assessment. This is because, as stated in the USFWS (2008b:194) OCAP BiOp:

> The [state and federal] water projects have little if any ability to affect water temperatures in the Estuary (Kimmerer 2004). Estuarine and Delta water temperatures are driven by air temperature. Water temperatures at Freeport can be cooled up to about 3°C by high Sacramento River flows, but only by very high river flows that cannot be sustained by the projects. Note also that the cooling effect of the Sacramento River is not visible in data from the west Delta at Antioch (Kimmerer 2004) so the area of influence is limited.

Since Delta water temperatures are driven by air temperature, climate change (as included in the No Action Alternative and all action alternatives) that increases air temperatures relative to existing conditions would be expected to increase water temperatures in the Delta as well. Effects of climate change on air and Delta water temperatures are discussed in Appendix 29C.In general, waters of the Delta would be expected to warm less than 5 degrees F, which translates into a < 0.5 mg/L decrease in DO.

The dissolved oxygen assessments were conducted in a qualitative manner based on anticipated changes in these factors.

Additionally, concerns have been raised that the project may increase flows on the San Joaquin River at Stockton, causing the location of the minimum DO point to shift downstream (see Section 8.1.3.6, *Dissolved Oxygen*, for a discussion of the existing DO impairment in the Stockton Deep Water Ship Channel). To assess this possibility, flows in San Joaquin River at Stockton were evaluated.

Electrical Conductivity

EC and TDS values tend to be highly correlated, because the majority of chemicals that contribute to TDS are charged particles that impart conductance of water. Because EC measurement is easily conducted with a portable meter, as compared to the requirement for physical sample collection and laboratory gravimetric analysis for TDS, the majority of water quality regulatory criteria/objectives are established for EC. Moreover, where regulatory objectives for TDS exist, they co-occur with the equivalent EC value (i.e., there are no independent TDS-only regulatory criteria/objectives or guidance values). EC also is the parameter modeled to represent salinity in DSM2. Therefore, this impact assessment for "salinity" as indicated by EC and TDS is based on EC values only and TDS is not addressed separately.

Applicable EC objectives for the affected environment utilized in this assessment are summarized in Table 8-46.

The assessment of effects on EC in the reservoirs and rivers upstream of the Delta was qualitative, and evaluates changes in EC based on anticipated changes in EC-contributing sources in the watersheds under the various BDCP alternatives assessed.

The assessment of hydrodynamic effects of the BDCP alternatives' CM1, CM2, and CM4 on EC in the Plan Area relied on DSM2 output. Because implementation CM4 would restore substantial areas of tidal habitat that would increase the magnitude of daily tidal water exchange at the restoration areas, and could alter other hydrodynamic conditions in adjacent Delta channels, the DSM2 modeling included assumptions regarding possible locations of tidal habitat restoration areas, and