

- Rio Vista minimum flow standard in January through August.

Alternative 5A operations include a preference for south Delta pumping in July through September to provide limited flushing for improving general water quality conditions and reduced residence times.

As discussed in Section ES 2.1, *Alternative 4*, portions of the actions previously contemplated under CM3, CM4, CM6, CM7, CM8, CM9, CM10, CM11, CM12, CM15, and CM16 would be included in Alternatives 2D and 5A, but at different levels. See Table ES.2.2-2, *Comparison of Environmental Commitments under Alternatives 4A, 2D, and 5A*, above, for a comparison of the implementation of Environmental Commitments.

Table ES.2.3-1 below, provides an overview of the alternatives analyzed in the RDEIR/SDEIS. The complete descriptions of these alternatives is provided in Section 3, *Alternative 4: Conveyance Facility Modifications* and Section 4, *New Alternatives: Alternatives 4A, 2D, and 5A* of this RDEIR/SDEIS.

Table ES.2.3-1. Comparison of Alternative 4, 2D, 4A, 5A

Alternative	Alignment Option	Conveyance Type	Intake Locations	North Delta Diversion Capacity	Operational Scenario	Federal ESA and CESA Compliance Approach
4	Pipeline/ Tunnel	Dual	2, 3, and 5	9,000 cfs	H	Section 10/ NCCP
2D	Pipeline/ Tunnel	Dual	1 through 5	15,000 cfs	B	Section 7/ 2081(b) permit
4A*	Pipeline/ Tunnel	Dual	2, 3, and 5	9,000 cfs	H3+** (See Table ES.2.2-1)	Section 7/ 2081(b) permit
5A	Pipeline/ Tunnel	Dual	2	3,000 cfs	C	Section 7/ 2081(b) permit

* Alternative 4A is the CEQA and NEPA preferred project proposed by State and Federal Lead Agencies.

** Operational Scenario H for Alternative 4A would not include the operation of the Fremont Weir modification associated with Yolo Bypass improvements because those activities would not be implemented as part of Alternative 4A. Starting operations would be determined through the Section 7 and 2081(b) permit processes and an adaptive management and monitoring program would guide future operational limits and criteria.

ES.3 Summary of Substantive Revisions

The following sections provide a brief overview of the substantives changes and conclusions provided in the RDEIR/SDEIS.

ES.3.1 Improved Fish and Aquatic Habitat Analyses

Section 2.1, *Improved Fish and Aquatic Habitat Analyses*, summarizes revisions made to Chapter 11, Fish and Aquatic Resources, since the release of the Draft EIR/EIS. Revisions were made to address design changes associated with the proposed project, incorporate the latest engineering assumptions and modeling procedures, and to respond to comments raised by the public.

1 ES.3.1.1 Summary of Changes

2 ES.3.1.1.1 New Data and/or Modeling

- 3 ● Effects of construction impacts are reassessed to account for changes in the proposed
4 construction approach.
- 5 ● Potential North Delta Diversion entrainment effects on striped bass and American shad eggs and
6 larvae are revised.
- 7 ● Analysis to assess the consequences on downstream aquatic habitat was conducted.
- 8 ● Selenium and mercury analysis and potential effects on aquatic resources are revised.
- 9 ● Updated water quality data is integrated into selenium quantitative modeling for water and fish
10 tissue.

11 ES.3.1.1.2 New/Revised Assumptions

- 12 ● Assessed and revised assumptions related to installation of piles needed for conveyance facility
13 construction.
- 14 ● Updated reservoir carryover storage for the Existing Conditions baseline.
- 15 ● Updated assumptions for sea level rise, restoration sediment demand, and effects of the creation
16 of new points of diversion.

17 ES.3.1.1.3 Summary of Analyses and Results

18 Draft EIR/EIS Chapter 11, *Aquatic Resources*, provided substantial information about the potential
19 effects of the alternatives on fish and their habitats in the Plan Area and in upstream areas used by
20 the evaluated species. Since release of the Draft EIR/EIS, the chapter has been revised to address
21 design changes associated with the proposed project, to incorporate the latest engineering
22 assumptions and modeling procedures, and to respond to comments raised by the public. Several
23 comments requested elaboration on the methods used to arrive at CEQA conclusions and NEPA
24 effects determinations and on the effects of contaminants. Additionally, commenters requested
25 analyses of the effects on downstream bays (i.e., San Francisco Bay), and that all analyses include a
26 NEPA conclusion. Since release of the Draft EIR/EIS, additional information has been developed
27 pertaining to the following: the use of RTM for restoration efforts; the construction effects of the
28 modification to Clifton Court Forebay; and the construction of an operable barrier at Head of Old
29 River. This section briefly describes the revisions and their effects on the impact analysis.

30 Revisions to Impacts in Alternatives Included in the Draft EIR/EIS

31 The following describes the changes in impact conclusions for alternatives included the Draft
32 EIR/EIS based on new information, comments received, and the application of a consistent
33 methodology across alternatives, as shown in Section 11.3.6 of Appendix A of the RDEIR/SDEIS. The
34 same approach was used to determine effects of Alternatives 4A, 2D, and 5A, and the conclusions for
35 those alternatives are shown in Table ES-9, Summary of BDCP/California WaterFix RDEIR/SDEIS
36 Impacts and Mitigation Measures.

- 37 ● Effects were changed from less-than-significant level (CEQA)/No Determination (NEPA) to less-
38 than-significant level (CEQA)/not adverse (NEPA) for:

- 1 ○ Effects of water operations on rearing habitat (AQUA-5) and migration conditions for
2 delta smelt (AQUA-6) for Alternatives 2A, 2B, 2C, 4, 5, 6A, 6B, 6C, 7, 8, and 9.
- 3 ○ Effects of water operations on spawning, egg incubation, and rearing habitat for longfin
4 smelt (AQUA-22) for Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9.
- 5 ○ Effects of contaminants associated with restoration measures on longfin smelt (AQUA-
6 26) for Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8, and 9.
- 7 ○ Effects of water operations on spawning and egg incubation habitat for Chinook salmon
8 (winter-run ESU) (AQUA-40) for Alternatives 4 and 7.
- 9 ○ Effects of water operations on migration conditions for Chinook salmon (winter-run
10 ESU) (AQUA-42) for Alternatives 4, 5, and 7.
- 11 ○ Effects of water operations on spawning and egg incubation habitat for Chinook salmon
12 (spring-run ESU) (AQUA-58) for Alternatives 2A, 4, 5, and 7.
- 13 ○ Effects of water operations on migration conditions for Chinook salmon (spring-run
14 ESU) (AQUA-60) for Alternatives 3, 4, 5, and 7.
- 15 ○ Effects of water operations on migration conditions for Chinook salmon (fall-/late fall-
16 run ESU) (AQUA-78) for Alternative 7.
- 17 ○ Effects of water operations on migration conditions for steelhead (AQUA-96) for
18 Alternatives 3, 4, 5, and 7.
- 19 ○ Effects of water operations on migration conditions for white sturgeon (AQUA-132) for
20 Alternative 4, 5, 6A, 9.
- 21 ○ Effects of water operations on migration conditions for white sturgeon (AQUA-150) for
22 Alternative 1A, 2A, 3, 4, 5, 6A, 7, and 9.
- 23 ● Effects were changed from less-than-significant level (CEQA)/No Determination (NEPA) to
24 significant and unavoidable with mitigation (CEQA)/adverse (NEPA) for:
- 25 ○ Effects of water operations on spawning and egg incubation habitat for Chinook salmon
26 (winter-run ESU) (AQUA-40) for Alternative 3.
- 27 ○ Effects of water operations on migration conditions for Chinook salmon (fall-/late fall-
28 run ESU) (AQUA-78) for Alternative 4.
- 29 ● Effects were changed from significant and unavoidable with mitigation (CEQA)/adverse (NEPA)
30 to less than significant (CEQA)/not adverse (NEPA) for:
- 31 ○ Effects of water operations on rearing conditions for Chinook salmon (winter-run ESU)
32 (AQUA-41) for Alternative 2A and 5.
- 33 ○ Effects of water operations on migration conditions for Chinook salmon (fall-/late fall-
34 run ESU) (AQUA-78) for Alternative 5.
- 35 ○ Effects of water operations on migration conditions for green sturgeon (AQUA-132) for
36 Alternative 2A and 7.
- 37 ● Effects were changed from less-than-significant level (CEQA)/no determination/not adverse
38 (NEPA) with no mitigation to less-than-significant level (CEQA)/not adverse (NEPA) for effects

1 of contaminants associated with restoration (AQUA-8) for Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3,
2 5, 6A, 6B, 6C, 7, 8, and 9.

- 3 ● Effects of contaminants associated with restoration measures on steelhead (AQUA-98) were
4 changed from less than significant/beneficial (CEQA)/beneficial (NEPA) to less than significant
5 (CEQA)/not adverse (NEPA) for Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9.
- 6 ● Effects of contaminants associated with restoration measures on green sturgeon (AQUA-134)
7 changed from less than significant/beneficial (CEQA)/beneficial (NEPA) for Alternatives 1A, 1B,
8 1C, 2A, 2B, 2C, 3, 4, 6A, 6B, 6C, 8, and 9 to less than significant/not adverse.
- 9 ● Effects of contaminants associated with restoration measures on river lamprey (AQUA-188)
10 were changed from less than significant/beneficial (CEQA)/not adverse/beneficial (NEPA) for
11 Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9 to less than significant/not
12 adverse.
- 13 ● Effects of water operations on entrainment of non-covered aquatic species of primary
14 management concern (AQUA-201) were changed from less than significant (CEQA)/not adverse
15 (NEPA) for Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6B, 6C, 7, 8, and 9 (with the exception of no
16 impact/no effect for California bay shrimp, and beneficial for Alternative 9 for largemouth bass),
17 and less than significant/not adverse for 6A (with exception of beneficial for largemouth bass
18 and no impact/no effect for California bay shrimp), to significant and unavoidable (CEQA)/
19 adverse (NEPA) for striped bass and American shad under all alternatives (except less than
20 significant/not adverse for Alternative 9) and less than significant (CEQA)/not adverse (NEPA)
21 for the other non-covered fishes under all alternatives
- 22 ● Effects of water operations on spawning and egg incubation habitat for non-covered aquatic
23 species of primary management concern (AQUA-202) changed from a range of no impact and
24 less than significant/not adverse to less than significant/not adverse, depending on the species.
- 25 ● Effects of water operations on rearing habitat for non-covered aquatic species of primary
26 management concern (AQUA-203) were changed from a range (depending on the species) of
27 less than significant and significant and unavoidable (CEQA)/not adverse (NEPA) to less than
28 significant/not adverse.

29 **Major Results of Updates to the Fish and Aquatic Habitats Analysis**

30 The following is a summary of the revisions made to Chapter 11, *Fish and Aquatic Resources* in the
31 Draft EIR/EIS. The same approach was used in analyzing new Alternatives 4A, 2D, and 5A presented
32 in this RDEIR/SDEIS.

- 33 ● The methods section is updated to better explain the rationale and process applied to
34 development of CEQA conclusions and NEPA effects determinations.
- 35 ● A description of the potential changes in sediment loading as a result of the creation of new
36 points of diversion under Alternatives 1A through 8 is included.
- 37 ● An analysis of changes in sediment loading to the Bay for all of the alternatives, with specificity
38 to operations-related effects and restoration-related effects, is included.
- 39 ● The analysis of selenium and mercury has been revised in three locations: revisions to
40 Conservation Measure 12 Methylmercury Management and Avoidance and Minimization
41 Measure 27 Selenium Management (see Appendix D); revisions to the CM4 tidal habitat

1 contaminants analysis; and a new impact to specifically address effects of contaminants on fish
2 as a result of change in operations (See Chapter 11, Impact AQUA-219 in Appendix A).

- 3 • New impacts were created to analyze impacts to fish and aquatic habitat under the No Action
4 Alternative (Impacts AQUA-NAA1-16).
- 5 • AMM27 is expanded, with specific requirements included to reduce the potential for
6 bioaccumulation in covered fish species.
- 7 • Better understanding and articulation of the potential for selenium and mercury effects on fish
8 as a result of both operations and restoration actions proposed under the alternatives has
9 allowed a more certain determination for contaminants effects under NEPA, which have been
10 determined to be not adverse across all alternatives.
- 11 • The effects of underwater noise caused by pile driving were reassessed to account for changes
12 in the proposed construction approach.
- 13 • Reanalysis to assess the potential for entrainment of noncovered species of primary
14 management concern because for some (striped bass, American shad) most of their spawning
15 could occur upstream of the proposed north Delta intake locations, and the early life stages
16 (eggs/larvae) would be susceptible to entrainment.

17 **ES.3.2 Water Quality Revisions**

18 Water quality constituent sections in Chapter 8, *Water Quality* of the Draft EIR/EIS that received the
19 most updating were electrical conductivity, chloride, selenium, and bromide. Additionally,
20 assessments of effects on *Microcystis* and constituents downstream of the Plan Area in San Francisco
21 Bay were added. Several other modifications and additions were made to the assessments of
22 mercury, nutrients, trace metals, and dissolved oxygen.

23 Additionally, three new alternatives, Alternative 4A, 2D, and 5A, were evaluated for effects on water
24 quality from construction and operation of the water conveyance facility (CM1) and for other
25 environmental commitments (CM 3, 4, 6, 7, 9–12, 15, and 16). The alternatives evaluated in Chapter
26 8 contain many similarities to each other from a water quality perspective, and thus are often
27 grouped together in the following discussion. The three new alternatives are also very similar to
28 each other, but from a water quality perspective, are fundamentally different than the alternatives
29 evaluated in Chapter 8, in that they contain substantially less tidal restoration acreage. Although this
30 section is focused on describing changes made in Chapter 8 from the Draft EIR/EIS, differences
31 between the alternatives assessed in Chapter 8 and the three new alternatives are highlighted
32 where appropriate.

33 Section 2.2, *Water Quality Revisions*, of this RDEIR/SDEIS describes additional analyses undertaken
34 to more accurately characterize the potential for exceedances of water quality standards and
35 summarizes associated

36 **ES.3.2.1 Summary of Changes**

37 **ES.3.2.1.1 New Data and/or Modeling**

- 38 • New modeling and sensitivity analyses were conducted to evaluate the impacts to electrical
39 conductivity (EC) from:

- 1 ○ Changing the existing Emmaton compliance location to a new location at Threemile Slough.
- 2 ○ Monthly-daily patterning at the Delta boundary locations.
- 3 ○ Including operation of the Suisun Marsh Salinity Control Gates consistent with the
- 4 assumptions in the No Action Alternative.
- 5 ○ Removing tidal restoration areas (as a means of understanding the contribution of
- 6 restoration versus CM1 to exceedances of EC objectives).
- 7 ○ Revising Head of Old River Barrier operations during April and May.
- 8 ● Chloride modeling results were updated:
 - 9 ○ New calculation of exceedances of the 150 mg/L chloride objective were prepared based on
 - 10 calendar years 1976–1990 of the original modeled results (i.e., 15 years instead of 16),
 - 11 because the objective applies on a calendar year basis.
 - 12 ● New calculations were prepared of objective exceedances based on the water year type at the
 - 13 modeled time step (e.g., LLT) rather than the water year type defined for Existing Conditions.
 - 14 ● Selenium modeling was updated to include:
 - 15 ○ Updated source water concentration data.
 - 16 ○ Updated bioaccumulation modeling methodology for bass in the Delta.
 - 17 ○ Expanded discussion of residence time in the Delta and its effect on selenium
 - 18 bioaccumulation in the Delta.
 - 19 ● New modeling for sensitivity analyses was conducted to evaluate what factors were causing or
 - 20 contributing to bromide increases in Barker Slough.
 - 21 ● Water column and fish tissue methylmercury modeling was conducted under Alternative 8 and
 - 22 was corrected to be based on proper source water concentration data.
 - 23 ● A new assessment of *Microcystis aeruginosa* was prepared.
 - 24 ● New assessment of water quality effects in San Francisco Bay was included.
 - 25 ● Updated dissolved oxygen assessment was prepared to include an evaluation of the effects from
 - 26 changes in San Joaquin River flows.

27 **ES.3.2.1.2 New/Revised Assumptions**

- 28 ● The EC compliance location is now at Emmaton instead of Threemile Slough for Alternative 4;
- 29 Emmaton also is the compliance location for Alternatives 4A, 2D, and 5A.
- 30 ● The project description now assumes continued operation of the Suisun Marsh Salinity Control
- 31 Gates for all project alternatives, consistent with assumptions included in the No Action
- 32 Alternative.

33 **ES.3.2.1.3 New/Revised Criteria or Thresholds**

- 34 ● Updated numeric thresholds were used in the selenium assessment to EPA's draft water quality
- 35 criteria for the protection of freshwater aquatic life from toxic effects of selenium released in
- 36 May 2014. The draft criteria include tissue-based concentrations, which are most closely

1 associated with reproductive effects, and water concentrations, which are to be used when fish
2 tissue data is not available.

3 **ES.3.2.2 Summary of Analyses and Results**

4 The following summarizes the results of the above described revisions on the water quality impact
5 analysis.

6 *EC and Chloride*

- 7 • With the change in the EC compliance point from Threemile Slough to Emmaton, Alternative 4
8 no longer shows a significant impact with respect to EC objective exceedance at Emmaton, while
9 all other alternatives still show significant impacts. The three new alternatives assessed (4A, 2D,
10 and 5A) also maintain the existing compliance point at Emmaton and, thus, also do not show
11 significant impacts due to EC objective exceedance at Emmaton.
- 12 • Alternatives 1A, 1B, 1C, 2A, 2B, 2C, 3, 5, 6A, 6B, 6C, 7, 8, and 9 no longer show significant impacts
13 with respect to EC objective exceedance at San Andreas Landing. The new Alternatives, 4A, 2D,
14 and 5A also show no significant impacts with respect to EC objective exceedance at San Andreas
15 Landing.
- 16 • Based on the sensitivity analyses, optimizing the design and siting of restoration areas is
17 expected to be able to reduce EC and chloride increases in Suisun Marsh, relative to Existing
18 Conditions and the No Action Alternative, to levels that would be less than significant.
- 19 • Revising the assessment of the 150 mg/L chloride objective to properly calculate exceedances
20 on a calendar year basis resulted in fewer exceedances of the objective under the project
21 alternatives assessed in the Draft EIR/EIS (1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9)
22 than previously indicated. The specific number of exceedances predicted under the revised
23 approach varied by alternative, and for some alternatives remained a significant impact. The
24 new Alternatives 4A, 2D, and 5A, did not result in any exceedances of this objective, likely in part
25 due to the lower acreage of tidal restoration included in these alternatives.
- 26 • Revising the electrical conductivity assessment to correctly apply the water quality objective
27 based on the modeled time step (i.e., LLT) hydrology and water year type, rather than the
28 Existing Conditions water year type, resulted in the modeled percent of days out of compliance
29 increasing by 0–5% for both the No Action Alternative and project alternatives, depending on
30 the alternative and water quality objective evaluated. However, these changes did not alter any
31 of the related impact conclusions.
- 32 • All alternatives assessed in the Draft EIR/EIS (1A, 1B, 1C, 2A, 2B, 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and
33 9) remained significant and unavoidable for chloride and EC, but based on the sensitivity
34 analyses and revisions identified above, the magnitude of the impacts is substantially less than
35 was indicated in the Draft EIR/EIS.
- 36 • Alternatives 4A, 2D, and 5A would not result in significant impacts for EC related to objective
37 exceedance in the Sacramento River at Emmaton, would not result in substantial degradation in
38 the western Delta due to increased chloride concentrations, would have less adverse water
39 quality effects in the western Delta related to EC, and would have fewer exceedances of the fish
40 and wildlife EC objective between Prisoners Point and Jersey Point, such that it is feasible to
41 introduce mitigation that would prevent significant impacts related to EC increases. After
42 introduction of these mitigation measures, Alternatives 4A, 2D, and 5A would result in less than

1 significant impacts for EC. Alternatives 4A, 2D, and 5A would also result in less than significant
2 impacts for chloride.

3 *Selenium*

- 4 ● Results of updated selenium modeling showed that there would generally be a greater increase
5 from Existing Conditions and No Action Alternative concentrations to the concentrations under
6 the alternatives than previously predicted (i.e., the relative effect of the project alternatives was
7 greater). However, the absolute values of all of the estimated concentrations for Existing
8 Conditions, the No Action Alternative, and all project alternatives were lower than modeled in
9 the Draft EIR/EIS, and thus were lower relative to thresholds of concern and water quality
10 criteria used in the assessment.
- 11 ● The result of updates to bioaccumulation modeling for selenium is that predicted bass tissue
12 concentrations in the Delta are more consistent across location and alternative than was
13 determined in the Draft EIR/EIS. This update could not be made for sturgeon bioaccumulation
14 modeling because there was insufficient monitoring data to calibrate the model for such a
15 change.
- 16 ● The changes discussed above did not result in any changes to the selenium impact conclusions
17 in the Draft EIR/EIS.

18 *Bromide*

- 19 ● The cause of the modeled increases in bromide in Barker Slough, which was driving the impact
20 conclusion for almost all alternatives, is due to the assumptions regarding tidal habitat
21 restoration not due to conveyance facility operations. Thus, the mitigation measure was revised
22 to more appropriately address actions that could lessen the projected impact, based on these
23 findings.
- 24 ● Because new alternatives 4A, 2D, and 5A contain a lower acreage of tidal restoration, significant
25 impacts with regard to bromide are not expected under these alternatives.

26 *Mercury*

- 27 ● Revisions and updates to mercury modeling results made for Alternative 8 lowered the
28 concentrations predicted under Alternative 8, but did not change the assessment conclusions.
- 29 ● Implementation of restoration under the Environmental Commitments would result in
30 significant and unavoidable impacts with regard to mercury concentrations under Alternatives
31 4A, 2D, and 5A; however, these effects would be localized in the vicinity of restoration areas and
32 the magnitude of effect would be less than other alternatives because the amount of restoration
33 proposed under the new alternatives would be substantially less than other proposed
34 alternatives.

35 *Microcystis*

- 36 ● Because of the combined effects of increased temperatures due to climate change (not related to
37 the project alternatives) and increased residence times in the Delta (due primarily to the effects
38 of the conveyance facility and tidal restoration), effects of project alternatives 1A, 1B, 1C, 2A, 2B,
39 2C, 3, 4, 5, 6A, 6B, 6C, 7, 8, and 9 on *Microcystis* were considered adverse (under NEPA) and
40 significant and unavoidable (under CEQA). Mitigation measure WQ-32 was created to attempt to
41 lessen the effects of the alternatives on *Microcystis*.

- Because new alternatives 4A, 2D, and 5A contain a lower acreage of tidal restoration, residence times related to implementation of the alternative are not expected to increase as substantially, and thus significant impacts with regard to *Microcystis* are not expected under these alternatives, relative to Existing Conditions and the No Action Alternative.

San Francisco Bay

- These assessment of seaward effects of the project alternatives did not identify any new adverse or significant impacts or any substantial increase in the severity of previously identified impacts, except in the case of selenium. For Alternatives 6–9, projected increases in selenium loading and concentrations in North San Francisco Bay were considered adverse (under NEPA) and significant and unavoidable (under CEQA), while Alternatives 1–5 were considered not adverse and less than significant.

Dissolved Oxygen

Analysis of flows in the San Joaquin River at Stockton showed that in most cases flows decreased by a small amount and, thus, would not be expected to substantially move the location of minimum DO in the river.

ES.3.3 Air Quality, Health Risk Assessment, Traffic and Noise Revisions

Section 2.3, *Air Quality, Health Risk Assessment, Transportation, Noise, and Energy Revisions*, presents updated calculations based on improved construction assumptions and revises the impact assessment to reflect the amended construction data. The following summarizes the changes that can be found in Section 2.3 and Appendix A of the RDEIR/SDEIS.

ES.3.3.1 Summary of Changes

ES.3.3.1.1 New Data and/or Modeling

- Revised mobile, marine and helicopter source emissions, modeling based on updated guidance documents and new models, including the California Air Resources Board (ARB) model, EMFAC2014.
- Updated concrete batching modeling based on CO₂ emission factors for anticipated compression strength values.
- Included fugitive reactive organic emissions from asphalt paving.
- Modeled receptor exposure to localized PM_{2.5} and PM₁₀ concentrations.
- Estimated gasoline and diesel consumption by equipment and vehicles.

ES.3.3.1.2 New/Revised Assumptions

- Updated 2014 economic assessment (“cost estimate”), including revised truck trip, scheduling, material quantity, and equipment operating assumptions.
- Revised activity scaling factors for the PTO, East, West, and SCO alternatives.
- Updated construction electricity demand based on changes to project design.

- 1 • Refined environmental commitments that establish aggressive performance standards
- 2 equipment, vehicles, and material movement activities.
- 3 • Revised O&M assumptions based on changes to project design.
- 4 • Revised cancer risk calculation daily breath rates and fraction at home assumptions per Office of
- 5 Environmental Health Hazard guidance.

6 **ES.3.3.1.3 New/Revised Criteria or Thresholds**

- 7 • Air district thresholds for localized PM_{2.5} and PM₁₀ exposure.

8 **ES.3.3.2 Summary of Analyses and Results**

- 9 • Revised air quality, health risk, noise, and traffic analysis based on updated construction
- 10 assumptions outlined in the 2014 cost estimate from 5RMK Inc.
- 11 • Revised air quality and Health Risk Assessment (HRA) impact analysis based on updated
- 12 performance standards outlined in the Construction Equipment Exhaust Reduction Plan.
- 13 • Incorporated new air quality models and emission factors released since the Public Draft
- 14 EIR/EIS.
- 15 • Revised operational emissions based on the latest understanding of project operations.
- 16 • Expanded the analysis of odor impacts to consider excavated organic matter and land use
- 17 change.
- 18 • Included the General Conformity determination under the Clean Air Act.
- 19 • Added explicit identification and disclosure of health risks from receptor exposure to
- 20 localized particulate matter, localized carbon monoxide, localized diesel particulate matter,
- 21 and *C. immitis* (Valley Fever).
- 22 • Revised cancer risk calculations to account for the fraction of time spent at home and daily
- 23 breath rates by age groups, per OEHHA 2015 guidance.
- 24 • Incorporated an estimate of diesel and gasoline consumption into the energy impact
- 25 analysis.

26 **ES.3.4 Terrestrial Resources Revisions**

27 The analysis for Alternative 4 in Chapter 12, *Terrestrial Biological Resources*, of the Draft EIR/EIS
 28 was revised to account for changes in the magnitude of direct impacts on natural communities and
 29 species habitat associated with the footprint of the revised water conveyance facilities, including the
 30 revised power line alignment and assumptions. In addition, analyses for the three new sub-
 31 alternatives (Alternatives 4A, 2D, and 5A) were conducted. The following summarizes the changes
 32 that can be found in Chapter 12, *Terrestrial Biological Resources*, Section 12.3.3.9 of Appendix A of
 33 the RDEIR/SDEIS and the new analyses can be found in Section 4 of the RDEIR/SDEIS.

1 ES.3.4.1 Summary of Changes

2 ES.3.4.1.1 New Data and/or Modeling

- 3 • Updated method for mapping and quantifying wetlands and waters of the United States.
- 4 • Updated term of Avoidance and Minimization Measures (AMM) implementation.
- 5 • Updated AMM2 Construction Best Management Practices, AMM6 Disposal and Reuse of Spoils,
6 Reusable Tunnel Material, and Dredged Material, AMM11 Covered Plant Species, AMM18
7 Swainson's Hawk and White-Tailed Kite, AMM19 California Clapper Rail and California Black
8 Rail, AMM20 Greater Sandhill Crane, AMM26 Salt Marsh Harvest Mouse and Suisun Shrew, and
9 AMM27 Selenium Management.
- 10 • Updated acreage impacts of Alternative 4.
- 11 • Updated impacted acres of tidal perennial aquatic natural community, tidal freshwater
12 emergent wetland natural community, valley/foothill riparian natural community, nontidal
13 perennial aquatic natural community, nontidal freshwater perennial emergent wetland natural
14 community, alkali seasonal wetland complex natural community aquatic habitat, vernal pool
15 complex natural community, managed wetland, grassland natural community, vernal pool
16 crustacean modeled habitat, modeled valley elderberry longhorn beetle habitat, vernal pool
17 habitat, and nonlisted vernal pool invertebrate habitat in the study area.
- 18 • Updated impacted acres of the California red-legged frog, California tiger salamander, giant
19 garter snake, western pond turtle, special-status reptiles, California black rail, California least
20 tern, greater sandhill crane, lesser sandhill crane, least Bell's vireo, yellow warbler, Swainson's
21 hawk, tricolored blackbird, western yellow-billed cuckoo, white-tailed kite, yellow-breasted
22 chat, Cooper's hawk and osprey, golden eagle and ferruginous hawk, double-crested cormorant,
23 great blue heron, great egret, snowy egret, black-crowned night heron, short-eared owl,
24 northern harrier, mountain plover, California horned lark, grasshopper sparrow, least bittern,
25 white-faced ibis, loggerhead shrike, Modesto song sparrow, yellow-headed blackbird, riparian
26 brush rabbit, San Joaquin kit fox, San Joaquin pocket mouse, special-status bats, grassland plant
27 species, valley/foothill riparian plant species, tidal wetland plant species, and nontidal wetland
28 plant species.
- 29 • Updated methylmercury exposure impact discussion for California black rail, California clapper
30 rail, California least tern, greater sandhill crane, lesser sandhill crane, Suisun song sparrow,
31 saltmarsh common yellowthroat, tricolored blackbird, double-crested cormorant, great blue
32 heron, great egret, snowy egret, black-crowned night heron, least bittern, white-faced ibis, and
33 yellow-headed blackbird.
- 34 • Updated acres of fill of jurisdictional wetlands waters associated with all alternatives.
- 35 • Updated acres of potentially jurisdictional wetlands and waters potentially affected by CM2-
36 CM10 under Alternative 4.
- 37 • Revised California least tern indirect effect CEQA conclusion to less-than-significant.
- 38 • Updated acres of fill of jurisdictional wetlands associated with all alternatives.
- 39 • Updated acres of potentially jurisdictional wetlands and waters potentially affected by CM2-
40 CM10 under Alternative 4.

1 ES.3.4.2 Summary of Analyses and Results

2 The terrestrial resources analysis for Alternative 4 was revised to reflect impacts that changed due
 3 to a revised project footprint for Alternative 4. Affected species and habitats were updated with the
 4 number of impacted acres of habitat and the impact discussion was revised accordingly (see
 5 Appendix 12E *Detailed Accounting of Direct Effects of Alternatives on Natural Communities and*
 6 *Covered Species* in Appendix A of this RDEIR/SEIS). Species with habitats that include high tidal
 7 marshes are at risk for methylmercury exposure. Modeled methylmercury effects on largemouth
 8 bass (used as a surrogate species for analysis) did not differ substantially from existing conditions.
 9 Restoration actions that would create high and low tidal marsh, which is Black Rail habitat, could
 10 provide biogeochemical conditions for methylation of mercury in the in the newly inundated soils.
 11 There is potential for increased exposure of the foodwebs to methylmercury in these areas, with the
 12 level of exposure dependent on the amounts of mercury available in the soils and the
 13 biogeochemical conditions. Methylmercury effects discussions were updated and CM12 was
 14 expanded for each species to address methylmercury effects. NEPA effects and CEQA conclusions for
 15 Alternative 4 terrestrial resources in the RDEIR/SDEIS remained generally consistent with the Draft
 16 EIR/EIS.

17 The RDEIR/SDEIS also includes analyses of the new sub-alternatives (Alternatives 4A, 2D, and 5A).
 18 These analyses can be found in Sections 4.3.8 (Alternative 4A), 4.4.8 (Alternative 2D), and 4.5.8
 19 (Alternative 5A) of this RDEIR/SEIS. Tidal restoration under these alternatives would be
 20 substantially less than under the BDCP and thus the impacts to terrestrial resources from tidal
 21 restoration would be considerably less. However, the benefits of the large amount of tidal
 22 restoration, as well as other large amounts of other natural community restoration under the BDCP,
 23 would not occur under Alternatives 4A, 2D, and 5A, which is reflected in the NEPA effects and CEQA
 24 conclusions for several natural communities that went from being beneficial under the BDCP
 25 Alternatives to less-than-significant under Alternatives 4A, 2D, and 5A. The NEPA effects and CEQA
 26 conclusions for the other terrestrial resources are also different than those of the BDCP alternatives
 27 and, where different, change from being not adverse/less-than-significant to no effect/no impact.

28 A summary of some of the key revisions found in the RDEIR/SEIS compared to the Draft EIR/EIS are
 29 presented below.

- 30 ● Inclusion of NEPA effects determinations for Impact BIO-69 Loss or Conversion of Habitat for
 31 and Direct Mortality of Greater Sandhill Crane and BIO-70 Effects on Greater Sandhill Crane
 32 Associated with Electrical Transmission Facilities under all alternatives.
- 33 ● Updated NEPA effects determinations for indirect effects from methylmercury for several
 34 species under Alternative 4.
- 35 ● Revised Mitigation Measure BIO-147: Monitor Bank Swallow Colonies and Evaluate Winter and
 36 Spring Flows Upstream of the Study Area.
- 37 ● Revised Mitigation Measure BIO-162: Conduct Preconstruction Survey for American Badger.
- 38 ● New Mitigation Measure BIO-176: Compensatory Mitigation for Fill of Waters of the U.S.

1 **ES.3.5 Revised Project Descriptions and Enhanced Level of** 2 **Detail (Alt 4)**

3 Section 2.4, *Revised Project Description and Enhanced Level of Detail*, presents additional revisions
4 that explain how, for the purposes of CEQA and NEPA, project-level detail is included for water
5 conveyance facilities and provides additional information about early implementation actions,
6 including examples of habitat restoration and enhancement activities.

7 **ES.3.5.1 Summary of Analyses and Results**

8 The RDEIR/SDEIS includes a number of revisions to the project description and an enhanced level of
9 detail for Alternatives 4, 4A, 2D, and 5A. These include more explanation regarding the analysis of
10 water conveyance facilities, updates to conservation measures and environmental commitments
11 and their use to offset impacts related to the project, and more information on the role of the Bureau
12 of Reclamation, as NEPA Lead Agency and other cooperating and responsible agencies.

13 Each component feature of the water conveyance facilities is analyzed at a resource-specific level.
14 Following the release of the Draft EIR/EIS, DWR's Division of Engineering created a revised project
15 footprint for Alternative 4. Some of the major changes include removing pumping plants from the
16 north Delta and creating combined pumping plants on the north end of Clifton Court Forebay in the
17 south Delta, which would allow water to flow by gravity through the conveyance facilities. The
18 alignment was also revised to lessen impacts to wildlife on Staten Island.

19 Analyses of Alternatives 4 and 4A in the RDEIR/SDEIS reflect this new project footprint. Alternatives
20 2D and 5A reflect the alignment except for the number and location of intakes. Similar to Alternative
21 2, Alternative 2D also incorporates five intakes, but the rest of the alignment is identical to that of
22 Alternative 4. Similar to Alternative 5, Alternative 5A incorporates only one intake, but the rest of
23 the alignment is identical to that of Alternative 4. The impact analyses of these alternatives rely on
24 GIS data from DWR that incorporates the recent revisions to the alignment of water conveyance
25 features and associated lands required for construction.

26 The RDEIR/SDEIS reflects changes made to the conservation measures, environmental
27 commitments, and AMMs for Alternative 4 and, where applicable, Alternatives 4A, 2D, and 5A. Many
28 of the conservation measures from the Draft EIR/EIS became environmental commitments in the
29 RDEIR/SDEIS for Alternatives 4A, 2D, and 5A. These revisions are made to ensure that the
30 conservation measures (in Alternative 4), or environmental commitments in Alternatives 4A, 2D,
31 and 5A, are described consistently where needed in the RDEIR/SDEIS and reflect additional detail
32 that may have been developed since publication of the Draft BDCP, such as updated acreages for
33 mitigation measures. A discussion of the conservation measures and AMMs that have been
34 substantively changed and that would potentially affect the characterization of impacts can be found
35 in Appendix D.

36 **ES.3.6 Analysis of Geotechnical Investigations**

37 Section 2.5, *Analysis of Geotechnical Investigations*, provides an explanation about the method for
38 incorporating analyses of geotechnical investigations into the analysis of the water conveyance
39 facilities construction.

1 **ES.3.6.1 Summary of Analyses and Results**

2 As described in Appendix 3B, *Environmental Commitments*, in Appendix A of this RDEIR/SDEIS, DWR
 3 will perform a series of geotechnical investigations along both the selected water conveyance
 4 alignment and at locations proposed for facilities or material borrow areas. The work to be
 5 performed will constitute a subsurface investigation program to provide information required to
 6 support the design and construction of the water conveyance facilities. Geotechnical investigations
 7 will be conducted to identify surface and subsurface conditions as necessary to complete design of
 8 the water conveyance facilities.

9 Following publication of the Draft EIR/EIS, DWR developed a Draft Geotechnical Exploration Plan
 10 (Phase 2) for the Alternative 4 conveyance alignment. The geotechnical investigation plan provides
 11 additional details regarding the rationale, investigation methods and locations, and criteria for
 12 obtaining subsurface soil information and laboratory test data (California Department of Water
 13 Resources 2014). The proposed exploration is designed as a two-part program (Phases 2a and 2b)
 14 to collect geotechnical data relevant to engineering issues associated with conveyance facility
 15 construction (as opposed to learning more about the environmental impacts of those facilities). The
 16 two-part program will allow refinement of the second part of the program to respond to findings
 17 from the first part.

18 Because this new information allows for a more detailed assessment of the potential environmental
 19 effects resulting from geotechnical investigations than that which appeared in Chapter 31 of the
 20 Draft EIR/EIS, the activities described in the geotechnical plan have been incorporated into the
 21 revised impact analysis for Alternative 4 and the analysis of Alternatives 4A, 2D, and 5A in this
 22 RDEIR/SDEIS (see Section 3, *Alternative 4: Conveyance Facility Modifications*, for a description of
 23 other revisions to facility design and Appendix A for revised Draft EIR/EIS text).

24 **ES.3.7 Revisions to Cumulative Impact Analyses**

25 **ES.3.7.1 Summary of Analyses and Results**

26 In response to comments raised by key stakeholders during the public comment period, and in light
 27 of changes that have occurred over time in project landscapes and the availability of new
 28 information since the 2009 release of the Notice of Preparation and the 2011 commencement of the
 29 extensive amounts of modeling undertaken for the Draft EIR/EIS, the cumulative analysis presented
 30 in the Draft EIR/EIS has been revised.

31 CEQA Guidelines Section 15130 requires the consideration of cumulative impacts within an EIR
 32 when a proposed project's incremental contribution to a larger universe of significant cumulative
 33 effects from multiple projects is itself "cumulatively considerable." "Cumulatively considerable"
 34 means that "the incremental effects of an individual project are significant when viewed in
 35 connection with the effects of past projects, the effects of other current projects, and the effects of
 36 probable future projects." (CEQA Guidelines, § 15065[a][3]). A similar requirement to examine
 37 cumulative impacts exists for NEPA documents, and is required by Council on Environmental
 38 Quality (CEQ) regulations (CEQ 1987). Section 5 of this RDEIR/SDEIS updates and revises the
 39 cumulative impacts analysis presented in the Draft EIR/EIS; it also adds a discussion of the
 40 cumulative impacts associated with Alternatives 4A, 2D, and 5A.