- 1 requirement. The NEPA analysis isolates the effect of the alternative from the effects of sea level rise,
- climate change, future water demands, and implementation of required actions such as the Fall X2
 requirement.
- 4 When compared to NAA_ELT and informed by the NEPA analysis, the average delta smelt abiotic
- 5 habitat index under Alternative 4A restoration would be similar to NAA_ELT with Fall X2 under
- 6 Scenarios H3_ELT and H4_ELT. Overall, there would be a beneficial impact on the species compared
- 7 to existing conditions without Fall X2. Therefore, since Alternative 4A would benefit rearing delta
- 8 smelt because the abiotic habitat index would be greater than Existing Conditions, the impact would
- 9 be less than significant. No mitigation would be required.

Table 11-4A-3. Differences in Delta Smelt Fall Abiotic Index between Alternative 4A (Scenarios H3_ELT and H4_ELT) and Existing Biological Conditions Scenarios, Averaged by Prior Water Year Type

	EXISTING CONDITIONS vs. Alternative 4A		NAA_ELT vs. Alternative 4A	
Water Years	H3_ELT	H4_ELT	H3_ELT	H4_ELT
All	1,150 (29%)	1,184 (30%)	99 (2%)	132 (3%)
Wet	2,478 (53%)	2,485 (53%)	38 (1%)	46 (1%)
Above Normal	2,013 (53%)	2,032 (53%)	68 (1%)	88 (2%)
Below Normal	271 (7%)	354 (9%)	232 (6%)	316 (8%)
Dry	150 (4%)	212 (6%)	161 (5%)	222 (6%)
Critical	9 (0%)	11 (0%)	9 (0%)	11 (0%)

Note: Negative values indicate lower habitat indices under alternative scenarios. Water year 1922 was omitted because water year classification for prior year was not available.

13

14 Impact AQUA-6: Effects of Water Operations on Migration Conditions for Delta Smelt

As described for Alternative 4, the initiation of delta smelt upstream migration is associated with pulses of freshwater inflow, which are turbid, cool, and less saline (Grimaldo et al. 2009). Changes in flow under Alternative 4A could change turbidity, but are not expected to result in changes in water temperatures or pulses of local rainwater into the Delta. As described above in Impact AQUA-4 and in the discussion of Alternative 4, in-Delta water temperatures would not change in response to Alternative 4A flows. The modeling results indicate no biologically meaningful changes in water temperature within the Delta under Alternative 4, and this would also be the case for Alternative 4A.

22 As described in more detail for Alternative 4, turbid water is an important habitat characteristic for delta smelt (Nobriga 2008; Feyrer et al. 2011). Operation of the north Delta intakes (water 23 conveyance facilities) is estimated to result in around 11%² of sediment being removed from the 24 Sacramento River, the main source of sediment for the Delta and downstream subregions. In 25 addition, sediment could be accreted (captured) in restored areas (Environmental Commitment 4 26 27 *Tidal Natural Communities Restoration*); see Impact AQUA-220. These actions could limit sediment 28 supply to areas currently important to delta smelt, such as Suisun Bay, which would result in less 29 seasonal deposition of sediment that could be resuspended by wind-wave action to make/keep the 30 overlying water column turbid. Therefore, there is a potential for a slight increase in water clarity,

² This estimate is from the working draft Biological Assessment for the California WaterFix.

- 1 and a corresponding reduction in habitat quality for delta smelt. However, Alternative 4A is not
- 2 expected to affect suspended sediment concentration during the first flush of precipitation that cues
- delta smelt migration. As such, turbidity cues associated with adult delta smelt migration should not
- 4 change. With regard to suspended sediment concentrations at other times of the year, any effect will
- 5 be minimized through the reintroduction of sediment collected at the north Delta intakes, consistent
- 6 with the environmental commitment addressing Disposal and Reuse of Spoils, Reusable Tunnel
- 7 Material (RTM), and Dredged Material.

NEPA Effects: Alternative 4A is estimated to remove 11% of the suspended sediment in the
 Sacramento River at the north Delta intakes, with the potential for decreased habitat suitability for
 delta smelt in some locations, but this effect would be minimized by reintroduction of sediment;
 there would not be an adverse effect during the migration period and water temperature would not
 be affected by Alternative 4A water operations. These minor potential changes in turbidity are not
 likely affect migration cues and therefore the impact on migration conditions for delta smelt would
 not be adverse relative to NAA_ELT.

CEQA Conclusion: As described above, operations for all flow operating scenarios under Alternative
 4A would not substantially alter the turbidity cues associated with winter flush events that may
 initiate migration, nor would there be appreciable changes in water temperatures. Consequently, the
 impact on adult delta smelt migration conditions would be less than significant, and no mitigation is
 required.

Restoration Measures (Environmental Commitment 4, Environmental Commitment 6, Environmental Commitment 7, and Environmental Commitment 10)

- 22 Alternative 4A includes a greatly reduced extent of restoration measures relative to Alternative 4 23 and Alternative 1A, upon which the discussion of impacts for Alternative 4 is based. In particular, 24 Environmental Commitment 4 Tidal Natural Communities Restoration is reduced from 65,000 acres 25 to 295 acres, so that any impacts would be extremely small. The mechanisms of impacts of tidal 26 habitat restoration on delta smelt are anticipated to be similar under Alternative 4A compared to 27 those described in detail for Alternative 1A, although would be considerably reduced in magnitude 28 in proportion to the difference in restoration. The effects of restoration measures described for delta 29 smelt under Alternative 1A (Impacts AQUA-7 through AQUA-9) appropriately disclose the nature of
- 30 the anticipated effects of habitat restoration in Alternative 4A.
- 31 The following impacts are those presented under Alternative 4 and Alternative 1A that are
- anticipated to be similar in nature for Alternative 4A, but would occur to a lesser extent because of
 the reduced extent of the restoration measures under Alternative 4A.

34 Impact AQUA-7: Effects of Construction of Restoration Measures on Delta Smelt

35 The effects of construction of restoration measures on delta smelt under Alternative 4A are similar 36 in nature to those discussed in more detail under Alternative 1A: temporary increases in turbidity; 37 increased exposure to mercury and methylmercury; accidental spills; disturbance of contaminated 38 sediments; in-water work activities; and predation. In-water and shoreline restoration construction 39 activities may result in short-term effects on delta smelt through direct disturbance, short-term 40 water quality impacts, and increased exposure to contaminants associated with the incidental 41 disturbance of contaminated sediments. Overall and as noted for Alternative 1A, the effect of restoration construction activities on the bioavailability of contaminants is expected to be minimal, 42 as they would likely be localized, sporadic, and of low magnitude. Implementation of the 43