

Chapter 11

Fish and Aquatic Resources

11.1 Summary Comparison of Proposed Project

A summary comparison of quantifiable impacts on fish and aquatic resources is provided in Figure 11-0. This figure provides information on the impact of loss of aquatic habitat that is expected to result from the proposed project compared with the approved project. This loss of habitat under the proposed project would be offset with restoration.

Figure 11-0. Comparison of Impacts on Fish and Aquatic Resources

Chapter 11 - Fish and Aquatic Resources	Approved Project ^a	Proposed Project (Total)	Proposed Project (Increment)
Impacts AQUA-1, AQUA-19, AQUA-37, AQUA-55, AQUA-73, AQUA-91, AQUA-109, AQUA-127, AQUA-145, AQUA-163, AQUA-181, and AQUA-199: Effects of Construction of Water Conveyance Facilities on Delta Smelt, Longfin Smelt, Chinook Salmon (Winter-Run ESU), Chinook Salmon (Spring-Run ESU), Chinook Salmon (Fall-/Late Fall-Run ESU), Steelhead, Sacramento Splittail, Green Sturgeon, White Sturgeon, Pacific Lamprey, River Lamprey, and Non-Covered Aquatic Species of Primary Management Concern	Tidal perennial habitat ^b : 52.0 acres; Channel margin habitat ^c : 1.02 miles; Shallow water habitat ^d : 500.6 acres.	Tidal perennial habitat ^b : 46.1 acres; Channel margin habitat ^c : 1.02 miles; Shallow water habitat ^d : 500.6 acres.	Tidal perennial habitat ^b : -5.9 acres; Channel margin habitat ^c : 0 miles; Shallow water habitat ^d : 0 acres.
	Less than significant/ not adverse	Less than significant/ not adverse	

^a Based on impacts described in Table 3.4.1 in Chapter 3 of the updated California WaterFix Biological Assessment.
^b Comprises 26.7 acres at north Delta diversions; 2.9 acres at Head of Old River; and either 22.4 acres under approved project or 16.5 acres under proposed project for barge landings.
^c All at the north Delta diversions.
^d From the downstream end of Intake 5 to the upstream observed limit of delta smelt occurrence (Knights Landing).

As depicted in Figure 11-0, the proposed project would not result in new significant impacts or a substantial increase in the severity of previously identified significant fish and aquatic resource impacts. This chapter contains the information necessary to make the Final EIR/EIS¹ adequate for the approved project as revised.

¹ The July 2017 document titled *Developments after Publication of the Proposed Final Environmental Impact Report* included modifications and additions to the proposed Final EIR/EIS. In this chapter, references to “the Final EIR/EIS” should be understood to include changes made to the December 2016 document as set forth in the July 2017 document.

1 11.2 Environmental Setting/Affected Environment

2 For the purposes of NEPA and CEQA effects analysis, the Existing Conditions of fish and aquatic
3 resources that would be affected by construction and operation of the proposed project is the same
4 as described in the December 2016 Final EIR/EIS Chapter 11, *Fish and Aquatic Resources*, Section
5 11.1, *Environmental Setting and Affected Environment*. The Final EIR/EIS provides a discussion of
6 areas of potential environmental effects, natural communities, species evaluated, ecological
7 processes and functions, and stressors found within the project area. The modifications to the
8 approved project would be located entirely within the previously analyzed project area; therefore,
9 the Existing Conditions have not changed.

10 11.3 Environmental Consequences

11 This section describes the potential effects of the modifications to the approved project on fish and
12 aquatic resources. The focus of this assessment is on determining the incremental effect that is
13 attributable to these modifications. With the exception of focusing on the incremental effects, the
14 methods of analysis and determination of effects is the same as indicated in the Final EIR/EIS.

15 Effects are evaluated for severity and, where appropriate, mitigation measures are identified. Where
16 mitigation measures identified in the Final EIR/EIS remain sufficient, such sufficiency is noted.

17 11.3.1 Methods for Analysis

18 The analysis of impacts of fish and aquatic resources used the same quantitative and qualitative
19 models as used in the Final EIR/EIS Chapter 11, *Fish and Aquatic Resources*, Section 11.3.2, *Methods*
20 *for Analysis*. Because the differences between the approved project and the proposed project
21 amount solely to construction impacts, the effects discussed in this chapter are limited to
22 construction impacts. For this reason, this chapter addresses only a relatively small subset of the
23 much larger universe of impacts related to fish and other aquatic resources addressed in the Final
24 EIR/EIS. Because the nonconstruction-related aquatic resource impacts of the proposed project
25 (e.g., operational impacts) would be identical to those of the approved project, this chapter does not
26 address those nonconstruction-related aquatic resource impacts. Similarly, because the
27 Environmental Commitments for the proposed project are approximately the same as those
28 described for the approved project and impacts would be similar, no additional discussion is
29 provided for effects on fish and aquatic resources resulting from Environmental Commitments.
30 Please refer to the Final EIR/EIS for these impact discussions.

31 11.3.2 Determination of Effects

32 The impacts of the proposed project on fish and aquatic biological resources may result from
33 construction, maintenance, and operation of water conveyance facilities, as well as construction and
34 implementation of other conservation measures. This impact analysis assumes that the proposed
35 project would have an adverse or significant impact on fish and aquatic resources if it would directly
36 or indirectly harm or harass individuals or populations of the species considered in this chapter, or
37 would substantially remove or damage the habitat of these species. The methods used are as
38 described in Final EIR/EIS Chapter 11, Section 11.3.3, *Determination of Effects*. From the perspective
39 of fish and aquatic resources, the proposed project differs from the approved project only in terms

1 of construction effects, as described further below; therefore, the methods used herein pertain to
2 construction effects.

3 **11.3.3 Effects and Mitigation Approaches**

4 **11.3.3.1 No Action Alternative**

5 Under the No Action Alternative, the new Byron Tract Forebay, reusable tunnel material storage,
6 and other footprint changes described for the proposed project would not occur. For the purposes of
7 this Supplemental EIR/EIS, the No Action Alternative, against which this proposed project is
8 compared, is consistent with the No Action Alternative Early Long-Term in the Final EIR/EIS. No
9 differing effects on fish and aquatic resources would result along the proposed project alignment
10 from what was previously described for the No Action Alternative Early Long-Term in the Final
11 EIR/EIS if the No Action Alternative were to occur.

12 **11.3.3.2 Proposed Project**

13 For fish and aquatic resources, the changes to the proposed project in relation to the approved
14 project consist of less construction, as described more specifically in the next section, *Construction of*
15 *Water Conveyance Facilities*. Only the construction impacts that differ under the proposed project
16 compared with the approved project are addressed. As noted above, impacts in this chapter are not
17 addressed if they would be the same as those of the approved project presented in the Final EIR/EIS.

18 **Construction of Water Conveyance Facilities**

19 For fish and aquatic resources, the only relevant changes for the proposed project compared with
20 the approved project are related to in-water construction (i.e., there will no longer be modifications
21 to Clifton Court Forebay; barge landings at Snodgrass Slough, Intake 2,² and Old River at Clifton
22 Court Forebay are no longer proposed; and the Potato Slough barge landing is slightly relocated and
23 reduced in size). The changes to barge landings would result in a total of 16.5 acres of impact on
24 tidal perennial habitat from barge landings (down from 22.4 acres under the approved project). The
25 reduction in in-water construction would result in incrementally less impact on fish and aquatic
26 resources under the proposed project compared with the approved project because less in-water
27 pile driving would be needed (Table 11-1) and the Snodgrass Slough, Intake 2, and Old River at
28 Clifton Court Forebay barge landings would not be constructed (Table 11-2). Other in-water
29 construction and maintenance and associated effects would remain the same as described in the
30 Final EIR/EIS for the approved project. Implementation of construction- and maintenance-related
31 environmental commitments, avoidance and minimization measures, and conservation measures as
32 described in Appendix 3B, *Environmental Commitments, AMMs and CMs*, together with Mitigation
33 Measures AQUA-1a and AQUA-1b, would avoid, minimize, and mitigate the effects.

² This barge landing was included in the National Marine Fisheries Service's California WaterFix Biological Opinion (p.141), but had not been previously included in impact acreage calculations for the Final EIR/EIS and Biological Assessment.

1 **Table 11-1. Extent, Timing, and Duration of Pile Driving Noise Levels at Clifton Court Forebay under**
 2 **the Proposed Project Compared with the Approved Project (Shown in Parentheses)**

Clifton Court Forebay						
Facility	Distance to 206-dB SPL Injury Threshold (feet)	Distance to Cumulative 187-dB SEL Injury Threshold ^{a, b} (feet)	Distance to 150-dB RMS Behavioral Threshold ^b (feet)	Number of Construction Seasons	Timing of Pile Driving	Duration of Pile Driving (days)
Embankment cofferdams	0 (30)	0 (2,814)	0 (13,058)	0 (1)	None (July–October)	0 (85)
Divider wall	0 (30)	0 (2,814)	0 (13,058)	0 (2)	None (July–October)	0 (86)
North outlet of Clifton Court Forebay siphon (no attenuation)	0 (46)	0 (1,774)	0 (9,607)	0 (2)	None (July–October)	0 (72)
North outlet of Clifton Court Forebay siphon (with attenuation)	0 (20)	0 (823)	0 (4,458)	0 (2)	None (July–October)	0 (72)

Source: National Marine Fisheries Service California WaterFix Biological Opinion, p.125.

dB = decibel.

RMS = root mean square.

SEL = sound exposure level.

SPL = sound pressure level.

^a Computed distances to injury thresholds are governed by the distance to “effective quiet” (150-dB SEL). Calculation assumes that single strike SELs <150-dB do not accumulate to cause injury. Accordingly, once the distance to the cumulative injury threshold exceeds the distance to effective quiet, increasing the number of strikes does not increase the presumed injury distance.

^b Distance to injury and behavioral thresholds assume an attenuation rate of 4.5-dB per doubling of distance and an unimpeded propagation path; on-land pile driving, vibratory driving or other non-impact driving methods, dewatering of cofferdams, and the presence of major river bends or other channel features can impede sound propagation and limit the extent of underwater sounds exceeding the injury and behavioral thresholds.

3

1 **Table 11-2. Extent, Timing, and Duration of Pile Driving Noise Levels Predicted to Exceed Fish Interim Injury and Behavioral Thresholds at the**
 2 **Barge Landing Sites Eliminated from the Proposed Project Compared with the Approved Project (Shown in Parentheses)**

Barge Landings Location	Distance to 206 dB Injury Threshold (feet)	Channel Width (feet)	Percent of Channel Width (206-dB Threshold)	Distance to Cumulative 187 dB SEL Injury Threshold ^{a, b} (feet)	Percent of Channel Width (187-dB Threshold)	Cumulative Distance (187-dB Threshold) (feet)	Distance to 150 dB Behavioral Threshold ^b (feet)	Number of Construction Seasons (Year 1 or 2)	Timing of Pile Driving	Duration of Pile Driving (days)
Intake 2 Location	0 (46)	700	0 (7)	0 (1,774)	0 (100)	0 (3,848)	0 (9,607)	0 (1)	None (July–August)	0 (2)
Snodgrass Slough	0 (46)	265	0 (17.3)	0 (1,774)	0 (100)	0 (3,848)	0 (9,607)	0 (1)	None (July–August)	0 (2)
Old River (Clifton Court Forebay)	0 (46)	285	0 (16)	0 (1,774)	0 (100)	0 (3,848)	0 (9,607)	0 (1)	None (July–August)	0 (2)

Source: Adapted from National Marine Fisheries Service California WaterFix Biological Opinion, p.141.

dB = decibel.

SEL = sound exposure level.

^a Computed distances to injury thresholds are governed by the distance to “effective quiet” (150 dB SEL). Calculation assumes that single strike SELs with a magnitude of <150 dB SEL do not accumulate to cause injury. Accordingly, once the distance to the cumulative injury threshold exceeds the distance to effective quiet, increasing the number of strikes does not increase the presumed injury distance since the sound has attenuated to less than 150 dB SEL.

^b Distance to injury and behavioral thresholds assume an attenuation rate of 4.5 dB per doubling of distance and an unimpeded propagation path; on-land pile driving, vibratory driving or other non-impact driving methods, dewatering of cofferdams, and the presence of major river bends or other channel features can impede sound propagation and limit the extent of underwater sounds exceeding the injury and behavioral thresholds.

3

1 **Impact AQUA-1: Effects of Construction of Water Conveyance Facilities on Delta Smelt**

2 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
3 effects of construction of the proposed project would not be adverse for delta smelt because adverse
4 effects would be effectively avoided and minimized by siting construction in areas that are
5 minimally used by this species, and through the use of in-water work windows, activity-specific
6 timing restrictions, and environmental commitments.

7 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-1, in the Final EIR/EIS, the impact
8 of the construction of the water conveyance facilities on delta smelt or critical habitat would not be
9 significant, except for construction noise associated with pile driving, because significant effects
10 would be effectively avoided and minimized by siting construction in areas that are minimally used
11 by this species, and through the use of in-water work windows, activity-specific timing restrictions,
12 and environmental commitments. Implementation of Mitigation Measures AQUA-1a and AQUA-1b
13 under the proposed project would reduce that noise impact to a less-than-significant level,
14 consistent with the conclusion for the approved project.

15 **Incremental Impact:** The level of impact under the proposed project would be incrementally
16 less than under the approved project because, under the proposed project, there would be no
17 modifications to Clifton Court Forebay; there would not be construction of barge landings at
18 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
19 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
20 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

21 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
22 **of Pile Driving and Other Construction-Related Underwater Noise**

23 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

24 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
25 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
26 **Underwater Noise**

27 Please refer to Mitigation Measure AQUA-1b under Impact AQUA 1 in the Final EIR/EIS.

28 **Impact AQUA-19: Effects of Construction of Water Conveyance Facilities on Longfin Smelt**

29 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
30 effects of construction of the proposed project would not be adverse for longfin smelt because
31 adverse effects would be effectively avoided and minimized by siting construction in areas that are
32 minimally used by this species, and through the use of in-water work windows, activity-specific
33 timing restrictions, and environmental commitments.

34 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-19, in the Final EIR/EIS, the impact
35 of the construction of water conveyance facilities on longfin smelt would not be significant, except
36 for construction noise associated with pile driving, because significant effects would be effectively
37 avoided and minimized by siting construction in areas that are minimally used by this species, and
38 through the use of in-water work windows, activity-specific timing restrictions, and environmental
39 commitments. Implementation of Mitigation Measures AQUA-1a and AQUA-1b under the proposed

1 project would reduce that construction noise impact from pile-driving to a less-than-significant
2 level, consistent with the conclusion for the approved project.

3 **Incremental Impact:** The level of impact under the proposed project would be incrementally
4 less than under the approved project because, under the proposed project, there would be no
5 modifications to Clifton Court Forebay; there would not be construction of barge landings at
6 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
7 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
8 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

9 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
10 **of Pile Driving and Other Construction-Related Underwater Noise**

11 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

12 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
13 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
14 **Underwater Noise**

15 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

16 **Impact AQUA-37: Effects of Construction of Water Conveyance Facilities on Chinook Salmon**
17 **(Winter-Run ESU)**

18 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
19 effects of construction of the proposed project would not be adverse for winter-run Chinook salmon
20 because adverse effects would be effectively avoided and minimized through the use of in-water
21 work windows, activity-specific timing restrictions, and environmental commitments.

22 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-37, in the Final EIR/EIS, the impact
23 of the construction of water conveyance facilities on winter-run Chinook salmon would not be
24 significant, except for construction noise associated with pile driving. Construction of the proposed
25 project would involve several elements with the potential to affect winter-run Chinook salmon.
26 However, these turbidity and hazardous material spill effects would be effectively avoided and/or
27 minimized through implementation of environmental commitments (see Impact AQUA-1 and
28 Appendix 3B, *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater*
29 *Pollution Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management*
30 *Plan; Spill Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel*
31 *Material, and Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan*). Mitigation
32 Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise impact to a
33 less-than-significant level, consistent with the conclusion for the approved project.

34 **Incremental Impact:** The level of impact under the proposed project would be incrementally
35 less than under the approved project because, under the proposed project, there would be no
36 modifications to Clifton Court Forebay; there would not be construction of barge landings at
37 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
38 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
39 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

1 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
2 **of Pile Driving and Other Construction-Related Underwater Noise**

3 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

4 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
5 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
6 **Underwater Noise**

7 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

8 **Impact AQUA-55: Effects of Construction of Water Conveyance Facilities on Chinook Salmon**
9 **(Spring-Run ESU)**

10 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
11 effects of construction of the proposed project would not be adverse for spring-run Chinook salmon
12 because adverse effects would be effectively avoided and minimized through the use of in-water
13 work windows, activity-specific timing restrictions, and environmental commitments.

14 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-55, in the Final EIR/EIS, the impact
15 of the construction of water conveyance facilities on spring-run Chinook salmon would not be
16 significant except for construction noise associated with pile driving. Potential effects of
17 construction of the water conveyance facilities on spring-run Chinook salmon would be similar to
18 those discussed for winter-run Chinook salmon (see Impact AQUA-37 for winter run Chinook
19 salmon in the Final EIR/EIS). Construction of the proposed project would involve several elements
20 with the potential to affect spring-run Chinook salmon. However, these turbidity and hazardous
21 material spill effects would be effectively avoided and/or minimized through implementation of
22 environmental commitments (see Impact AQUA-1 and Appendix 3B, *Environmental Commitments,*
23 *AMMs, and CMs: Environmental Training; Stormwater Pollution Prevention Plan; Erosion and*
24 *Sediment Control Plan; Hazardous Materials Management Plan; Spill Prevention, Containment, and*
25 *Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and Dredged Material; Fish Rescue*
26 *and Salvage Plan; and Barge Operations Plan). Implementation of Mitigation Measures AQUA-1a and*
27 *AQUA-1b under the proposed project would reduce that noise impact to a less-than-significant level,*
28 consistent with the conclusion for the approved project.

29 **Incremental Impact:** The level of impact under the proposed project would be incrementally
30 less than under the approved project because, under the proposed project, there would be no
31 modifications to Clifton Court Forebay; there would not be construction of barge landings at
32 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
33 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
34 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

35 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
36 **of Pile Driving and Other Construction-Related Underwater Noise**

37 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

1 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
2 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
3 **Underwater Noise**

4 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

5 **Impact AQUA-73: Effects of Construction of Water Conveyance Facilities on Chinook Salmon**
6 **(Fall-/Late Fall-Run ESU)**

7 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
8 effects of construction of the proposed project would not be adverse for fall/late fall-run Chinook
9 salmon because adverse effects would be effectively avoided and minimized through the use of in-
10 water work windows, activity-specific timing restrictions, and environmental commitments.

11 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-73, in the Final EIR/EIS, the impact
12 of construction of the water conveyance facilities on fall-run/late fall-run Chinook salmon would
13 not be significant, except for construction noise associated with pile driving, because adverse effects
14 would be effectively avoided and minimized through the use of in-water work windows, activity-
15 specific timing restrictions, and environmental commitments (see Impact AQUA-1 and Appendix 3B,
16 *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater Pollution*
17 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
18 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
19 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan*). Implementation of
20 Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise
21 impact to a less-than-significant level, consistent with the conclusion for the approved project.

22 **Incremental Impact:** The level of impact under the proposed project would be incrementally
23 less than under the approved project because, under the proposed project, there would be no
24 modifications to Clifton Court Forebay; there would not be construction of barge landings at
25 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
26 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
27 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

28 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
29 **of Pile Driving and Other Construction-Related Underwater Noise**

30 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

31 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
32 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
33 **Underwater Noise**

34 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

35 **Impact AQUA-91: Effects of Construction of Water Conveyance Facilities on Steelhead**

36 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
37 effects of construction of the proposed project would not be adverse for steelhead because adverse
38 effects would be effectively avoided and minimized through the use of in-water work windows,
39 activity-specific timing restrictions, and environmental commitments.

1 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-91, in the Final EIR/EIS, the impact
2 of the construction of water conveyance facilities on steelhead would not be significant except for
3 construction noise associated with pile driving. Construction of the proposed project would involve
4 several elements with the potential to affect steelhead. However, these turbidity and hazardous
5 material spill effects would be effectively avoided and/or minimized through implementation of
6 environmental commitments (see Impact AQUA-1 and Appendix 3B, *Environmental Commitments*,
7 *AMMs*, and *CMS: Environmental Training; Stormwater Pollution Prevention Plan; Erosion and*
8 *Sediment Control Plan; Hazardous Materials Management Plan; Spill Prevention, Containment, and*
9 *Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and Dredged Material; Fish Rescue*
10 *and Salvage Plan; and Barge Operations Plan*). Implementation of Mitigation Measures AQUA-1a and
11 AQUA-1b under the proposed project would reduce that noise impact to a less-than-significant level,
12 consistent with the conclusion for the approved project.

13 **Incremental Impact:** The level of impact under the proposed project would be incrementally
14 less than under the approved project because, under the proposed project, there would be no
15 modifications to Clifton Court Forebay; there would not be construction of barge landings at
16 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
17 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
18 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

19 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
20 **of Pile Driving and Other Construction-Related Underwater Noise**

21 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

22 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
23 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
24 **Underwater Noise**

25 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

26 **Impact AQUA-109: Effects of Construction of Water Conveyance Facilities on Sacramento**
27 **Splittail**

28 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
29 effects of construction of the proposed project would not be adverse for Sacramento splittail
30 because adverse effects would be effectively avoided and minimized through the use of in-water
31 work windows, activity-specific timing restrictions, and environmental commitments.

32 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-109, in the Final EIR/EIS, the
33 impact of the construction of the water conveyance facilities on splittail would not be significant
34 except for construction noise associated with pile driving. Construction of the proposed project
35 would involve several elements with the potential to affect splittail. However, these turbidity and
36 hazardous material spill effects would be effectively avoided and/or minimized through
37 implementation of environmental commitments (see Impact AQUA-1 and Appendix 3B,
38 *Environmental Commitments, AMMs, and CMS: Environmental Training; Stormwater Pollution*
39 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
40 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
41 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan*). Implementation of

1 Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce the noise
2 impact to a less-than-significant level, consistent with the conclusion for the approved project.

3 **Incremental Impact:** The level of impact under the proposed project would be incrementally
4 less than under the approved project because, under the proposed project, there would be no
5 modifications to Clifton Court Forebay; there would not be construction of barge landings at
6 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
7 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
8 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

9 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
10 **of Pile Driving and Other Construction-Related Underwater Noise**

11 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

12 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
13 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
14 **Underwater Noise**

15 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

16 **Impact AQUA-127: Effects of Construction of Water Conveyance Facilities on Green Sturgeon**

17 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
18 effects of construction of the proposed project would not be adverse for green sturgeon because
19 adverse effects would be effectively avoided and minimized through the use of in-water work
20 windows, activity-specific timing restrictions, and environmental commitments.

21 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-127, in the Final EIR/EIS, the
22 impact of the construction of the water conveyance facilities on green sturgeon would not be
23 significant except for construction noise associated with pile driving. Construction of the proposed
24 project would involve several elements with the potential to affect green sturgeon. However, these
25 turbidity and hazardous material spill effects would be effectively avoided and/or minimized
26 through implementation of environmental commitments (see Impact AQUA-1 and Appendix 3B,
27 *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater Pollution*
28 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
29 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
30 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan). Implementation of*
31 Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise
32 impact to a less-than-significant level, consistent with the conclusion for the approved project.

33 **Incremental Impact:** The level of impact under the proposed project would be incrementally
34 less than under the approved project because, under the proposed project, there would be no
35 modifications to Clifton Court Forebay; there would not be construction of barge landings at
36 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
37 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
38 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

1 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
2 **of Pile Driving and Other Construction-Related Underwater Noise**

3 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

4 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
5 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
6 **Underwater Noise**

7 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

8 **Impact AQUA-145: Effects of Construction of Water Conveyance Facilities on White Sturgeon**

9 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
10 effects of construction of the proposed project would not be adverse for white sturgeon because
11 adverse effects would be effectively avoided and minimized through the use of in-water work
12 windows, activity-specific timing restrictions, and environmental commitments.

13 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-145, in the Final EIR/EIS, the
14 impact of the construction of the water conveyance facilities on white sturgeon would not be
15 significant except for construction noise associated with pile driving. Construction of the proposed
16 project would involve several elements with the potential to affect white sturgeon. However, these
17 turbidity and hazardous material spill effects would be effectively avoided and/or minimized
18 through implementation of environmental commitments (see Impact AQUA-1 and Appendix 3B,
19 *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater Pollution*
20 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
21 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
22 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan*). Implementation of
23 Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise
24 impact to a less-than-significant level, consistent with the conclusion for the approved project.

25 **Incremental Impact:** The level of impact under the proposed project would be incrementally
26 less than under the approved project because, under the proposed project, there would be no
27 modifications to Clifton Court Forebay; there would not be construction of barge landings at
28 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
29 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
30 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

31 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
32 **of Pile Driving and Other Construction-Related Underwater Noise**

33 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

34 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
35 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
36 **Underwater Noise**

37 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

1 **Impact AQUA-163: Effects of Construction of Water Conveyance Facilities on Pacific Lamprey**

2 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
3 effects of construction of the proposed project would not be adverse for Pacific lamprey because
4 adverse effects would be effectively avoided and minimized through the use of in-water work
5 windows, activity-specific timing restrictions, and environmental commitments.

6 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-163, in the Final EIR/EIS, the
7 impact of the construction of the water conveyance facilities on Pacific lamprey would not be
8 significant except for construction noise associated with pile driving. Construction of the proposed
9 project would involve several elements with the potential to affect Pacific lamprey. However, these
10 turbidity and hazardous material spill effects would be effectively avoided and/or minimized
11 through implementation of environmental commitments (see Impact AQUA-1 and Appendix 3B,
12 *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater Pollution*
13 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
14 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
15 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan*). Implementation of
16 Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise
17 impact to a less-than-significant level, consistent with the conclusion for the approved project.

18 **Incremental Impact:** The level of impact under the proposed project would be incrementally
19 less than under the approved project because, under the proposed project, there would be no
20 modifications to Clifton Court Forebay; there would not be construction of barge landings at
21 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
22 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
23 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

24 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
25 **of Pile Driving and Other Construction-Related Underwater Noise**

26 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

27 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
28 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
29 **Underwater Noise**

30 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

31 **Impact AQUA-181: Effects of Construction of Water Conveyance Facilities on River Lamprey**

32 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
33 effects of construction of the proposed project would not be adverse for river lamprey because
34 adverse effects would be effectively avoided and minimized through the use of in-water work
35 windows, activity-specific timing restrictions, and environmental commitments.

36 **CEQA Conclusion:** As described for Alternative 4A, Impact AQUA-181, in the Final EIR/EIS, the
37 impact of the construction of water conveyance facilities on river lamprey would not be significant
38 except for construction noise associated with pile driving. Construction of the proposed project
39 would involve several elements with the potential to affect river lamprey. However, these turbidity
40 and hazardous material spill effects would be effectively avoided and/or minimized through
41 implementation of environmental commitments (see Impact AQUA-1 and Appendix 3B,

1 *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater Pollution*
2 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
3 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
4 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan). Implementation of*
5 *Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise*
6 *impact to a less-than-significant level, consistent with the conclusion for the approved project.*

7 **Incremental Impact:** The level of impact under the proposed project would be incrementally
8 less than under the approved project because, under the proposed project, there would be no
9 modifications to Clifton Court Forebay; there would not be construction of barge landings at
10 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
11 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
12 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

13 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
14 **of Pile Driving and Other Construction-Related Underwater Noise**

15 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

16 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
17 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
18 **Underwater Noise**

19 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

20 **Impact AQUA-199: Effects of Construction of Water Conveyance Facilities on Non-Covered**
21 **Aquatic Species of Primary Management Concern**

22 **NEPA Effects:** As concluded for Alternative 4A (the approved project) in the Final EIR/EIS, the
23 effects of construction of the proposed project would not be adverse for non-covered aquatic species
24 of primary management concern because adverse effects would be effectively avoided and
25 minimized through the use of in-water work windows, activity-specific timing restrictions, and
26 environmental commitments.

27 **CEQA Conclusion:** Consistent with the conclusion for Alternative 4A, Impacts AQUA-1 and AQUA-
28 199, in the Final EIR/EIS, the impact of the construction of the proposed project water conveyance
29 facilities on non-covered aquatic species of primary management concern would not be significant
30 except for construction noise associated with pile driving. Construction of the proposed project
31 would involve several elements with the potential to affect these fish species. However, these
32 turbidity and hazardous material spill effects would be effectively avoided and/or minimized
33 through implementation of environmental commitments (see Impact AQUA-1 and Appendix 3B,
34 *Environmental Commitments, AMMs, and CMs: Environmental Training; Stormwater Pollution*
35 *Prevention Plan; Erosion and Sediment Control Plan; Hazardous Materials Management Plan; Spill*
36 *Prevention, Containment, and Countermeasure Plan; Disposal of Spoils, Reusable Tunnel Material, and*
37 *Dredged Material; Fish Rescue and Salvage Plan; and Barge Operations Plan). Implementation of*
38 *Mitigation Measures AQUA-1a and AQUA-1b under the proposed project would reduce that noise*
39 *impact to a less-than-significant level, consistent with the conclusion for the approved project.*

1 **Incremental Impact:** The level of impact under the proposed project would be incrementally
2 less than under the approved project because, under the proposed project, there would be no
3 modifications to Clifton Court Forebay; there would not be construction of barge landings at
4 Snodgrass Slough, Intake 2, and Old River at Clifton Court Forebay; and the Potato Slough barge
5 landing would be reduced in size. With implementation of Mitigation Measures AQUA-1a and
6 AQUA-1b, the impact would be not adverse (NEPA) and less than significant (CEQA).

7 **Mitigation Measure AQUA-1a: Minimize the Use of Impact Pile Driving to Address Effects**
8 **of Pile Driving and Other Construction-Related Underwater Noise**

9 Please refer to Mitigation Measure AQUA-1a under Impact AQUA-1 in the Final EIR/EIS.

10 **Mitigation Measure AQUA-1b: Monitor Underwater Noise and, if Necessary, Use an**
11 **Attenuation Device to Reduce Effects of Pile Driving and Other Construction-Related**
12 **Underwater Noise**

13 Please refer to Mitigation Measure AQUA-1b under Impact AQUA-1 in the Final EIR/EIS.

14 **11.3.4 Cumulative Analysis**

15 As described in Final EIR/EIS Section 11.3.6, *Cumulative Effects of the Action Alternatives*, the
16 following cumulative effects were found to be not adverse and less than significant:

- 17 • Covered Fish Species
- 18 ○ Impact AQUA-CUM1: Effects of Construction of Facilities on Covered Fish Species
 - 19 ○ Impact AQUA-CUM2: Effects of Maintenance of Facilities on Covered Fish Species
 - 20 ○ Impact AQUA-CUM3: Effects of Water Operations on Entrainment of Covered Fish Species
 - 21 ○ Impact AQUA-CUM4: Effects of Water Operations on Spawning and Egg Incubation Habitat
 - 22 for Covered Fish Species
 - 23 ○ Impact AQUA-CUM5: Effects of Water Operations on Rearing Habitat for Covered Fish
 - 24 Species
 - 25 ○ Impact AQUA-CUM6: Effects of Water Operations on Migration Habitat for Covered Fish
 - 26 Species
 - 27 ○ Impact AQUA-CUM7: Effects of Restoration Measures on Covered Fish Species
 - 28 ○ Impact AQUA-CUM8: Effects of Other Conservation Measures on Covered Fish Species
- 29 • Non-Covered Fish Species of Primary Concern
- 30 ○ Impact AQUA-CUM7: Effects of Construction of Facilities on Non-Covered Fish Species
 - 31 ○ Impact AQUA-CUM8: Effects of Maintenance of Facilities on Non-Covered Fish Species
 - 32 ○ Impact AQUA-CUM9: Effects of Water Operations on Entrainment of Non-Covered Fish
 - 33 Species
 - 34 ○ Impact AQUA-CUM10: Effects of Water Operations on Spawning and Egg Incubation Habitat
 - 35 for Non-Covered Fish Species

- 1 ○ Impact AQUA-CUM11: Effects of Water Operations on Rearing Habitat for Non-Covered Fish
- 2 Species
- 3 ○ Impact AQUA-CUM12: Effects of Water Operations on Migration Habitat for Non-Covered
- 4 Fish
- 5 ○ Impact AQUA-CUM9: Effects of Restoration Measures on Non-Covered Fish Species
- 6 ○ Impact AQUA-CUM10: Effects of Other Measures on Non-Covered Fish Species
- 7 The analysis for cumulative effects for fish and aquatic resources remains the same as described in
- 8 the Final EIR/EIS with consideration of the proposed project modifications.

9 **11.4 References Cited**

- 10 National Marine Fisheries Service. 2017. *California WaterFix Biological Opinion*. June 16. Portland,
- 11 OR.