

17.1 Introduction

This chapter describes the alternative formulation and screening process, presents the project alternatives included for analysis, and summarizes and compares the environmental impacts of the No-Project Alternative and the project alternatives.

17.2 Alternative Formulation and Screening

NEPA and CEQA require the analysis of a range of alternatives. The project sponsors developed alternatives by combining the salinity reduction, water delivery, and habitat restoration options presented in Section 2.5 of Chapter 2, “Site Description, Options, and Alternatives.”

Combining the four salinity reduction options, the water delivery option, and four habitat restoration options results in 16 possible alternatives. To ensure that a complete range of alternatives was analyzed, an additional alternative was added that does not use recycled water. With the No-Project Alternative, there are 18 possible project alternatives.

The project sponsors then screened these alternatives with respect to cost effectiveness, feasibility, and environmental impacts and achievement of overall project objectives for salinity reduction, water delivery, and habitat restoration. Table 17-1 shows the 18 alternatives, including the alternatives evaluated in this EIR/EIS, and also cross-referenced alternatives as numbered in the Corps’ Draft Feasibility Report. The No-Project Alternative was retained for detailed evaluation as required by CEQA and NEPA.

Table 17-1. Integration of Project Options to Create Project Alternatives

EIR/EIS Alternative Number	Salinity Reduction Option				Habitat Restoration Option				Recy. Water Use?	Feas. Report Alt. Number
	1A	1B	1C	2	1	2	3	4		
Alternatives Evaluated in the EIR/EIS										
No- Project	NA	NA	NA	NA	NA	NA	NA	NA	No	1
1	X				X				Yes	2
2		X			X				Yes	6
3		X				X			Yes	7
4		X					X		Yes	8
5		X						X	Yes	9
6			X		X				Yes	10
7				X				X	Yes	17
8		X			X				No	NA
Alternatives Eliminated from the Analysis in the EIR/EIS										
9	X					X			Yes	3
10	X						X		Yes	4
11	X							X	Yes	5
12			X			X			Yes	11
13			X				X		Yes	12
14			X					X	Yes	13
15				X	X				Yes	14
16				X		X			Yes	15
17				X			X		Yes	16

17.2.1 Alternatives Screening

All but one of the alternatives involving Salinity Reduction Option 2 were eliminated from further consideration because they would not meet the project goal of managing salinity levels in ponds to support a rich diversity of biota. Most of the alternatives involving Salinity Reduction Option 2 were eliminated because they would increase salinity in existing ponds, lengthen the amount of time to achieve desired salinity levels, and degrade existing habitats in Ponds 1, 1A, and 2, and would be substantially more expensive to implement. Salinity Reduction Option 2, with a breach of Pond 3, recycled water delivery, and Habitat Restoration Option 4, was retained because it represents the fastest overall habitat restoration process. Although this alternative degrades the existing habitat in Ponds 1, 1A, and 2, it provides an alternative to discharging to Napa Slough.

The Project and Program Components of the Water Delivery Option were retained for most alternatives because of the high level of interest from local water agencies and the San Francisco Bay RWQCB, and availability and

suitability of this supply of water to accelerate restoration of the upper ponds. Although the program water delivery component is general, subsequent environmental analysis would be conducted by SCWA before this component could be implemented.

All of the habitat restoration options were retained in at least one alternative. However, the project team screened out other combinations of salinity reduction and habitat restoration options to focus on Habitat Restoration Option 1 because it provides a mixture of pond and tidal marsh habitats, is the one that best meets the project goals, and is cost effective.

17.3 Alternatives Included for Analysis

Based on the above screening process, the following nine alternatives were included for detailed analysis:

- No-Project Alternative;
- Alternative 1: Napa River and Napa Slough Discharge (Salinity Reduction Option 1A), Recycled Water Delivery, and Mixture of Ponds and Tidal Marsh (Habitat Restoration Option 1);
- Alternative 2: Napa River and Napa Slough Discharge and Breach of Pond 3 (Salinity Reduction Option 1B), Recycled Water Delivery, and Mixture of Ponds and Tidal Marsh (Habitat Restoration Option 1);
- Alternative 3: Napa River and Napa Slough Discharge and Breach of Pond 3 (Salinity Reduction Option 1B), Recycled Water Delivery, and Tidal Marsh Emphasis (Habitat Restoration Option 2);
- Alternative 4: Napa River and Napa Slough Discharge and Breach of Pond 3 (Salinity Reduction Option 1B), Recycled Water Delivery, and Pond Emphasis (Habitat Restoration Option 3);
- Alternative 5: Napa River and Napa Slough Discharge and Breach of Pond 3 (Salinity Reduction Option 1B), Recycled Water Delivery, and Accelerated Restoration (Habitat Restoration Option 4);
- Alternative 6: Napa River and Napa Slough Discharge with Breaches of Ponds 3 and 4/5 (Salinity Reduction Option 1C), Recycled Water Delivery, and Mixture of Ponds and Tidal Marsh (Habitat Restoration Option 1);
- Alternative 7: Napa River and San Pablo Bay Discharge and Breach of Pond 3 (slight modification of Salinity Reduction Option 2), Recycled Water Delivery, and Accelerated Restoration (Habitat Restoration Option 4); and
- Alternative 8: Napa River and Napa Slough Discharge and Breach of Pond 3 (Salinity Reduction Option 1B), No Recycled Water, and Mixture of Ponds and Tidal Marsh (Habitat Restoration Option 1).

The salinity reduction portion of Alternative 7 is slightly modified from Salinity Reduction Option 2 and includes a breach of Pond 3. These impacts are considered under analysis of this alternative.

17.3.1 Comparison of Alternatives

17.3.1.1 Project Features

Project features are summarized in Table 17-2. Alternatives 1–8 are considered “action” alternatives. Each action alternative provides a mix of pond and new tidal habitat. The No-Project Alternative provides no tidal habitat. All alternatives assume that Ponds 1 and 1A would remain as ponds, managed in the same manner as they are now. Similarly, all action alternatives retain Ponds 7, 7A, and 8 as ponds. Ponds 1, 1A, 7, 7A, and 8 are accessible by land and are smaller in area, and therefore more easily managed and maintained than the island ponds. All action alternatives would convert Ponds 3 and 4 to tidal habitat. These two ponds are large and immediately adjacent to the Napa River and have deteriorating levees. (As described in Section 2.5.2, “Salinity Reduction Options,” Pond 3 is partially open to tidal exchange as a result of the ditches that were dug in August 2002, but salinity reduction of this pond still needs to be conducted.) All action alternatives except Alternative 4 also would convert Pond 5 to tidal habitat.

Under all action alternatives except Alternatives 3 and 4, Pond 6/6A could be restored to tidal habitat based on adaptive management considerations 10–20 years after Pond 3 is opened to tidal action. Alternative 3 would convert Ponds 6, 6A, and the eastern portion of Pond 2 (Pond 2E) to tidal habitat shortly after Ponds 3, 4, and 5 are opened to tidal action. Ponds not opened to tidal action would be retained as managed ponds.

All action alternatives include initial levee repairs to upgrade levees to a minimum 20-year life. Initial levee repairs would be required at Ponds 1, 1A, 2, 7, 7A, and 8. Under all action alternatives, these ponds would be maintained as ponds in the long term. Under Alternative 3, only the western portion of Pond 2 (Pond 2W) would require initial repairs, but a new levee would need to be built between Ponds 2E and 2W. All action alternatives except Alternative 3 also require initial levee repairs at Ponds 6/6A. Alternative 4 additionally requires initial external levee repairs at Pond 5. All action alternatives except Alternative 4 include the installation of four interior 100-foot breaches between Ponds 4 and 5 and between Ponds 6 and 6A to improve circulation within these two sets of linked ponds. No levee repairs or breaches would occur under the No-Project Alternative.

Alternative 1 includes water control structures on Pond 3, whereas all other action alternatives do not. Alternative 6 is the only action alternative that does not include water control structures on Pond 4/5. All action alternatives include the installation of water control structures on Ponds 7, 7A, and 8, and mixing of discharges from the upper ponds in a mixing chamber; all action alternatives would discharge from the mixing chamber to Napa Slough except Alternative 7, which would discharge to San Pablo Bay. Alternatives 1–6 and 8 also include desalination of Ponds 6/6A by means of water control structures into Pond 5 and from there into the Napa River. Alternative 7 instead would discharge water from the upper ponds through Ponds 6/6A, 2, and 1/1A into San Pablo Bay.

Table 17-2. Comparison of Project Features and Outcomes

Project Features	No-Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Ponds Opened to Full Tidal Action	None	3, 4, and 5	3, 4, and 5	3, 4, 5, 6, 6A, and 2E	3 and 4	3, 4, and 5	3, 4, and 5	3, 4, and 5	3, 4, and 5
Acreage of Ponds Opened to Full Tidal Action	None	2,904	2,904	4,373	2,162	2,904	2,904	2,904	2,904
Ponds Retained as Ponds	1, 1A, 2, 3, 4, 5, 6, 6A, 7, 7A, and 8	1, 1A, 2, 7, 7A, and 8	1, 1A, 2, 7, 7A, and 8	1, 1A, 2W, 7, 7A, and 8	1, 1A, 2, 5, 6, 6A, 7, 7A, and 8	1, 1A, 2, 7, 7A, and 8	1, 1A, 2, 7, 7A, and 8	1, 1A, 2, 7, 7A, and 8	1, 1A, 2, 7, 7A, and 8
Acreage of Ponds Retained as Ponds	6,457	2,407	2,407	2,080	4,295	2,407	2,407	2,407	2,407
Adaptive Management of Ponds 6/6A	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Initial Levee Repairs (lineal feet)	None	46,460	46,460	24,130	47,670	46,460	46,460	46,460	46,460
New Water Control Structures at Pond 3	No	Yes	No	No	No	No	No	No	No
New Water Control Structures at Ponds 4/5	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
New Water Control Structures at Ponds 6/6A	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
New Siphon from Ponds 6/6A to Pond 2	No	No	No	No	No	No	No	Yes	No
New Water Control Structures and Mixing Chamber for Upper Ponds (Ponds 7, 7A, and 8)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Discharge from Upper Ponds to Napa Slough	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Discharge from Upper Ponds through Ponds 6/6A, 2, and 1/1A to San Pablo Bay	No	No	No	No	No	No	No	Yes	No
Use of Recycled Water	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Breaches for Habitat Restoration (number)	None	23	23	31	19	23	23	23	23
Ditch Blocks for Habitat Restoration (number)	None	22	22	26	16	22	22	22	22
Levee Lowering (lineal feet)	None	22,200	22,200	34,600	14,600	22,200	22,200	22,200	22,200
Starter Channels with Berms (lineal feet)	None	27,500	27,500	40,600	19,600	55,300	27,500	55,300	27,500
100-Acre Fill	No	No	No	No	No	Yes	No	Yes	No
Ongoing Levee Repairs	Limited	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

(Continued)

Table 17-2. Continued

Project Features	No-Project	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Water Quality Monitoring	Limited	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Biological and Hydrological Monitoring	None	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Replacement of Water Control Structures	Minimal	At Ponds 1, 1A, 2, 7, 7A, and 8. Also possibly 6/6A.	At Ponds 1, 1A, 2, 7, 7A, and 8. Also possibly 6/6A.	At Ponds 1, 1A, 2W, 7, 7A, and 8	At Ponds 1, 1A, 2, 5, 6, 6A, 7, 7A, and 8	At Ponds 1, 1A, 2, 7, 7A, and 8. Also possibly 6/6A.	At Ponds 1, 1A, 2, 7, 7A, and 8. Also possibly 6/6A.	At Ponds 1, 1A, 2, 7, 7A, and 8. Also possibly 6/6A.	At Ponds 1, 1A, 2, 7, 7A, and 8. Also possibly 6/6A.
Salinity Reduction Duration (approx. years)									
Pond 3	1	1-2 years	<1 month	<1 month	<1 month	<1 month	<1 month	<1 month	<1 month
Pond 4/5	NA	3-5 ^a	3-5	3-5	3-5	3-5	<1 month	3-5	3-5
Pond 6/6A	NA	1	1	1	1	1	1	1	1
Pond 7	NA	30-50 ^b	30-50 ^b	30-50 ^b	30-50 ^b	30-50 ^b	30-50 ^b	<10 ^b	50+(?)
Pond 7A	NA	1	1	1	1	1	1	1	1
Pond 8	1	1	1	1	1	1	1	1	1
Habitat Types at Year 50 (approx. acres)									
Subtidal	Unknown	770	770	930	680	770	770	770	770
Intertidal mudflat		1,620	1,620	2,800	930	900	1,620	900	1,620
Lower marsh		90	90	230	80	640	90	640	90
Middle marsh		2,190	2,190	2,180	2,220	2,360	2,190	2,360	2,190
Managed ponds		3,550 ^c	3,550 ^c	2,080	4,290	3,550 ^c	3,550 ^c	3,550 ^c	3,550 ^c

^a Includes 1-2 years salinity reduction for Pond 3.

^b Based on a bittern dilution ratio of 1:100.

^c If Ponds 6 and 6A are also restored to tidal marsh after 10–20 years, the total acreage of managed ponds at year 50 would be 2,404.

Alternatives 1–6 and 8 would avoid any discharges through Ponds 1, 1A, and 2. Alternative 7 would use these ponds as additional dilution/mixing chambers for water discharged from the upper ponds and require the installation of an additional 63-inch-diameter culvert under SR 37. All action alternatives include monitoring of the discharge, fish screens on intakes from Napa Slough or the Napa River if needed, and diffusers on outfalls to the Napa River and Napa Slough. All action alternatives except Alternative 8 include the use of recycled water.

All action alternatives also have common habitat restoration elements. All action alternatives include breaches, starter channels and berms, and levee lowering at Ponds 3 and 4. All action alternatives except Alternative 4 also include these habitat restoration features at Pond 5. Alternative 3 additionally includes these habitat restoration features at Ponds 2E and 6/6A. The extent of levee lowering would be greatest under Alternative 3, and the extent of starter channels and berms would be greatest under Alternatives 5 and 7. In addition, these two alternatives include an approximately 100-acre fill to compensate for the potential fringing marsh loss when ponds are first opened to tidal action.

All alternatives incorporate adaptive management of the project area. Specifically, ponds would be opened to tidal action in a manner that allows orderly development of habitat to occur. Under Alternatives 1 and 2 and 5–8, Ponds 6 and 6A also become a major focus of adaptive management. The two ponds would be retained as ponds for the first 10–20 years of the project, and then, depending on a variety of factors, could be converted to tidal habitat or maintained as ponds in the long term.

All action alternatives also include installation of replacement water control structures at the start of the project for Ponds 1, 1A, and 2, and as needed during the life of the project for the ponds retained as ponds. Levee maintenance of all ponds retained as ponds would occur on a regular schedule. Only limited levee repair and repair or replacement of water control structures would occur under the No-Project Alternative.

17.3.1.2 Environmental Effects

The environmental analysis indicates that the construction and operation of the alternatives could result in significant adverse impacts on hydrology, water quality, vegetation, wildlife, aquatic resources, geology and soils, hazardous materials, transportation and circulation, air quality, noise, and cultural resources (Table 17-3). These impacts would occur under all alternatives, mostly during the construction/salinity reduction phase of the project. Nearly all impacts would be reduced to a less-than-significant level as a result of mitigation.

Each alternative would also result in beneficial impacts on flooding, water quality, wildlife, and aquatic resources. Table 17-4 provides a summary of beneficial impacts. Generally, these beneficial impacts vary as a result of the different acreage of habitat types that would eventually occur under each alternative.

Although the alternatives share common impacts, the duration and intensity of these impacts help distinguish the alternatives from one another. Table 17-2 provides information that helps describe the duration and intensity of impacts. The following discussion of impacts on water quality, wildlife, aquatic resources, air quality and noise, and cultural resources summarizes the relative difference in intensity and duration of impacts between alternatives.

Water Quality

The duration of adverse impacts on water quality associated with salinity reduction would be similar under Alternatives 1, 2, 3, 4, and 5 because the period necessary to meet salinity reduction targets in Ponds 3, 4/5, and 7 would be nearly the same. The duration of water quality impacts would be greatest under Alternative 8 because of the relatively long period necessary to reduce the salinity in Pond 7. Conversely, the duration of adverse impacts on water quality would be shortest under Alternatives 6 and 7 because of the short period necessary to improve water quality in the lower ponds and meet water quality objectives in Pond 7.

Construction activities necessary to lower and breach levees would also adversely affect water quality. The intensity of water quality impacts would be greatest under Alternative 3 because nearly 15,000 linear feet of levee would be lowered (Table 17-2). This would be followed by Alternatives 1, 2, 5, 6, 7, and 8, each of which includes 10,900 linear feet of lowered levees. Impacts on water quality associated with habitat restoration levee breaches would be nearly the same for Alternatives 1, 2, 5, 6, 7, and 8 because they include the same number of breaches. Impacts would be slightly less under Alternative 4 because it requires the fewest number of habitat restoration levee breaches, and slightly more under Alternative 3 because there is one more breach than under the other alternatives.

Wildlife

Construction related impacts on wildlife and wildlife habitat would occur as a result of lowering levees, constructing water control structures, and breaching levees. Similar to impacts associated with water quality, the intensity and extent of impacts on wildlife associated with construction would be greatest under Alternative 3 because it requires the greatest amount of land-disturbing activity (Table 17-2). Impacts on wildlife associated with constructing Alternatives 1, 2, 5, 6, and 7 would be less than those under Alternative 3 because less land-disturbing activity would occur. Although impacts on wildlife associated with disturbing land at the ponds would be the same for Alternatives 1, 2, 5, 6, 7, and 8, short-term construction related impacts on wildlife would be less under Alternative 4 because there is less levee lowering and Alternative 8 because the pipelines proposed for importing treated wastewater would not be constructed.

Table 17-3. Summary of Significant Environmental Effects and Mitigation Measures

Resource/Effect	LOS Before Mitigation *	Mitigation	LOS After Mitigation *	Applicable Alternatives
Hydrology				
H-2: Modification of Surface Drainage Patterns	S	Measure H-2 (Avoid Drainage Pattern Alteration in Plans for Future Pipeline Alignments)	LTS	1, 2, 3, 4, 5, 6, 7
H-3: Increased Risk of Property Damage, Injury, or Death as a Result of Flooding	S	Measure H-1 (Repair Unintended Levee Breaches)	LTS	2, 3, 4, 5, 6, 8
H-7: Potential Increase in Flood Risk on Adjacent Properties as a Result of Increased Discharge in Tidal Channels	S	Measure H-3 (Refine Project Design to Limit Adverse Effects of Increased Tidal Discharge)	LTS	1, 2, 3, 4, 5, 6, 7, 8
H-8: Potential Increase in Flood Risk on Adjacent Properties as a Result of Wave Erosion	S	Measure H-4 (Evaluate Susceptibility of Levees to Wind-Driven Wave Erosion and Conduct Repairs as Needed)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Water Quality				
WQ-1: Long-Term Potential for Discharge of Contaminants to Adjacent Surface Water	S	None required for No-Project Alternative	NA	No-Project
WQ-2: Short-Term Construction-Related Water Quality Impacts	S	Measure WQ-1 (Obtain RWQCB Authorization under Waste Discharge Requirements or NPDES Stormwater Permit for General Construction Activity and Implement Best Management Practices)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure WQ-5 (Prepare Levees and Time Breaches)	LTS S	1, 2, 4, 6, 8 3, 5
		Measure WQ-6 (Prepare and Implement Storm Water Pollution Prevention Plans)	LTS	1, 2, 3, 4, 5, 6, 7
WQ-3: Increase in Salinity in the Napa River	S	Measure WQ-2 (Design Project in Compliance with Resource Agency Permit Conditions and Conduct Water Quality Monitoring)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure WQ-5 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
WQ-4: Increase in Conventional and Toxic Constituents	S	Measure WQ-2 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8

* LOS = Level of Significance; LTS = Less than Significant; S = Significant; SR = salinity reduction component of alternative; SU = Significant and Unavoidable.

Table 17-3. Continued

Resource/Effect	LOS Before Mitigation *	Mitigation	LOS After Mitigation *	Applicable Alternatives
Water Quality (continued)				
WQ-5: Discharges of Priority Toxic Constituents in the Napa River and Local Sloughs	S	Measure WQ-2 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
WQ-6: Increase in Contribution of Conventional and Toxic Constituents from Recycled Water	S	Measure WQ-3 (Design, Operate, and Monitor Use of Recycled Water in Accordance with RWQCB Requirements)	LTS	1, 2, 3, 4, 5, 6, 7, 8
WQ-7: Water Quality Changes in the Salt Ponds	S	Measure WQ-4 (Monitor Pond Water Quality and Use Adaptive Management)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Biological Resources—Vegetation				
V-2: Temporary Alteration of Common Vegetation and Sensitive Communities	S	Measure V-2 (Conduct Preconstruction Surveys and Implement Impact Avoidance, Minimization, and Mitigation Measures)	LTS	1, 2, 3, 4, 5, 6, 7
V-3: Removal of Soft Bird's-Beak	S	Measure V-1 (Avoid Ground Disturbance in Populations of Soft Bird's-Beak)	LTS	1, 2, 3, 4, 5, 6, 7, 8
V-7: Invasion of Nonnative Species	S	Measure V-3 (Monitor and Manage Invasive Exotic Plant Species)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Biological Resources—Wildlife				
W-1: Long-Term Decline in Habitat Value and Function	S	None required for No-Project Alternative	NA	No-Project
W-2: Temporary Disturbance of Wildlife	S	None required for No-Project Alternative	NA	No-Project
W-3: Construction-Related Disturbance and Mortality of Special-Status Species	S	Measure W-1 (Avoid Construction Activities near Nesting Habitats during Breeding Season)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure W-4 (Complete Focused Surveys for Special-Status Wildlife Species before Construction)	LTS	1, 2, 3, 4, 5, 6, 7
		Measure W-5 (Educate Construction Crews regarding Special-Status Wildlife Species)	LTS	1, 2, 3, 4, 5, 6, 7
		Measure W-6 (Use Trenchless Construction Techniques for Special-Status Wildlife Species Protection)	LTS	1, 2, 3, 4, 5, 6, 7
		Measure W-7 (Restore Habitat Modified by Construction)	LTS	1, 2, 3, 4, 5, 6, 7

* LOS = Level of Significance; LTS = Less than Significant; S = Significant; SR = salinity reduction component of alternative; SU = Significant and Unavoidable.

Table 17-3. Continued

Resource/Effect	LOS Before Mitigation *	Mitigation	LOS After Mitigation *	Applicable Alternatives
Biological Resources—Wildlife (continued)				
W-4: Construction-Related Disturbance and Mortality of Salt Marsh Harvest Mouse and Suisun Ornate Shrew	S	Measure W-2 (Avoid Construction Activities near Occupied Suisun Ornate Shrew Habitat or Remove Shrews)	LTS	1, 2, 3, 4, 5, 6, 7
		Measure W-3 (Avoid Construction Activities near Occupied Salt Marsh Harvest Mouse Habitat)	LTS	1, 2, 3, 4, 5, 6, 7
W-5: Exposure of Wildlife to Contaminants during Construction	S	Measure WQ-1 (<i>see “Water Quality” above</i>)	LTS	1, 2, 3, 4, 5, 6, 7
W-6: Interference with the Movement of Wildlife	S	Measure W-4 (Complete Wildlife Surveys before Construction)	LTS	1, 2, 3, 4, 5, 6, 7
Biological Resources—Aquatic Resources				
A-1: Reduced Water Quality as a Result of Uncontrolled Breaches of Levees	S	None required for No-Project Alternative	S	No-Project
A-4: Stranding of Fish and Other Aquatic Organisms as a Result of Levee Repairs	S	None required for No-Project Alternative	S	No-Project
A-5: Entrainment of Fish and Other Aquatic Organisms through Diversions into the Managed Ponds	S	None required for No-Project Alternative	S	No-Project
		Measure A-1 (Minimize Entrainment of Sensitive Species)	LTS	1, 2, 3, 4, 5, 6, 7, 8
A-6: Short-Term Reduction in Aquatic Habitat Suitability during Construction Activities	S	Measure WQ-1 (<i>see “Water Quality” above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure A-2 (Install Cofferdams to Minimize In-Water Construction)	LTS	1, 7
		Measure A-4 (Use Trenchless Technology during Construction to Protect Aquatic Species)	LTS	1, 2, 3, 4, 5, 6, 7
A-7: Reduction in Aquatic Habitat Suitability as a Result of the Deterioration of Water Quality	S	Measure WQ-2 (<i>see “Water Quality” above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure WQ-3 (<i>see “Water Quality” above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure WQ-4 (<i>see “Water Quality” above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure A-3 (Assess and Maintain Salinity Levels Protective of Aquatic Resources)	LTS	1, 2, 3, 4, 5, 6, 7, 8
A-9: Substantial Interference with the Movement or Migration of Fish Species	S	Measure A-4 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7
A-11: Short-Term Construction-Related Impacts	S	Measure WQ-1 (<i>see “Water Quality” above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8

* LOS = Level of Significance; LTS = Less than Significant; S = Significant; SR = salinity reduction component of alternative; SU = Significant and Unavoidable.

Table 17-3. Continued

Resource/Effect	LOS Before Mitigation *	Mitigation	LOS After Mitigation *	Applicable Alternatives
Geology and Soils				
Geo-1: Levee Failure as a Result of Strong Seismic Ground Shaking	S	None required for No-Project Alternative	S	No-Project
Geo-2: Levee Failure as a Result of Erosion	S	None required for No-Project Alternative	S	No-Project
Geo-4: Landslide, Lateral Spreading, Subsidence, Liquefaction, or Collapse as a Result of Construction on Unstable Soils	S	Measure Geo-3 (Remove Unstable or Expansive Soils and Backfill with Engineered Fill)	LTS	1, 2, 3, 4, 5, 6, 7
Geo-5: Risk to Life or Property as a Result of Construction of Structures on Expansive Soils	S	Measure Geo-3 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7
Geo-7: Potential Erosion as a Result of Excess Pond Water Height	S	Measure Geo-2 (Maintain Water Level 2 Feet below Levee Crest)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Geo-8: Potential Erosion as a Result of Increased Tidal Prism	S	Measures H-1, H-3, and H-4 (<i>see "Hydrology" above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Hazards and Hazardous Materials				
Haz-1: Potential Release of Bittern or Highly Saline Brines into the Environment as a Result of Levee Breaching	S	None required for No-Project Alternative	S	No-Project
Haz-2: Potential Exposure to and/or Release of Hazardous Materials/Waste Associated with Construction Activities	S	Measure Haz-1 (Provide Enhanced Spill Prevention and Response Training, and Spill Response Preparation)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Haz-4: Potential Releases of Residual Hazardous Materials or Constituents from Breaching of Levees	S	Measure Haz-2 (Employ Explosives Experts when Breaching Levees)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Haz-5: Potential Releases of Irritant Dust as a Result of Construction Activities	S	Measure Haz-3 (Develop and Implement a Health and Safety Plan)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure Haz-4 (Monitor Perimeter Dust Concentrations during Work on and in the Vicinity of Pond 8)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Haz-9: Exposures Resulting from Exceeding Human Health Criteria	S	Measure Haz-5 (Prepare and Implement a Safety Plan)	LTS	1, 2, 3, 4, 5, 6, 7
Transportation and Circulation				
T-3: Increase in Construction-Related Traffic Hazards	S	Measure T-1 (Implement Safety Plan for Pipeline Construction along Rail Line)	LTS	1, 2, 3, 4, 5, 6, 7
		Measure T-2 (Implement Safety Plan for Construction along Public Roads)	LTS	1, 2, 3, 4, 5, 6, 7

* LOS = Level of Significance; LTS = Less than Significant; S = Significant; SR = salinity reduction component of alternative; SU = Significant and Unavoidable.

Table 17-3. Continued

Resource/Effect	LOS Before Mitigation *	Mitigation	LOS After Mitigation *	Applicable Alternatives
Air Quality				
AQ-3: Potential Releases of Irritant Dust as a Result of Construction Activities	S	Measure AQ-1 (Minimize Dust Generation and Implement Dust Control Measures for Work Areas with Salt Crusts)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure Haz-3 (see “Hazards and Hazardous Materials” above)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure Haz-4 (see “Hazards and Hazardous Materials” above)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Noise				
N-1: Temporary Increase in Ambient Noise Levels as a Result of Emergency Repairs	SU	None required for No-Project Alternative	SU	No-Project
N-2: Temporary Increase in Ambient Noise Levels as a Result of Construction	SU	Measure N-1 (Decrease Noise Levels with Use of Noise Reduction Devices)	SU	1, 2, 3, 4, 5, 6, 7
Land Use and Planning				
LU-1: Compatibility with Land Use Goals and Objectives	S	Measure N-1 (see “Noise” above)	LTS	1, 2, 3, 4, 5, 6, 7
Public Services and Utilities				
PS-2: Increased Risk of Instability of Power Towers	S	Measure PS-1 (Ensure the Stability of the Power Towers)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Recreation, Public Access, Visual Resources, and Public Health				
R-6: Increased Mosquito Production	S	Measure R-1 (Coordinate Project Activities with the Napa County Mosquito Abatement District)	LTS	1, 2, 3, 4, 5, 6, 7, 8
R-7: Conflicts with Existing or Planned Recreational Uses, and Recreation Plans and Policies	S	Measure R-2 (Prepare a Public Access Plan)	LTS	1, 2, 3, 4, 5, 6, 7
Cultural Resources				
C-2: Potential for Ground-Disturbing Activities to Damage Previously Unidentified Buried Cultural Resources Sites	S	Measure C-1 (Stop Work If Cultural Resources Are Discovered during Ground-Disturbing Activities)	LTS	1, 2, 3, 4, 5, 6, 7, 8

* LOS = Level of Significance; LTS = Less than Significant; S = Significant; SR = salinity reduction component of alternative; SU = Significant and Unavoidable.

Table 17-3. Continued

Resource/Effect	LOS Before Mitigation *	Mitigation	LOS After Mitigation *	Applicable Alternatives
Cultural Resources (continued)				
C-3: Potential to Damage Previously Unidentified Human Remains	S	Measure C-2 (Comply with State Laws Pertaining to the Discovery of Human Remains)	LTS	1, 2, 3, 4, 5, 6, 7, 8
C-4: Changes in the Significance of a Historic and/or Archaeological Resource	S	Measure C-3 (Conduct Archaeological Monitoring of Construction Activities in the Vicinity of CA-NAP-224, C-164, and CA-NAP-230)	LTS	1, 2, 3, 4, 5, 6, 7
		Measure C-4 (Conduct Records Search and Visual Survey)	LTS	1, 2, 3, 4, 5, 6, 7
C-5: Disturbance of Human Remains	S	Measure C-2 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7
Cumulative Impacts				
Cu-1: Cumulative Hydrologic Changes in the Lower Napa River	S	Measure Cu-1 (Implement Monitoring and Adaptive Management Program)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Cu-2: Cumulative Adverse Change in Water Quality	S	Measure WQ-2 (<i>see "Water Quality" above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
		Measure Cu-1 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Cu-4: Increase in Nonnative Smooth Cord Grass	S	Measure V-3 (<i>see "Biological Resources—Vegetation" above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Cu-5: Cumulative Reduction in Sensitive Vegetation Species and their Habitats	S	Measure Cu-2 (Conduct Biological Surveys for Sensitive Biological Resources)	LTS	1, 2, 3, 4, 5, 6, 7, 8
Cu-8: Cumulative Reduction in Sensitive Wildlife Species and their Habitats	S	Measure Cu-2 (<i>see above</i>)	LTS	1, 2, 3, 4, 5, 6, 7, 8

* LOS = Level of Significance; LTS = Less than Significant; S = Significant; SR = salinity reduction component of alternative; SU = Significant and Unavoidable.

Table 17-4. Summary of Beneficial Impacts

Resource/Effect	Applicable Alternatives
Hydrology	
H-1: Reduced Risk of Property Damage, Injury, or Death as a Result of Flooding	1, 2, 3, 4, 5, 6, 7, 8
H-5: Increased Flood Conveyance Capacity	1, 2, 3, 4, 5, 6, 7, 8
Water Quality	
W-8: Long-Term Changes to Water Quality in Local Rivers and Salt Ponds from Project Operations	1, 2, 3, 4, 5, 6, 7
Biological Resources—Vegetation	
V-5: Long-Term Enhancement of Common Vegetation and Sensitive Communities	1, 2, 3, 4, 5, 6, 7, 8
Biological Resources—Wildlife	
W-7: Increase in Mudflat Foraging Habitat	1, 2, 3, 4, 5, 6, 7, 8
W-8: Long-Term Increase in Subtidal Habitat	1, 2, 3, 4, 5, 6, 7, 8
W-9: Increase in Lower Marsh and Middle Marsh Habitats	1, 2, 3, 4, 5, 6, 7, 8
W-10: Lowering of Levees to Create Marsh Habitat	1, 2, 3, 4, 5, 6, 7, 8
Biological Resources—Aquatic Resources	
A-10: Substantial Increase in Habitat Area and Types	1, 2, 3, 4, 5, 6, 7, 8
Geology and Soils; Hazards and Hazardous Materials; Transportation and Circulation; Air Quality; Noise; Land Use and Planning; Public Services and Utilities	
No beneficial impacts for these resource areas.	
Recreation, Public Access, Visual Resources, and Public Health	
R-1: Enhanced Recreational Opportunities	1, 2, 3, 4, 5, 6, 7, 8
Cultural Resources	
No beneficial impacts for this resource area.	
Cumulative Impacts	
C-3: Cumulative Change in Sensitive Plant Communities	1, 2, 3, 4, 5, 6, 7, 8
C-6: Long-Term Increase in Lower and Middle Marsh Habitat Suitable for Special-Status Species	1, 2, 3, 4, 5, 6, 7, 8
C-9: Increase in Subtidal Habitat	1, 2, 3, 4, 5, 6, 7, 8

Wildlife would benefit from restoration of the salt ponds that would occur under Alternatives 1–8. The extent of this benefit is a function of the types of habitat that would be created, which includes subtidal, intertidal mudflat, lower marsh, middle marsh, and managed ponds. The acreage of these beneficial habitat types varies among the different alternatives (Table 17-2).

Aquatic Resources

Most impacts on aquatic resources would occur under the construction and salinity reduction phase of each alternative. The extent of impacts on aquatic resources during the salinity reduction phase are expected to be less under Alternatives 4 and 6 than under other alternatives because under Alternative 4 fewer ponds would be opened to tidal action, and under Alternative 6 salinity reduction of the lower ponds would occur relatively quickly reducing the potential for adverse effects to aquatic resources. Impacts are expected to be slightly greater under Alternatives 1, 2, 3, 5, 7 and 8 because these alternatives would result in the greatest number of ponds being reopened to tidal action. Opening these ponds would result in short-term adverse impacts on aquatic resources as a result of decreased water quality, and increased potential of entrainment and stranding. Recycled water would be sent to the Napa River, North Slough, Hudeman Slough, or other existing discharge locations and would not adversely or beneficially affect aquatic resources.

Similar to wildlife, aquatic resources would benefit as a result of the restoration that would occur under Alternatives 1–8. This benefit would vary among alternatives based on the mix of habitat types that are restored and the number of ponds that are open to tidal exchange (Table 17-2).

Air Quality and Noise

The extent of air quality and noise impacts is directly related to the amount of ground-disturbing activities that would be required under each alternative. Impacts would be greatest under Alternative 3 because it includes the greatest amount of land-disturbing activities when starter channel construction, levee lowering, breaches, and pipeline construction are combined (Table 17-2). Air quality and noise impacts would be less under Alternatives 1, 2, 4, 5, 6, and 7 than under Alternative 3 because less land-disturbing activity would occur. Impacts on air quality and noise would be less under Alternative 8 than under all other alternatives because the pipelines proposed for importing treated wastewater would not be constructed.

Cultural Resources

Impacts on cultural resources generally would be limited to the construction phase of the project, although some effects could occur during habitat restoration as sloughs erode. The potential to affect cultural resources is higher for those

alternatives that include the greatest amount of land-disturbing activity, such as levee lowering, construction of water control structures, and breaching levees. Impacts on cultural resources would be greatest under Alternatives 3 and 5 because these alternatives require the greatest amount of land-disturbing activity (Table 17-2). Potential impacts on cultural resources would be less under Alternatives 1, 2, 4, 5, 6, and 7 because less land-disturbing activity would occur. Although the potential for impacts on cultural resources would be the nearly the same for Alternatives 1, 2, 6, 7, and 8, potential impacts are expected to be less under Alternative 8 because the pipelines proposed for importing treated wastewater would not be constructed.

17.3.2 Additive Impacts

By combining the salinity reduction, water delivery, and habitat restoration options, there is potential for additive impacts, or new impacts that could result from combining project options.

While the timing of combinations of construction and operation activities would differ for each alternative, the location, intensity, and duration of these activities were described in the impact analysis for the salinity reduction, water delivery, and habitat restoration options. There would not be any additive short-term construction- or long-term operation-related impacts for any of the resource topics that are not already addressed in the EIR/EIS.

17.4 Alternative Selection

17.4.1 Environmentally Superior Alternative

The environmentally superior alternative is the alternative that would result in the least damage to the biological and physical environment, and that protects, preserves, and enhances the historical, cultural, and natural resources of the project area. As this is a restoration project, all alternatives by definition would benefit the biological and physical environment and are designed to enhance the natural resources in the project area. However, Alternative 6 (Draft Feasibility Report Alternative 10) is considered the environmentally superior alternative because it would result in relatively quick salinity reduction of the lower ponds (several weeks for Pond 3 and several months for Pond 4/5), reducing the potential for adverse effects to aquatic resources. Construction-related ground disturbance associated with this alternative is equivalent to Alternatives 1, 2, 5, 7, and 8, and less than Alternative 3. While there would be more construction-related ground disturbance than under Alternative 4, Alternative 4 does not result in the optimal mix of restored habitats. The short period of time for salinity reduction helps the habitat restoration process proceed sooner under Alternative 6 than all others except Alternative 5 (which requires the use of fill). Alternative 6 (Draft Feasibility Report Alternative 10) provides a mixture of pond and tidal marsh habitats that meets the project objectives and is phased in a way that would

minimize current and future adverse effects. Though some effects are less with Alternative 8, these effects can be mitigated and the recycled water is needed to accelerate the salinity reduction process of the upper ponds.

The No-Project Alternative is not considered the environmentally superior alternative because of the continued deterioration of the site and potential for long-term adverse water quality effects.

17.4.2 Proposed Project

The project sponsors will select either Alternative 2 (Draft Feasibility Report Alternative 6) or Alternative 6 (Draft Feasibility Report Alternative 10) as the proposed project. These two alternatives are nearly identical except for their treatment of Ponds 4 and 5 during salinity reduction. Alternative 2 (Draft Feasibility Report Alternative 6) uses water control structure to reduce salinities in Ponds 4 and 5, while Alternative 6 (Draft Feasibility Report Alternative 10) uses levee breaches to reduce salinity. The project sponsors are working with the RWQCB to select the proposed project. The proposed project will be identified in the Final EIR/EIS. The Draft Feasibility Report identifies Alternative 6 (Draft EIR/EIS Alternative 2) as the recommended plan.