

PRELIMINARY CALFED HCP PROGRAMMATIC ACTION CODE KEY

Ecological Zone Code Key

The following represent the numerical codes assigned to each of the Ecosystem Restoration Program Plan (ERPP) ecological zones. These two digit codes are used in the code designations described for each of the CALFED component programs.

- 01= Sacramento-San Joaquin Delta
- 02= Suisun Marsh/North San Francisco Bay
- 03= Sacramento River
- 04= North Sacramento Valley
- 05= Cottonwood Creek
- 06= Colusa Basin
- 07= Butte Basin
- 08= Feather River/Sutter Basin
- 09= American River Basin
- 10= Yolo Basin
- 11= Eastside Delta Tributaries
- 12= San Joaquin River
- 13= East San Joaquin Basin
- 14= West San Joaquin Basin

Additional Zone Codes Assigned to the Water Quality Program Actions

- 15= Sacramento River Region
- 16= San Francisco Bay Watershed Region
- 17= CALFED Solution Area
- 18= San Joaquin River Region

Ecosystem Restoration Program

Each programmatic action is assigned a unique alpha-numeric code (e.g., E011503). The initial letter "E" indicates the programmatic action is identified in the Ecosystem Restoration Program Plan (ERPP). The letter code is followed by three 2-digit codes ordered from left to right that represent the ERPP ecological zone where the action would be implemented (e.g., in the code E011503, 01 would indicate the action would be implemented in the Sacramento-San Joaquin Delta Ecological Zone), the ERPP resource element the action addresses (e.g., in the code E011503, 15 would represent an action that addresses the seasonal wetland resource element), and the programmatic action itself (e.g., in the code E011503, 03 represents the third programmatic action described in the ERPP for the Sacramento-San Joaquin Delta Ecological

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Zone under the seasonal wetland resource element).

Water Quality Program

Each programmatic action is assigned a unique alpha-numeric code (e.g., W130206). The initial letter "W" indicates the programmatic action is identified in the Water Quality Program Plan (WQPP). The letter code is followed by three 2-digit codes ordered from left to right that represent the ERPP ecological zone where the action would be implemented (e.g., in the code W130206, 13 would indicate the action would be implemented in the East San Joaquin Basin Ecological Zone), the WQPP action category in which the action is proposed (e.g., in the code W130206, 02 would represent an action that addresses the Urban and Industrial Runoff action category), and the programmatic action itself (e.g., in the code W130206, 06 represents the sixth programmatic action described in the WQPP for the East San Joaquin Basin Ecological Zone under the Urban and Industrial Runoff action category).

Levee System Integrity Program

To come following completion of the Levee System Integrity Program Plan (LSIP).

For preparation of the preliminary draft HCP species tables, each LSIP long-term action category described in Appendix D to the CALFED Phase II Alternatives Description was numbered sequentially and assigned an alpha prefix of L.

Water Use Efficiency Program

To come following completion of the Water Use Efficiency Program Plan.

Conveyance Facilities

The coding procedure described below is a placeholder for demonstrating how conveyance facility actions would be evaluated in the HCP using Program Alternative Variation 3E as an example.

Each programmatic action is assigned a unique alpha-numeric code (e.g., C3E0114). The initial letter "C" indicates the programmatic action is identified as a conveyance facility action in

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the CALFED Alternatives. The letter code is followed by on two place alpha-numeric code and two 2-digit codes ordered from left to right that represent the CALFED Alternative variation, the ERPP ecological zone where the action would be implemented (e.g., in the code C3E0114, 3E would indicate the action would be implemented under Alternative 3, variation E), the ERPP ecological zone where the action would be implemented (e.g., in the code C3E0114, 01 would indicate the action would be implemented in the Sacramento-San Joaquin Delta Ecological Zone), and the programmatic action itself (e.g., in the code C3E0114, 14 represents the fourteenth programmatic action described in Alternative 3, variation E for implementation in the Sacramento-San Joaquin Delta Ecological Zone).

Storage Facilities

This code is a placeholder for demonstrating how storage facility actions would be evaluated in the HCP using Program Alternative Variation 3E as an example.

Storage facility programmatic actions are assigned codes as described for conveyance facilities, except action codes begin with the letter S.

Table Xa. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting Species "X"

Summary Outcome (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Region: The name of the CALFED Solution Area region. This row is inserted at the beginning of column descriptions for CALFED activities in each region in the following order: Delta, Bay, Sacramento River, and San Joaquin River in which the actions would be implemented.		
<p>1. Summarizes the potential outcome(s) of implementing actions described in the <u>Applicable Programmatic Actions column</u> as they pertain to the species being evaluated.</p> <p><i>For example, the greater sandhill crane could be affected by the loss of some types of agricultural cover types. Many actions would result in the loss of agricultural lands and the outcome of those actions could be summarized as "Convert up to approximately 115,000 acres of agricultural lands to aquatic, wetland, and riparian habitat areas".</i></p>	<p>List of Common Program and Conveyance and Storage Facility programmatic action codes which, if implemented, would contribute to the <u>Summary Outcome</u> described in the first table column.</p>	<p>List of types of activities that could be associated with implementing actions described in the <u>Applicable Programmatic Actions column</u> that could result in take of the species.</p> <p><i>For example, actions that would create wetlands could include activities such as:</i></p> <ol style="list-style-type: none"> 1. <i>Constructing setback levees</i> 2. <i>Grading and filling</i> 3. <i>Removing or breaching levees</i> 4. <i>Installing structures that restrict channel flow</i> 5. <i>Excavating channels</i> 6. <i>Temporarily or permanently inundating land</i>

Table Xb. Potential CALFED Program Effects and Mitigation Measures for Species "X"

Overall Program Effect with Mitigation: This row provides a brief description of the combined effect of implementing CALFED Common Programs and Conveyance and Storage Facility actions with mitigation on the species being evaluated throughout the species range within the CALFED solution area.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
<p>Region: The name of the CALFED Solution Area region. This row is inserted at the beginning of column descriptions for Program activities in each region in the following order: Delta Bay, Sacramento River, and San Joaquin River in which the actions would be implemented.</p>						
<p>1. Summarizes the potential outcome(s) of implementing actions described in the <u>Applicable Programmatic Actions column</u> as they pertain to the species being evaluated.</p> <p><i>The entry in this column is the same as entered in the first column of Table "X" a.</i></p>	<p>List of Common Program and Conveyance and Storage Facility programmatic action codes which, if implemented, would contribute to the <u>Summary Outcome</u> described in the first table column.</p> <p><i>The entry in this column is the same as entered in the first column of Table "X" a.</i></p>	<p>This column describes expected benefits at a programmatic level to the evaluation species of implementing the proposed actions. Each discrete benefit is coded sequentially starting with Beneficial Effect (BE)1 (e.g., actions that increase the quantity of nesting habitat would provide different benefits than those that increase the quantity of foraging habitat).</p>	<p>This column describes expected adverse effects at a programmatic level to the evaluation species, including take of individuals and habitat, of implementing the proposed actions. Each discrete effect is coded sequentially starting with Adverse Effect (AE)1. Adverse effects would only occur if the location of an action is potentially occupied at the time the action is implemented over the life of CALFED.</p>	<p>This column describes potential mitigation strategies for each adverse effect at a programmatic level that, if implemented, could offset impacts on the species. Each mitigation strategy is coded sequentially starting with Mitigation Strategy (M)1.</p>	<p>This column describes the expected overall effect of each summary outcome within the region being evaluated.</p>	

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Table 4b. Potential CALFED Program Effects and Mitigation Measures for the Greater Sandhill Crane

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quantity of suitable roosting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the species' current and historical winter range.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty	
Delta Region							
1. Convert up to approximately 115,000 acres of agricultural lands to aquatic, wetland, and riparian habitat areas	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010601, E010602, E010607, E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011007, E011101, E011102, E011401, E011402, E011403, E011404, E011405, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E011601, E011602, E011603, E011604, E011605, E011606, L3	BE1. Restoration of some types of wetlands would increase the availability of roosting sites used by the species. BE2. Restoration of seasonal wetland habitats could increase the availability and/or quality of foraging habitat during periods when wetlands are not flooded if habitat is restored on agricultural lands that provide little or no forage value to the species under existing conditions.	AE1. Potential for permanent loss of agricultural foraging habitat. <i>This could result if native habitats with little or no species forage value are restored on agricultural lands that provide higher species forage-habitat value than restored habitats.</i>	M1. To the extent feasible, avoid conversion of agricultural lands that provide high-quality foraging areas to native habitats that provide lower quality foraging area for the species. M2. Restore or enhance sufficient suitable mitigation foraging-habitat area to offset impacts on the species at offsite locations before or when project impacts on occupied or potentially occupied habitat are incurred.	Potential increase in suitable foraging habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.		

Table 4b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quantity of suitable roosting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the species' current and historical winter range.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			AE2. Temporary disturbance to individuals could result if activities required to implement actions occur in or near occupied habitat areas. Adverse effects on individuals would be temporary because activities that cause disturbance would terminate following completion of the actions.	M3. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area. M4. To the extent feasible, implement actions during periods (i.e., early spring through early fall) when the species is largely absent from the Delta Region. M5. To the extent feasible, avoid activities that implement actions near roost sites and occupied foraging habitat areas during periods when the species is present or phase action implementation to avoid or reduce disturbance near occupied habitats during periods when the species is present in the Delta Region.		

Table 4b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quantity of suitable roosting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the species' current and historical winter range.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
2 Restore 4,000 acres of perennial grassland	E011801, E011802, E011803	BE3. Restoration of perennial grasslands would provide foraging habitat of higher quality than most agricultural habitat types. The area of available foraging habitat would also be increased if grasslands are restored on lands that currently provide little for no forage value for the species.	AE2.	M4 and M5.	Potential increase in the quality and quantity of suitable foraging habitat if habitat is restored on lands with lower forage value. If not, potential increase in suitable foraging habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.	
			AE3. Potential temporary loss of quantity or quality of foraging habitat could result from restoration activities until restored habitat matures.	M4 and M5.		
				M6. Restore habitats on lands that provide little or no forage value under existing conditions.		

Table 4b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quantity of suitable roosting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the species' current and historical winter range.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
5. Construct and operate 200,000 acre-feet of storage on Delta islands.	S3E0101	BE6. Potential increase in suitable wetland forage habitat. <i>This benefit would only occur if the design and operation of storage islands resulted in conditions that allowed more suitable wetland habitat to establish along the margin of storage pools than would be needed to offset potential adverse effects of the action.</i>	AE1 and AE2. <i>Potential permanent loss of agricultural foraging habitat (AE1) would occur if storage pools remove lands that currently provide forage value from production.</i>	M1 through M5.	None.	
6. Improve drainage of floodwater from the Yolo Bypass	E010607	None.	AE2.	M4 and M5.	No effect on the species.	
7. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.		

Table 4a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the Greater Sandhill Crane

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Convert up to approximately 115,000 acres of agricultural lands to aquatic, wetland, and riparian habitat areas	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010601, E010602, E010607, E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011007, E011101, E011102, E011401, E011402, E011403, E011404, E011405, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E011601, E011602, E011603, E011604, E011605, E011606, L3	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees 4. Installing structures that restrict channel flow 5. Excavating channels 6. Temporarily or permanently inundating land
2. Restore 4,000 acres of perennial grassland	E011801, E011802, E011803	<ol style="list-style-type: none"> 1. Disturbance associated with habitat restoration activities
3. Cooperatively manage 40,000-75,000 acres of agricultural lands to improve habitat values for wildlife	E011901, E011902, E011903, E011904, E011905, E011906, E011907	<ol style="list-style-type: none"> 1. Disturbance associated with installing water control infrastructure 2. Changing patterns of agricultural practices 3. Flooding fields 4. Grading and filling
4. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Constructing conveyance facility

Table 4a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
5. Construct and operate 200,000 acre-feet of storage on Delta islands.	S3E0101	1. Construction to upgrade levees 2. Installing infrastructure 3. Grading and filling 4. Inundating
6. Improve drainage of flood water from the Yolo Bypass	E010607	1. Grading and filling 2. Excavating channels
7. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None

Table 3b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the species nesting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the current and historical range of the Swainson's hawk.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			AE2. Potential for permanent loss of agricultural foraging habitat. <i>This could result if native habitats with little or no species forage value are restored on agricultural lands that provide higher species forage habitat value.</i>	M3. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area. M4. To the extent feasible, avoid conversion of agricultural lands that provide high-quality foraging areas to native habitats that provide lower quality foraging area for the species. M5. Restore or enhance sufficient suitable mitigation foraging habitat area to offset impacts on the species at offsite locations before or when project impacts on occupied or potentially occupied habitat are incurred.		

Table 3b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the species nesting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the current and historical range of the Swainson's hawk.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			<p>AE3. Temporary disturbance to individuals could result if activities required to implement actions occur in or near occupied habitat areas. Adverse effects on individuals would be temporary because activities that cause disturbance would terminate following completion of the actions.</p>	<p>M6. To the extent feasible, implement actions during periods (i.e., early fall through late winter) when the species is largely absent from the Delta Region.</p>		
			<p>AE4. Temporary reduction in nesting success could occur as a result of disturbance or nest destruction if activities required to implement actions occur in or near active nest sites during the nesting season. Adverse effects on nesting success would be temporary because activities that would affect nesting success would terminate following completion of the actions.</p>	<p>M7. To the extent feasible, avoid activities that implement actions near nest sites or phase action implementation to avoid disturbance near active nest sites during the nesting season.</p>		

Table 3b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the species nesting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the current and historical range of the Swainson's hawk.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
2 Restore 4,000 acres of perennial grassland	E011801, E011802, E011803	BE3. Restoration of perennial grasslands would provide high- quality foraging habitat compared to most agricultural habitat types. The area of available foraging habitat would also be increased if grasslands are restored on lands that currently provide little or no forage value for the species.	AE3 and AE4.	M6 and M7.	Increase in the quality and quantity of suitable foraging habitat.	
			AE5. Potential temporary loss of quantity or quality of foraging habitat could result from restoration activities until restored habitat matures	M6.		
				M8. Restore habitats on lands that provide little or no forage value under existing conditions		

Table 3b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the species nesting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the current and historical range of the Swainson's hawk.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
3. Cooperatively manage 40,000-75,000 acres of agricultural lands to improve habitat values for wildlife	E011901, E011902, E011903, E011904, E011905, E011906, E011907	BE4. Potential increase in the quality of foraging habitat on lands where management practices increase the availability or number of prey species to above current conditions Potential increase in foraging habitat area on managed lands that do not provide foraging habitat under existing conditions	AE6. Potential loss of foraging habitat area or quality on lands flooded to provide habitat for other wildlife during periods when lands are flooded	M5. M9. To the extent feasible, avoid managing agricultural lands that currently provide high forage-habitat value to a condition that would provide lower forage habitat value	Increase in the quality of suitable of some existing foraging habitat areas and potential decrease in foraging habitat area if DFG Swainson's hawk mitigation guidelines are used to determine habitat mitigation requirements, which only require suitable foraging habitats to be mitigated if affected foraging habitat is located within 10 miles of an active nest site.	
4. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	BE5. Potential increase in the availability of riparian nest trees BE6. Potential decrease in the level of levee-maintenance-associated disturbance near occupied nest sites	AE4.	M7.	Increase in the quality and quantity of suitable nesting habitat.	

Table 3b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the species nesting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the current and historical range of the Swainson's hawk.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
5. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	BE2. <i>This benefit would only occur if setback levee design and conveyance operations permitted riparian vegetation to establish and mature along setback levees</i>	AE1 through AE4.	M1 through M3, M6, and M7.	Potential decrease in foraging habitat area if DFG Swainson's hawk mitigation guidelines are used to determine habitat mitigation requirements, which only require suitable foraging habitats to be mitigated if affected foraging habitat is located within 10 miles of an active nest site. Potential increase in suitable nesting habitat area.	
6. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	None.	AE1 through AE4. <i>Potential permanent loss of agricultural foraging habitat (AE2) would occur if storage pools remove lands that currently provide forage value from production</i>	M1 through M3, M6, and M7.	None.	
7. Other program objectives that potentially could adversely affect the species as a result of action implementation activities	E014701, W010501, W010701, C3E0106, C3E0109	None.	AE1, AE3, and AE4.	M1 through M3, M6, and M7.	Potential short-term loss of suitable nesting habitat area and long-term increase in suitable nesting habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.	

Table 3b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the species nesting habitat, increases in the quality of foraging habitat, and potential increases in quantity of foraging habitat within the current and historical range of the Swainson's hawk.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
8. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

Table 3a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the Swainson's Hawk

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Convert up to approximately 115,000 acres of agricultural lands to aquatic, wetland, and riparian habitat areas	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010601, E010602, E010607, E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011007, E011101, E011102, E011401, E011402, E011403, E011404, E011405,, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E011601, E011602, E011603, E011604, E011605, E011606, L3	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees 4. Installing structures that restrict channel flow 5. Excavating channels 6. Temporarily or permanently inundating land
2. Restore 4,000 acres of perennial grassland	E011801, E011802, E011803	<ol style="list-style-type: none"> 1. Disturbance associated with habitat restoration activities
3. Cooperatively manage 40,000-75,000 acres of agricultural lands to improve habitat values for wildlife	E011901, E011902, E011903, E011904, E011905, E011906, E011907	<ol style="list-style-type: none"> 1. Disturbance associated with installing water control infrastructure 2. Changing patterns of agricultural practices 3. Flooding fields 4. Grading and filling
4. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	<ol style="list-style-type: none"> 1. Reduction in the level of levee-maintenance-associated disturbance 2. Disturbance associated with implementation of weed control activities.

Table 3a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
5. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Constructing conveyance facility
6. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	<ol style="list-style-type: none"> 1. Construction to upgrade levees 2. Installing infrastructure 3. Grading and filling 4. Inundating
7. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, W010501, W010701, C3E0106, C3E0109	<ol style="list-style-type: none"> 1. Grading and filling 2. Demolishing, relocating, and or constructing water diversions, intakes, and other management structures
8. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None

Table 2b. Potential CALFED Program Effects and Mitigation Measures for the California Clapper Rail

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the quality and quantity of the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Restore 2,500 acres of tidal perennial aquatic habitat	E010905	<p>BE1. Restoration of this habitat type would improve many of the ecological processes (e.g., nutrient exchange) that support tidal emergent wetlands if the action occurs near existing habitat areas, thereby indirectly benefitting the species by increasing the productivity of suitable habitat areas</p> <p>BE2. If saline or brackish tidal wetlands naturally establish as a result of this action in the west Delta, there could potentially be an increase in occupied habitat area within the species' historical range and increase in numbers of the species resulting from increases in the species' preferred habitat</p>	<p>AE1. Temporary loss or degradation of suitable habitat could result if activities required to implement actions occur in areas that support existing species habitat. Adverse effects on habitat would be temporary if suitable tidal wetland habitat naturally reestablishes onsite as a result of the actions.</p>	<p>M1. Restore or enhance sufficient suitable mitigation habitat area to offset impacts on the species at offsite locations before or when project impacts on occupied or potentially occupied habitat are incurred.</p> <p>M2. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area preferred by the species</p>	<p>Potential increase in suitable habitat compared to existing conditions if saline or brackish tidal wetlands naturally establish as a result of the action</p> <p>Increase in suitable tidal emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1</p>	

Table 2b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the quality and quantity of the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			AE2. Permanent loss or degradation of suitable habitat could result if activities required to implement actions occur in areas that support existing species habitat. Adverse effects on habitat would be permanent if in-kind suitable habitat types would not be restored onsite as a result of the actions.	M1 and M2.		
			AE3. Temporary disturbance to individuals could result if activities required to implement actions occur in or near occupied habitat areas. Adverse effects on individuals would be temporary because activities that cause disturbance would terminate following completion of the actions.	M1 and M2.		
				M3. To the extent feasible, implement actions during periods when the species is least susceptible to the associated adverse effects of disturbance		

Table 2b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the quality and quantity of the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			AE4. Temporary reduction in nesting success could occur as a result of disturbance or nest destruction if activities required to implement actions occur in or near occupied habitat areas during the nesting season. Adverse effects on nesting success would be temporary because activities that would affect nesting success would terminate following completion of the actions.	M1 through M3.		
			AE5. Levels of predation on the species could temporarily be increased as a result of activities required to implement actions if they occur in or near occupied habitat areas and adequate escape cover for use by individuals disturbed by these activities is unavailable. Increased levels of predation would be temporary because activities that potentially could increase predation levels would terminate following completion of the actions.	M1 through M3.		

Table 2b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the quality and quantity of the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
2. Restore 20-50 miles of slough habitat	E011101	BE1.	AE1 through AE5.	M1 through M3.	Potential increase in suitable habitat compared to existing conditions if saline or brackish tidal wetlands naturally establish as a result of the action Increase in suitable tidal emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1	
3. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	BE2. Improvement in the aquatic environment associated with tidal sloughs and channels may improve the foodweb and other ecological processes that support associated wetland habitats used by the species	AE3.	M3.	Improvement in the health of ecological processes that support freshwater wetland habitat areas adjacent to Delta sloughs and channels	
4. Improve water quality	E015701, E015702, W1150101, W100101, W160101, W170201, W170202, W020301, W010302, W170302, W180401, W170401, W170403	BE3. Implementation of this action would potentially increase populations of invertebrates used as food by the species that are adversely affected by toxic agents and potentially would reduce the likelihood for reduced species survival and reproductive success that could be caused by ingestion of agents toxic to the species	None.	None.	Potential increase in species survival and reproductive success	

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Table 2b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the quality and quantity of the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
5. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, W010501, W010701	None.	AE2 through AE5.	M2 and M3.	Increase in suitable freshwater emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1	
6. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

Table 2a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the California Clapper Rail

Activity Description	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Restore 2,500 acres of tidal perennial aquatic habitat	E010905	1. Grading and filling 2. Breaching or removing dikes and levees
2. Restore 20-50 miles of slough habitat	E011101	1. Excavating 2. Grading and filling
3. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	1. Disturbance associated with implementation of weed control activities
4. Improve water quality	E015701, E015702, W1150101, W100101, W160101, W170201, W170202, W020301, W010302, W170302, W180401, W170401, W170403	None
5. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, W010501, W010701	1. Grading and filling 2. Demolishing, relocating, and or constructing water diversions, intakes, and other management structures
6. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None

D-049953

Table 1b. Potential CALFED Program Effects and Mitigation Measures for the California Black Rail

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Restore 30,000 to 45,000 acres of tidal freshwater emergent wetland.	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E011101, E011102, E011202, E011401, E011402, E011403, E011404, E011405, C3E0103	BE1. Potential increase in occupied habitat area within the species' historical range and increase in numbers of the species resulting from increases in the species' preferred habitat	AE1. Temporary loss or degradation of suitable habitat could result if construction and related activities required to implement actions occur in areas that support existing species habitat. Adverse effects on habitat would be temporary because affected habitat would be restored onsite as a result of the actions AE2. Temporary disturbance to individuals could result if construction and related activities required to implement actions occur in or near occupied habitat areas. Adverse effects on individuals would be temporary because activities that cause disturbance would terminate following completion of the actions.	M1. Restore or enhance sufficient suitable mitigation habitat area to offset impacts on the species at offsite locations before or at the time that project impacts on occupied or potentially occupied habitat are incurred M2. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area preferred by the species M1 and M2	Substantial increase in suitable habitat compared to existing conditions	

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			<p>AE3. Temporary reduction in nesting success could occur as a result of disturbance or nest destruction if construction and related activities required to implement actions occur in or near occupied habitat areas during the nesting season. Adverse effects on nesting success would be temporary because activities that would affect nesting success would terminate following completion of the actions.</p>	<p>M3. To the extent feasible, implement actions during periods when the species is least susceptible to the associated adverse effects of disturbance.</p> <p>M1 through M3.</p>		

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			AE4. Levels of predation on the species could temporarily be increased as a result of construction and related activities required to implement actions if they occur in or near occupied habitat areas and adequate escape cover for use by individuals disturbed by these activities is unavailable. Increased levels of predation would be temporary because activities that potentially could increase predation levels would terminate following completion of the actions.	M1 through M3.		
2. Restore 17,000 acres of nontidal freshwater emergent wetland	E010406, E011406, E011407, E011408, E011409, E011410, E011903, L3	BE1.	AE1 through AE4.	M1 through M3.	Substantial increase in suitable habitat compared to existing conditions	
3. Restore and manage 44,000 to 54,000 acres of seasonal wetlands	E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, L3	BE2. Potential increase in species numbers through reduction in predation levels resulting from restoration of habitat used as cover by the species	AE1 through AE4.	M1 through M3.	Substantial increase in flood refugia habitat during high tides where seasonal wetlands are restored adjacent to suitable tidal wetlands and increase in cover habitat for the species during movements among preferred habitat areas	

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			AE5. Permanent loss or degradation of suitable habitat could result if construction and related activities required to implement actions occur in areas that support existing species habitat. Adverse effects on habitat would be permanent because in-kind suitable habitat types would not be restored onsite as a result of the actions.	M1 and M2.	Increase in suitable freshwater emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1.	
4. Improve management of 4,000 acres of existing degraded seasonal wetland	E011501, E011506, E011509, E011510, E011511	BE2.	AE1 and AE2.	M3.	Improvements in the quality of existing seasonal wetland vegetation that would be treated potentially would increase species survival by improving flood refugia and cover values for the species	

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
5. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010901, E010902, E010903, E010904, E010905	BE3. Restoration of this habitat type would restore or improve many of the ecological processes (e.g., nutrient exchange) that support tidal emergent wetlands, thereby indirectly benefitting the species by increasing the productivity of suitable habitat areas	AE1 through AE4.	M1 through M3.	Increase in suitable freshwater emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1 Restoration of shallow tidal perennial aquatic habitat would reestablish ecological processes necessary to maintain healthy tidal freshwater emergent wetland habitats used by the species.	
6. Restore 4,000 acres of perennial grassland	E011801, E011802, E011803	BE2.	This adverse effect would only apply if perennial grassland is restored on lands that provide flood refugia for the species under current conditions.	M1 through M4.	Potential improvements in the quality of upland habitat used as flood refugia. Vegetation that would be treated potentially would increase species survival by improving flood refugia and cover values for the species.	

D-049959
D-049958

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
7. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	BE4. Reduction in the rate of erosion of tidal wetlands associated with dredging and boat wakes will prevent or reduce the rate of existing species habitat loss BE5. Reduction in boat wakes in occupied nesting habitat would potentially increase the species' reproductive success by reducing the likelihood of nest losses to swamping caused by boat wakes	AE2 and AE3.	M1 through M4.	Reduction in loss of habitat area to erosion will provide long-term protection of existing suitable habitat areas Species numbers potentially could be increased as a result of increased nesting success	
8. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	BE6. Improvement in the aquatic environment associated with tidal sloughs and channels may improve the foodweb and other ecological processes that support associated wetland habitats used by the species	AE2.	M3.	Improvement in the health of ecological processes that support freshwater wetland habitat areas adjacent to Delta sloughs and channels	

D-049960
D-049959

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
9. Improve water quality	E015701, E015702, W1150101, W100101, W160101, W170201, W170202, W020301, W010302, W170302, W180401, W170401, W170403	BE7. Implementation of this action would potentially increase populations of invertebrates used as food by the species that are adversely affected by toxic agents and potentially would diminish the likelihood for reduced species survival and reproductive success that could be caused by ingestion of agents toxic to the species	None.	None.	Potential increase in species survival and reproductive success	
10. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications)	C3E0101, C3E0102, C3E0103	BE1. <i>This benefit would only occur if the design of setback levees and channel islands resulted in conditions that allowed more suitable wetland habitat to establish following construction than would be needed to offset potential adverse effects of the action</i>	AE1 through AE5. <i>Loss of habitat would be temporary (AE1) if sufficient suitable habitat to offset losses reestablishes following the action. If not, permanent habitat loss (AE5) would result.</i>	M1 through M3.	Potential increase in suitable freshwater emergent wetland habitat area if more suitable habitat area reestablishes as a result of the action than is affected or, if mitigation is required, habitat acreage loss is mitigated at ratios greater than 1 to 1	
11. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	BE1. <i>This benefit would only occur if the design and operation of storage islands resulted in conditions that allowed more suitable wetland habitat to establish along the margin of storage pools than would be needed to offset potential adverse effects of the action</i>	AE1 through AE5. <i>Loss of habitat would be temporary (AE1) if sufficient suitable habitat to offset losses reestablishes following the action. If not, permanent habitat loss (AE5) would result.</i>	M1 through M3.	Potential increase in suitable freshwater emergent wetland habitat area if more suitable habitat area reestablishes as a result of the action than is affected or, if mitigation is required, habitat acreage loss is mitigated at ratios greater than 1 to 1	

D-049961
D-049960

Table 1b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
12. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, W010501, W010701, C3E0104, C3E0106, C3E0109, C3E0111, C3E0112, C3E0113, C3E0114	None.	AE2 through AE5.	M1 through M3.	Increase in suitable freshwater emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1	
13. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

D-049962
D-049961

Table 1a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the California Black Rail

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Restore 30,000 to 45,000 acres of tidal freshwater emergent wetland	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E011101, E011102, E011202, E011401, E011402, E011403, E011404, E011405, C3E0103	1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees 4. Installing structures that restrict channel flow 5. Excavating channels
2. Restore 17,000 acres of nontidal freshwater emergent wetland	E010406, E011406, E011407, E011408, E011409, E011410, E011903, L3	1. Converting lands to flood overflow basins 2. Grading and filling 3. Constructing water control infrastructure
3. Restore and manage 44,000 to 54,000 acres of seasonal wetlands	E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, L3	1. Grading and filling 2. Constructing water control infrastructure
4. Improve management of 4,000 acres of existing degraded seasonal wetlands	E011501, E011506, E011509, E011510, E011511	1. Grading and filling 2. Constructing water control infrastructure
5. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010901, E010902, E010903, E010904, E010905	1. Placing fill in existing channels 2. Setting levees back 3. Placing fill to bring Delta islands to grade and breaching island levees
6. Restore 4,000 acres of perennial grassland	E011801, E011802, E011803	1. Disturbance associated with habitat restoration activities
7. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	1. Reducing dredging of Delta channels 2. Reducing boat wakes 3. Installing wave attenuation or bank protection structures

Table 1a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
8. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	1. Disturbance associated with implementation of weed control activities
9. Improve water quality	E015701, E015702, W150101, W100101, W160101, W170201, W170202, W020301, W010302, W170302, W180401, W170401, W170403	None
10. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications)	C3E0101, C3E0102, C3E0103	1. Constructing setback levees 2. Grading and filling
11. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	1. Construction to upgrade levees 2. Installing infrastructure 3. Grading and filling 4. Inundation
12. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, W010501, W010701, C3E0104, C3E0106, C3E0109, C3E0111, C3E0112, C3E0113, C3E0114	1. Grading and filling 2. Channel construction (i.e., excavation) 3. Demolishing, relocating, and/or constructing water diversions, intakes, and other management structures 4. Constructing conveyance channels
13. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None

Table 6b. Potential CALFED Program Effects and Mitigation Measures for the Riparian Brush Rabbit

Overall Program Effect with Mitigation: Implementation of CALFED would result in increasing the number of the species' populations from 1 to 6, reducing the risk of extirpation to the only known population, increase the quality of existing occupied habitat areas, and substantially increase the quantity of suitable habitat areas.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Reestablish 500 acres of suitable species riparian habitat and adjacent suitable upland habitats	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010501, E010502, E010607, E011101, E011102, E011601, E011602, E011603, E011604, E010605, E011606, E011608, E011408, E014101	BE1. Restoration of suitable riparian woodland habitats would increase the availability of suitable sites to reintroduce populations within the species historical range.	None. <i>This assessment assumes that all actions are completed before the species is reintroduced or that actions that may be implemented following species reintroductions would avoid affecting occupied habitat areas.</i>	None.	In concert with summary outcome 2, the range, numbers of populations, and numbers of individuals would be increased.	
2. Reestablish up to five new populations within the species historical range	E014101	BE2. Establishment of additional populations would increase the number of populations within the species historical range, thereby reducing the likelihood for extirpation of the species as a result of catastrophic events, such as flood or fire.	AE1. Potential species mortality related to reintroduction activities.	None.	In concert with Summary Outcome 1, the range, numbers of populations, and numbers of individuals would be increased.	
3. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	BE3. Potential increase in the availability of suitable riparian habitat. BE4. Potential decrease in the level of levee maintenance-associated disturbance near occupied habitat areas.	AE2. Temporary disturbance of individuals could result if activities required to implement actions occur in or near occupied habitat areas. Adverse effects on individuals would be temporary because activities that cause disturbance would terminate following completion of the actions.	M1. To the extent feasible, implement actions during periods when the species is least susceptible to disturbance from levee maintenance activities.	Increase in the quality and potential increase in quantity of suitable riparian habitat.	

Table 6b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increasing the number of the species' populations from 1 to 6, reducing the risk of extirpation to the only known population, increase the quality of existing occupied habitat areas, and substantially increase the quantity of suitable habitat areas.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
4. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	BE1. <i>This potential benefit would only occur if setback levee design and conveyance operations permitted suitable riparian vegetation to establish and mature along setback levees.</i>	None. <i>This assessment assumes that all actions are completed before the species is reintroduced or that actions that may be implemented following species reintroductions would avoid affecting occupied habitat areas.</i>	None.	Potential increase in the quantity of suitable riparian habitat.	
5. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.		

D-049966
D-049965

Riparian Brush Rabbit

Table 6a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the Riparian Brush Rabbit

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Reestablish 500 acres of suitable species riparian habitat and adjacent suitable upland habitats	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010501, E010502, E010607, E011101, E011102, E011601, E011602, E011603, E011604, E010605, E011606, E011608, E011408, E014101	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees 4. Installing structures that restrict channel flow 5. Excavating channels
2. Reestablish up to five new populations within the species historical range	E014101	<ol style="list-style-type: none"> 1. Handling transplanted individuals
3. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	<ol style="list-style-type: none"> 1. Reducing the level of levee maintenance-associated disturbance 2. Disturbance associated with implementation of weed control activities
4. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Constructing conveyance facility
5. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.

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Table 7b. Potential CALFED Program Effects and Mitigation Measures for the Valley Elderberry Longhorn Beetle

Overall Program Effect with Mitigation: Implementation of CALFED would improve the quality of the species' habitat in some locations, substantially increase the quantity of suitable species' habitat area, and potentially increase the range and numbers of species' populations.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Protect, restore, or enhance riparian forest, woodland, and scrub	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010501, E010502, E010607, E011101, E011102, E011601, E011602, E011603, E011604, E010605, E011606, E011608, E011408, E014601	BE1. Restoration of riparian habitat areas that support elderberry shrubs potentially allow for expansion of existing populations	AE1. Species mortality and permanent loss or degradation of occupied habitat could result if activities required to implement actions result in the removal of elderberry shrubs and associated riparian vegetation. Adverse effects on habitat would be permanent if sufficient in-kind suitable habitat to offset losses would not be restored onsite as a result of the actions.	M1. Avoid removal of elderberry shrubs used by the species M2. Implement USFWS valley elderberry longhorn beetle mitigation guidelines to ensure adverse effects of actions are adequately mitigated M3. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area	Potential substantial increase in the quantity of suitable riparian habitat area	

Table 7b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would improve the quality of the species' habitat in some locations, substantially increase the quantity of suitable species' habitat area, and potentially increase the range and numbers of species' populations.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
2 Restore tidal and nontidal aquatic and wetland habitats	E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011401, E011402, E011403, E011404, E011405, E010406, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E014101	None	AE1.	M1 through M3.	Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1 Potential increase in occupied habitat area if mitigation is implemented in compliance with USFWS Valley Elderberry Longhorn Beetle Mitigation Guidelines if occupied elderberry shrubs are removed from affected sites and successfully transplanted to two or more offsite locations	
3. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	BE2. Potential increase in quality and quantity of suitable riparian habitat areas	None	None	Potential increase in the quality and quantity of suitable riparian habitats	

Table 7b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would improve the quality of the species' habitat in some locations, substantially increase the quantity of suitable species' habitat area, and potentially increase the range and numbers of species' populations.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
4. Reduce the amount of herbicides and pesticides applied on Delta lands	E015701, E014601	BE3. Potential reduction in species mortality attributable to pesticide applications and loss of occupied habitat resulting from herbicide applications	None	None	Potential increase in habitat quality and decrease in species' mortality attributable to pesticides	
5. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	BE1. <i>This benefit would only occur if setback levee design and conveyance operations permitted riparian vegetation to establish and mature along setback levees</i>	AE1.	M1 through M3.	Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if setback levees are designed to restore riparian habitats. If not, potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1. Potential increase in occupied habitat area if mitigation is implemented in compliance with USFWS Valley Elderberry Longhorn Beetle Mitigation Guidelines if occupied elderberry shrubs are removed from affected sites and successfully transplanted to two or more offsite locations.	

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Table 7b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would improve the quality of the species' habitat in some locations, substantially increase the quantity of suitable species' habitat area, and potentially increase the range and numbers of species' populations.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
6. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	None.	AE1.	M1 through M3.	<p>Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.</p> <p>Potential increase in occupied habitat area if mitigation is implemented in compliance with USFWS Valley Elderberry Longhorn Beetle Mitigation Guidelines if occupied elderberry shrubs are removed from affected sites and successfully transplanted to two or more offsite locations.</p>	

Table 7b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would improve the quality of the species' habitat in some locations, substantially increase the quantity of suitable species' habitat area, and potentially increase the range and numbers of species' populations.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
7. Other program objectives that potentially could adversely affect the species as a result of action implementation activities	E014701, W010501, W010701, C3E0106, C3E0109	None.	AE1.	M1 through M3.	Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1. Potential increase in occupied habitat area if mitigation is implemented in compliance with USFWS Valley Elderberry Longhorn Beetle Mitigation Guidelines if occupied elderberry shrubs are removed from affected sites and successfully transplanted to two or more offsite locations.	
8. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

Table 7a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the Valley Elderberry Longhorn Beetle

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Protect, restore, or enhance riparian forest, woodland, and scrub	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010501, E010502, E010607, E011101, E011102, E011601, E011602, E011603, E011604, E010605, E011606, E011608, E011408, E014601	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching of levees 4. Installing structures that restrict channel flow 5. Excavating channels 6. Temporarily or permanently inundating land
2. Restore tidal and nontidal aquatic and wetland habitats	E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011401, E011402, E011403, E011404, E011405, E010406, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E014101	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees
3. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	<ol style="list-style-type: none"> 1. Reducing the level of levee maintenance-associated disturbance 2. Disturbance associated with implementation of weed control activities
4. Reduce the amount of pesticides applied on Delta lands	E015701	None

Table 7a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
5. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Constructing conveyance facility
6. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	<ol style="list-style-type: none"> 1. Constructing to upgrade levees 2. Installing infrastructure 3. Grading and filling 4. Inundation
7. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, W010501, W010701, C3E0106, C3E0109	<ol style="list-style-type: none"> 1. Grading and filling 2. Demolishing, relocating, and/or constructing water diversions, intakes, and other management structures
8. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None

Table 9b. Potential CALFED Program Effects and Mitigation Measures for the Winter-Run Chinook Salmon

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Restore 30,000-45,000 acres of tidal freshwater emergent wetland	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E010602, E010603, E011101, E011102, E011201, E011202, E011401, E011402, E011403, E011404, E011405, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	BE1. Potential increase in fry, fingerling, and smolt rearing habitat in the Delta and Susuin Bay should lead to increased growth through greater food and feeding habitat availability and greater survival through reduction in predation prior to emigration, which in turn should increase the productive capacity of the population and lead to greater production and escapement.	AE1. Temporary loss, disturbance, or degradation of suitable habitat could result if construction and related activities required to implement actions occur in areas that support existing species habitat. Adverse effects on habitat would be temporary because affected habitat would be restored onsite as a result of the actions.	ME1. Initially implement the ERPP, to the extent feasible, to restore sufficient suitable habitat to offset impacts on the species on lands supporting unsuitable species habitat before or when impacts on occupied or potentially occupied habitat are incurred. ME2. To the extent feasible, implement actions when the species is least susceptible to the associated adverse effects of disturbance.	Substantial increase in suitable fry, fingerling, smolt rearing and migratory habitat compared to existing conditions.	The response of winter-run is predicted based on known life history and theory. There are questions as to the importance of Delta habitat for the winter run pop, and whether food production is limiting.
2. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010407, E010901, E010902, E010903, E010904, E010905, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	BE2. Restoration of this habitat type would improve many of the ecological processes (e.g., nutrient exchange) that support tidal emergent wetlands, thereby indirectly benefitting the species by increasing the productivity of suitable habitat areas and providing more rearing habitat for fry, fingerling, and smolts.	AE1	ME1	Restoration of shallow tidal perennial aquatic habitat would provide more rearing habitats used by the species.	There is uncertainty that winter-run would benefit from increased shallow-water habitat in the Delta.

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Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
3. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	BE3. Reduction in the rate of erosion of tidal wetlands associated with dredging and boat wakes would prevent or reduce the rate of habitat loss, which should protect existing rearing habitats for fry, fingerling, and smolts.	None.	None.	Reduction in loss of habitat area to erosion will provide long-term protection of existing suitable habitat areas, which should improve growth and survival of juvenile winter-run, which in turn should lead to improved production and escapement.	E1.
4. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	BE4. Improvement in the aquatic environment associated with tidal sloughs and channels may improve the foodweb and other ecological processes that support associated wetland habitats used by the species.	AE4. Eradication activities include chemical herbicides and mechanical means. Both activities and disturbance associated with their applications have the potential to affect juvenile winter-run survival in the Delta.	ME4a. Herbicide applications will be such that toxic effects on juvenile salmon will be minimal. ME4b. Activities related to application of controls will limited to minimize disturbance to juveniles rearing in local and adjacent habitats.	With control, channel and slough habitat value for winter-run salmon will be improved, potentially leading to improved growth and survival.	Habitat use of channels and sloughs by winter-run juveniles and the potential effects of invasive plant species on such habitats and use by salmon are relatively unknown.

Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
5. Improve water quality	E015701, E015702, W170201, W170202, W170203, W020301, W120302, W170401, W170601, W270701	BE5. Implementation of this action would reduce concentrations of toxins in the Delta, which would potentially increase abundance of invertebrates used as food by the species, and reduce the uptake of toxins by winter-run salmon.	None.	None.	Potential increase in species survival and reproductive success.	The present effect of toxins on winter-run salmon production is unknown; the potential benefits of improved water quality is unknown.
6. Enhance first fall-early winter pulse of riverflow	E010102	BE6. Passing unimpaired reservoir inflow and reducing diversions, in combination with natural inflows during the first flow event of the water-year would reduce potentially high concentrations of toxins and increase potential transport of juvenile winter-run migrating down the Sacramento River into the Delta and Bay. Both factors could lead to greater survival and higher production and escapement.	AE6. Passing inflows through reservoirs may lead to reduced carryover storage, particularly for the first flow event when water supply forecasts are as yet unavailable for the coming water-year. Reduction in carryover storage could lead to reduced environmental flow discharges from reservoirs in coming years, which could reduce winter-run survival, production, and escapement.		Potential increase in species survival and reproductive success.	The potential benefits of the first flow pulse of the water-year has not been determined from monitoring data or experiment.

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Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
7. Increase spring riverflows	E010101	BE7. Increasing spring (Feb-May) flows in the Sacramento River and Delta would potentially increase river and estuary productivity, improve spawning habitat in the river, reduce effects of toxins, reduce predation on juvenile salmon, and improve transport to and through the Delta; all of which could lead to improved survival, production, and escapement of winter-run salmon.	AE7. Passing inflows through reservoirs in spring may lead to reduced carryover storage, particularly during long periods of drought when water supply is below normal. Reduction in carryover storage could lead to reduced environmental flow discharges from reservoirs in coming years, which could reduce winter-run survival, production, and escapement.		Potential increase in species survival and reproductive success.	The potential benefits of improved spring flow is based on correlation of higher flows with greater winter-run production, but the cause and effect mechanism has not been determined with certainty.

Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
8. Improve riparian and SRA habitat in the Delta	E010401, E010407, E010501, E010502, E010601, E010603, E010607, E010901, E010902, E010903, E010904, E010905, E010906, E011101, E011102, E011201, E011202, E011401, E012402, E011403, E011404, E011404, E011405, E011501, E011502, E011503, E011601, E011602, E011603, E011604, E011605, E011606, E011608, E014901, E015001, E015002, E015003, E015004, E015201, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	BE8. Protection and enhancement of riparian and SRA habitat would improve rearing and migratory habitat for winter-run juveniles in the Delta. Shade, feeding habitat, protection from predators, reduced water temperatures, and increased food supply provided by more riparian and aquatic insects would potentially increase growth, survival, production, and escapement.	AE1.	ME1, ME2.	Substantial increase in suitable fry, fingerling, smolt rearing and migratory habitat compared to existing conditions.	Relationship of riparian habitat to winter-run survival in the Delta is based on theory. The magnitude of potential benefits to winter-run are unknown.
9. Improve downstream (juvenile) and upstream (adult) passage through the Delta by reducing barriers to migration	E010601, E010603, E010604, E010605, E010607, E010608	BE9. Less obstruction of direct upstream and downstream movement through the Delta would potentially improve survival and escapement.	AE1.	ME1, ME2.	Increase survival of juveniles migrating downstream through the Delta and reduce loss or delay of adults migrating upstream through the Delta.	The potential benefit is unknown because the extent of loss of juveniles and adults is unknown.

Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
10. Increase positive downstream flow in the San Joaquin River by operation of Old River barrier.	E010606		AE10. Operation of the Old River barrier in fall may increase the movement of juvenile winter-run from the central Delta into the southern Delta and thus potentially increase loss of juveniles to south-Delta pumping plants and predation.	ME10. Restrict operation of the Old River barrier when juvenile winter-run are found in the central Delta.	Operation of an Old River barrier should have minimal effect if monitoring is conducted and operation is restricted when necessary.	The extent of juvenile winter-run rearing in the Delta in fall has not been determined. Tradeoffs with San Joaquin salmon survival may be necessary.
11. Enhancement of striped bass population	E012701	BE11. Many of the actions necessary to benefit striped bass will also benefit winter-run salmon.	AE11. Artificial rearing and stocking of striped bass to supplement population numbers before system productivity has been upgraded to sustain such population numbers could increase predation rates on winter-run salmon and thus reduce survival, production, and escapement.	ME11. Artificial rearing and stocking of striped bass should be restricted to areas and times when predation on winter-run juveniles would be minimal. Stocking should be restricted to short-term striped bass population recovery and only after recovery of forage base for striped bass in the rivers and estuary.	Artificial support of striped bass would have minimal effect on winter-run population.	The effects of historical, existing, and potential future winter-run populations from striped bass predation are relatively unknown.

Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
12. Reduce loss of juvenile winter-run at water diversions and other structures from predation and entrainment	E014701, E014702, E014703, E015601, E015602, E015603, C3E0105, C3E0107, C3E0108, C3E0110	BE12. Reducing losses of juvenile winter-run at water diversions and other structures would reduce predation and entrainment losses, which in turn would increase survival, production, and escapement.	None.		Increase in survival compared to existing conditions.	Because the extent of losses to winter-run and role of diversions and other structures in the winter-run decline is not well understood, there is an unknown degree of potential benefit.
13. Reduce harvest of winter-run salmon	E015801, E015802, E015803	BE13. Reducing legal and illegal harvest of winter-run would increase escapement.	AE13. Reduction in legal harvest of winter-run would slightly reduce sport and commercial opportunities and harvest.	ME13. Allowing greater opportunities and harvest of hatchery runs of chinook salmon may offset potential short-term economic losses of harvest restrictions.	Long-term increase and protection of winter-run population.	The degree of potential benefit of harvest reductions to the population is uncertain.
14. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, S3E0101, C3E0106, C3E0110, C3E0111	None.			Increase in suitable habitat areas as a result of mitigating for habitat acreage loss at a ratio greater than 1 to 1.	

Table 9b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvement is expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
15. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

Table 9a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the Winter-Run Chinook Salmon

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Restore 30,000-45,000 acres of tidal freshwater emergent wetland	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E010602, E010603, E011101, E011102, E011201, E011202, E011401, E011402, E011403, E011404, E011405, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	1. Construction impacts such as short-term loss of riparian, SRA, and shallow-water habitat 2. Short-term increases in turbidity in construction zones
2. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010407, E010901, E010902, E010903, E010904, E010905, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	1. Disturbance associated with habitat restoration activities
3. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	None
4. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	1. Application of herbicides may directly or indirectly affect salmon survival
5. Improve water quality	E015701, E015702, W170201, W170202, W170203, W020301, W120302, W170401, W170601, W270701	None
6. Enhance first fall-early winter pulse of riverflow	E010102	1. Pass inflow through reservoirs rather than potentially storing water (may lead to subsequent shortfalls) 2. Reducing diversions in the Delta during event (may lead to later increased diversions)

Table 9a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
7. Increase spring riverflows	E010101	1. Pass inflow through reservoirs rather than potentially storing water (may lead to subsequent shortfalls) 2. Reducing diversions in the Delta during event (may lead to later increased diversions)
8. Improve riparian and SRA habitat in the Delta	E010401, E010407, E010501, E010502, E010601, E010603, E010607, E010901, E010902, E010903, E010904, E010905, E010906, E011101, E011102, E011201, E011202, E011401, E011402, E011403, E011404, E011404, E011405, E011501, E011502, E011503, E011601, E011602, E011602, E011603, E011604, E011605, E011606, E011608, E014901, E015001, E015002, E015003, E015004, E015201, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	1. Short-term disturbance and turbidity
9. Improve downstream (juvenile) and upstream (adult) passage through the Delta by reducing barriers to migration	E010601, E010603, E010604, E010605, E010607, E010608	Short-term construction disturbance and turbidity
10. Increase positive downstream flow in San Joaquin River by operation of Old River barrier	E010606	Increase central-Delta water conveyed to south-Delta pumping plants
11. Enhance striped bass population	E012701	Increase numbers of striped bass in the basin
12. Reduce loss of juvenile winter-run at water diversions and other structures from predation and entrainment	E014701, E014702, E014703, E015601, E015602, E015603, C3E0105, C3E0107, C3E0108, C3E0110	None

Table 9a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
13. Reduce harvest of winter-run salmon	E015801, E015802, E015803	None
14. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, S3E0101, C3E0106, C3E0110, C3E0111	None

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Table 8b. Potential CALFED Program Effects and Mitigation Measures for Mason's Lilaopsis

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Restore 30,000 to 45,000 acres of tidal freshwater emergent wetland	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E011101, E011102, E011202, E011401, E011402, E011403, E011404, E011405, C3E0103, L3	BE1. Increase in habitat suitable for occupation by the species within the species historical range BE2. Potential increase in the number of species individuals and populations resulting from increases in the preferred habitat	AE1. Temporary loss or degradation of occupied habitat and individuals could result if construction and related activities required to implement actions occur in areas currently supporting the species. Adverse effects on habitat would be temporary because affected habitat would be restored onsite as a result of the actions. Adverse effects on individuals and populations would be permanent if natural recolonization does not take place	M1. Avoid species populations and individuals to the extent feasible M2. Implement the ERPP, to the extent feasible, to restore suitable habitat M3. Replant species in suitable habitat to compensate for loss of individuals and populations	Substantial increase in suitable habitat compared to existing conditions and replacement of populations and individuals lost during project implementation	

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Table 8b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
				M4. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area preferred by the species		
2. Restore 7,000 acres of shallow tidal perennial aquatic habitat.	E010901, E010902, E010903, E010904, E010905	BE3. Restoration of this habitat type would improve many of the ecological processes (e.g., nutrient exchange) that support tidal emergent wetlands, thereby indirectly benefitting the species by increasing the productivity of suitable habitat areas	AE1.	M1 through M4.	Increase in suitable freshwater emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1 Restoration of shallow tidal perennial aquatic habitat would reestablish ecological processes necessary to maintain healthy tidal freshwater emergent wetland habitats used by the species	
3. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	BE4. Reduction in the rate of erosion of tidal wetlands associated with dredging and boat wakes would prevent or reduce the rate of existing species habitat loss and, in occupied habitat affected by these activities, species individuals and populations	None	None	Reduction in loss of habitat area to erosion (and potential increase in habitat) would provide long-term protection of suitable habitat areas available for occupation by the species and would reduce losses of existing populations	

Table 8b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
		BE5. Improving existing channel islands may lead to an increase in habitat suitable for colonization by the species				
4. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	BE6. Reduction in competition with invasive non-native plant species would promote the health of existing species populations and provide opportunities for the species' expansion	AE2. Species may be indirectly disturbed or removed during weed control activities	M5. Avoid adversely affecting all individuals of species by doing what???	Improvement in the health of ecological processes that support freshwater wetland habitat areas adjacent to Delta sloughs and channels	
5. Setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications)	C3E0101, C3E0102, C3E0103	BE7. This benefit would occur only if the design of setback levees and channel islands resulted in conditions that allowed more suitable wetland habitat to establish following construction than would be needed to offset potential adverse effects of the action	AE1.	M1, M3, and M4.	Potential increase in suitable freshwater emergent wetland habitat area if more suitable habitat area reestablishes as a result of the action than is affected or, if mitigation is required, habitat acreage loss is mitigated at ratios greater than 1 to 1.	
6. Alter hydrologic flows in the Delta	E010101, E010102, E010103, E010104, E010603, E010604, E010605	BE8. This benefit would occur only if the timing and rates of hydrologic flow alterations would promote tidal emergent wetland habitat	AE2. Species may be adversely affected if flow alterations cause erosion of occupied habitat or if timing and rates of flows reduce occupied tidal emergent wetland habitat	M5. Develop flow regime that would promote sustainability of species habitat	Potential increase in suitable wetland habitat or, if mitigation is required, no net loss in species numbers resulting from the actions	

Table 8b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in substantial increases in the species' preferred habitat within its current and historical range. Because historical loss of habitat is the primary reason for the species' decline, substantial increases in habitat could result in expansion of the population into formerly occupied areas of its historical range and result in substantial increases in the number of individuals.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
7. Construct and operate 200,000 acre-feet of storage on Delta islands	S3E0101	BE9. This benefit would occur only if the design and operation of storage islands resulted in conditions that allowed more suitable wetland habitat to establish along the margin of storage pools than would be needed to offset potential adverse effects of the action	AE1.	M1, M3, and M4.	Potential increase in suitable freshwater emergent wetland habitat area if more suitable habitat area reestablishes as a result of the action than is affected or, if mitigation is required, habitat acreage loss is mitigated at ratios greater than 1 to 1	
8. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, C3E0104, C3E0106, C3E0109, C3E0111, C3E0112, C3E0113, C3E0114	None.	AE1.	M1, M3, and M4.	Increase in suitable freshwater emergent wetland habitat areas if habitat acreage loss is mitigated at ratios greater than 1 to 1	
9. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here		None.	None.	None.	

Table 8a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting Mason's Lilaepsis

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Restore 30,000 to 45,000 acres of tidal freshwater emergent wetland	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E011101, E011102, E011202, E011401, E011402, E011403, E011404, E011405, C3E0103, L3	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching of levees 4. Installing structures that restrict channel flow 5. Excavating channels
2. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010901, E010902, E010903, E010904, E010905	<ol style="list-style-type: none"> 1. Placing fill in existing channels 2. Setting levees back 3. Placing fill to bring Delta islands to grade and breaching island levees
3. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201	<ol style="list-style-type: none"> 1. Reducing dredging of Delta channels 2. Reducing boat wakes 3. Installing wave attenuation or bank protection structures
4. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	<ol style="list-style-type: none"> 1. Weed control activities
5. Setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications).	C3E0102, C3E0103	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Removing existing levees
6. Alter hydrologic flows in Delta	E010101, E010102, E010103, E010104, E010603, E010604, E010605	<ol style="list-style-type: none"> 1. Increasing or decreasing rates and timing of flows
7. Construct and operate 200,000 acre-feet of storage on Delta Islands	S3E0101	<ol style="list-style-type: none"> 1. Grading and filling

Table 8a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
8. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, C3E0104, C3E0106, C3E0109, C3E0111, C3E0112, C3E0113, C3E0114	<ol style="list-style-type: none"> 1. Hydrologic alteration 2. Constructing barriers and pumping plant 3. Removing, replacing, and/or relocating existing improvements 4. Modifying channels
9. Program objectives that are not expected to directly adversely affect the species	Large list of remaining action codes to be inserted here	None

D-049990

Table 5b. Potential CALFED Program Effects and Mitigation Measures for the Western Yellow-Billed Cuckoo

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quality and quantity of the species' nesting and foraging habitats the historical range of the western yellow-billed cuckoo.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Protect, restore, or enhance riparian forest	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010501, E010502, E010607, E011101, E011102, E011601, E011602, E011603, E011604, E010605, E011606, E011608, E011408	BE1. Restoration of riparian forest and woodland would increase the availability of migration, breeding, and foraging habitat for the species.	AE1. Permanent loss or degradation of suitable habitat could result if activities required to implement actions result in the removal of suitable riparian forest and woodland habitats. Adverse effects on habitat would be permanent if sufficient in-kind suitable habitat to offset losses would not be restored onsite as a result of the actions.	M1. Avoid removal of trees and shrubs that are within active nesting territories. M2. Restore or enhance sufficient suitable mitigation habitat area to offset impacts on the species at offsite locations before or when project impacts on occupied or potentially occupied habitat are incurred. M3. To the extent feasible, locate mitigation habitats near suitable existing habitat areas to create larger and more contiguous units of habitat area.	Potential substantial increase in the quantity of suitable nesting, forage, and cover habitat.	

Table 5b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quality and quantity of the species' nesting and foraging habitats the historical range of the western yellow-billed cuckoo.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
			<p>AE2. Temporary disturbance to individuals could result if activities required to implement actions occur in or near occupied habitat areas. Adverse effects on individuals would be temporary because activities that cause disturbance would terminate following completion of the actions.</p>	<p>M4. To the extent feasible, implement actions during periods (i.e., late-fall through early spring) that the species is absent from the Delta Region.</p>		
			<p>AE3. Temporary reduction in nesting success could occur as a result of disturbance or nest destruction if activities required to implement actions occur in or near active nest sites during the nesting season. Adverse effects on nesting success would be temporary because activities that would affect nesting success would terminate following completion of the actions.</p>	<p>M5. To the extent feasible, avoid activities that implement actions near nest sites or phase action implementation to avoid disturbance near active nest sites during the nesting season.</p>		

Table 5b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quality and quantity of the species' nesting and foraging habitats the historical range of the western yellow-billed cuckoo.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
2 Restore tidal and non-tidal aquatic and wetland habitats	E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011401, E011402, E011403, E011404, E011405, E010406, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E014101	None.	AE1 through AE3.	M1 through M5.	Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.	
3. Modify levee vegetation management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	BE2. Potential increase in the availability of riparian nest trees. BE3. Potential decrease in the level of levee maintenance associated disturbance near occupied nest sites.	A2 and AE3. <i>These potential adverse affects would only occur if weed control activities occurred near occupied nest sites.</i>	M5.	Potential increase in the quantity of suitable riparian habitat.	

Table 5b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in increases in the quality and quantity of the species' nesting and foraging habitats the historical range of the western yellow-billed cuckoo.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
4. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000 cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	BE1. <i>This benefit would only occur if setback levee design and conveyance operations permitted riparian vegetation to establish and mature along setback levees.</i>	AE1 through AE3.	M1 through M5.	Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if setback levees are designed to restore riparian habitats. If not, potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.	
5. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, W010501, W010701, L1, C3E0106, C3E0109, S3E0101	None.	AE1 through AE3.	M1 through M5.	Potential short-term loss of suitable habitat area and long-term increase in suitable habitat area if affected habitat acreage loss is mitigated at ratios greater than 1 to 1.	
6. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

**Table 5a. Summary of Programmatic Actions and Impact Mechanisms
Potentially Affecting the Western Yellow-Billed Cuckoo**

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Protect, restore, or enhance riparian forest	E010401, E010402, E010403, E010404, E010405, E010406, E010407, E010501, E010502, E010607, E011101, E011102, E011601, E011602, E011603, E011604, E010605, E011606, E011608, E011408	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees 4. Installing structures that restrict channel flow 5. Excavating channels
2. Restore tidal and non-tidal aquatic and wetland habitats.	E010901, E010902, E010903, E010904, E010905, E011001, E011002, E011003, E011004, E011005, E011006, E011401, E011402, E011403, E011404, E011405, E010406, E011406, E011407, E011408, E011409, E011410, E011502, E011503, E011504, E011505, E011507, E011508, E011510, E011512, E014101	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Removing or breaching levees
3. Modify levee vegetation-management practices to encourage the establishment of shoreline riparian vegetation and implement annual programs to eradicate invasive non-native riparian vegetation	E014901, E015301, E015302, E015303	<ol style="list-style-type: none"> 1. Reducing the level of levee maintenance-associated disturbance 2. Disturbance associated with implementation of weed control activities
4. Construct setback levees along the Mokelumne River for conveyance (North Delta Channel Modifications) and construct a 15,000-cfs open conveyance channel from Hood to Clifton Court Forebay	C3E0101, C3E0102, C3E0103, C3E0104, C3E0111, C3E0112, C3E0113, C3E0114	<ol style="list-style-type: none"> 1. Constructing setback levees 2. Grading and filling 3. Constructing conveyance facility

Table 5a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
5. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, W010501, W010701, L1, C3E0106, C3E0109, S3E0101	<ol style="list-style-type: none"> 1. Construction to upgrade levees 2. Installing infrastructure 3. Grading and filling 4. Inundation 5. Demolishing, relocating, and/or constructing water diversions, intakes, and other management structures
6. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.

D-049996

Table 10b. Potential CALFED Program Effects and Mitigation Measures for the Delta Smelt

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
Delta Region						
1. Restore 30,000-45,000 acres of tidal freshwater emergent wetland.	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E010602, E010603, E011101, E011102, E011201, E011202, E011401, E011402, E011403, E011404, E011405, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	BE1. Potential increase in larval, juvenile, and adult rearing habitat in the Delta and Suisun Bay should lead to increased growth through greater food and feeding habitat availability and greater survival through reduction in predation, which in turn should increase the productive capacity of the population and lead to greater production and population size.	AE1. Temporary loss, disturbance, or degradation of suitable habitat could result if construction and related activities required to implement actions occur in areas that support existing species habitat. Adverse effects on habitat would be temporary because affected habitat would be restored onsite as a result of the actions.	M1. Initially implement the ERPP, to the extent feasible, to restore sufficient suitable habitat to offset impacts on the species on lands supporting unsuitable species habitat before or when impacts on occupied or potentially occupied habitat are incurred. M2. To the extent feasible, implement actions when the species is least susceptible to the associated adverse effects of disturbance.	Substantial increase in suitable rearing and migratory habitat compared to existing conditions.	The response of delta smelt is predicted based on known life history and theory. There are questions as to the importance of Delta habitat for the delta smelt population, and whether food production is limiting.
2. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010407, E010901, E010902, E010903, E010904, E010905, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	BE2. Restoration of this habitat type will restore or improve many of the ecological processes (e.g., nutrient exchange) that support tidal aquatic habitat, thereby indirectly benefitting the species by increasing the productivity of suitable habitat areas and providing more rearing habitat.	AE1	M1	Restoration of shallow tidal perennial aquatic habitat would provide more rearing habitat used by the species.	There is uncertainty as to whether delta smelt would benefit from increased shallow-water habitat in the Delta.

Table 10b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
3. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	BE3. Reduction in the rate of erosion of tidal wetlands associated with dredging and boat wakes will prevent or reduce the rate of habitat loss, which should protect existing rearing habitats for fry, fingerling, and smolts.	None.	None.	Reduction in loss of habitat area to erosion would provide long-term protection of existing suitable habitat areas, which should improve growth and survival of delta smelt, which in turn should lead to improved production and escapement.	E1.
4. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channel	E015201	BE4. Improvement in the aquatic environment associated with tidal sloughs and channels may improve the foodweb and other ecological processes that support associated wetland habitats used by the species.	AE4. Eradication activities include chemical herbicides and mechanical means. Both activities and disturbance associated with their applications have the potential to affect juvenile delta smelt survival in the Delta.	M4a. Herbicide applications will be such that toxic effects on juvenile salmon will be minimal. M4b. Activities related to application of controls will limited to minimize disturbance of juveniles rearing in local and adjacent habitats.	With control, channel and slough habitat value for delta smelt will be improved, potentially leading to improved growth and survival.	Habitat use of channels and sloughs by delta smelt, and the potential effects of invasive plant species on such habitats and use by salmon are relatively unknown.

Table 10b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
E5. Improve water quality	E015001, E015002, E015003, E015004, E015701, E015702, W170201, W170202, W170203, W020301, W120302, W170401, W170601, W270701	BE5. Implementation of this action would reduce concentrations of toxins in the Delta, which would potentially increase abundance of invertebrates used as food by the species and reduce the uptake of toxins by delta smelt	None.	None.	Potential increase in species survival and reproductive success.	The present effect of toxins on delta smelt production is unknown; the potential benefits of improved water quality is unknown.
E6. Enhance first fall-early winter pulse of riverflow.	E010102	BE6. Passing unimpaired reservoir inflow and reducing diversions, in combination with natural inflows during the first flow event of the water-year would reduce potentially high concentrations of toxins and increase potential transport of juvenile delta smelt migrating down the Sacramento River into the Delta and Bay. Both factors could lead to greater survival and higher production and escapement.	AE6. Passing inflows through reservoirs may lead to reduced carryover storage, particularly for the first flow event when water supply forecasts are as yet unavailable for the coming water year. Reduction in carryover storage could lead to reduced environmental flow discharges from reservoirs in coming years, which could reduce delta smelt survival, production, and escapement.		Potential increase in species survival and reproductive success.	The potential benefits of the first flow pulse of the water-year have not been determined from monitoring data or experiment.

Table 10b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
7. Increase spring riverflows.	E010101	BE7. Increasing spring (Feb-May) flows in the Sacramento River and Delta would potentially increase river and estuary productivity, improve spawning habitat in the river, reduce effects of toxins, reduce predation on juvenile salmon, and improve transport to and through the Delta, all of which could lead to improved survival, production, and escapement of delta smelt.	AE7. Passing inflows through reservoirs in spring may lead to reduced carryover storage, particularly during long periods of drought when water supply is below normal. Reduction in carryover storage could lead to reduced environmental flow discharges from reservoirs in coming years, which could reduce delta smelt survival, production, and escapement.		Potential increase in species survival and reproductive success.	The potential benefits of improved spring flow are based on correlation of higher flows with greater delta smelt production, but the cause and effect mechanism has not been determined with certainty.

D-050000

Table 10b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
8. Improve riparian and SRA habitat in the Delta	E010401, E010407, E010501, E010502, E010601, E010603, E010607, E010901, E010902, E010903, E010904, E010905, E010906, E011101, E011102, E011201, E011202, E011401, E012402, E011403, E011404, E011404, E011405, E011501, E011502, E011503, E011601, E011602, E011602, E011603, E011604, E011605, E011606, E011607, E011608, E014901, E015001, E015002, E015003, E015004, E015201, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	BE8. Protection and enhancement of riparian and SRA habitat would improve rearing and migratory habitat for delta smelt in the Delta. Shade, feeding habitat, protection from predators, reduced water temperatures, and increased food supply provided by more riparian and aquatic insects would potentially increase growth, survival, production, and escapement.	AE1.	M1, M2.	Substantial increase in suitable fry, fingerling, smolt rearing and migratory habitat compared to existing conditions.	Relationship of riparian habitat to delta smelt survival in the Delta is based on theory. The magnitude of potential benefits to delta smelt is unknown.
9. Improve downstream (juvenile) and upstream (adult) passage through the Delta by reducing barriers to migration	E010601, E010603, E010604, E010605, E010607, E010608	BE9. Less obstruction of direct upstream and downstream movement through the Delta would potentially improve survival and escapement.	A1.	M1, M2.	Increase survival of juveniles migrating downstream through the Delta and reduce loss or delay of adults migrating upstream through the Delta.	The potential benefit is unknown because the extent of loss of juveniles and adults is unknown.

D-050001

Table 10b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
10. Increase positive downstream flow in the San Joaquin River by operation of the Old River barrier	E010606		AE10. Operation of the Old River barrier in fall may increase the movement juvenile delta smelt from the central Delta into the southern Delta and thus potentially increase loss to south-Delta pumping plants and predation.	M10. Restrict operation of the Old River barrier when delta smelt are found in the central Delta.	Operation of an Old River barrier should have minimal effect if monitoring is conducted and operation is restricted when necessary.	The extent of juvenile delta smelt spawning and rearing in the Delta has not been determined. Tradeoffs with San Joaquin salmon survival may be necessary.
11. Enhancement of striped bass population	E012701	BE11. Many of the actions necessary to benefit striped bass will also benefit delta smelt.	AE11. Artificial rearing and stocking of striped bass to supplement population numbers before system productivity has been upgraded to sustain such population numbers could increase predation rates on delta smelt and thus reduce survival and population recovery.	M11. Artificial rearing and stocking of striped bass should be restricted to areas and times when predation on delta smelt would be minimal. Stocking should be restricted to short-term striped bass population recovery and only after recovery of a forage base for striped bass in the rivers and estuary.	Artificial support of striped bass would have minimal effect on the delta smelt population.	The effects of historical, existing, and potential future delta smelt populations from striped bass predation are relatively unknown.

Table 10b. Continued

Overall Program Effect with Mitigation: Implementation of CALFED would result in a substantial increase in survival and production of the species through reduction in stressors, increases in preferred habitat, and improved ecosystem processes. Such improvements are expected to lead to the recovery and delisting of the species.

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Potential Beneficial Effects on Species	Potential Adverse Effects on Species (Take)	Potential Mitigation Strategies	Overall Effect of Summary Outcomes with Mitigation	Level of Certainty
12. Reduce loss of delta smelt at water diversions and other structures from predation and entrainment	E014701, E014702, E014703, E015601, E015602, E015603, C3E0105, C3E0107, C3E0108, C3E0110.	BE12. Reducing losses of delta smelt at water diversions and other structures would reduce predation and entrainment losses, which in turn would increase survival, production, and escapement.	None.		Increase in survival compared to existing conditions.	Because the extent of losses of delta smelt and the role of diversions and other structures in the delta smelt decline are not well understood, there is an unknown degree of potential benefit.
14. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, S3E0101, C3E0106, C3E0110, C3E0111	None.			Increase in suitable habitat areas as a result of mitigating for habitat acreage loss at a ratio greater than 1 to 1.	
15. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	None.	None.	None.	None.	

D-050003

Table 10a. Summary of Programmatic Actions and Impact Mechanisms Potentially Affecting the Delta Smelt

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
Delta Region		
1. Restore 30,000-45,000 acres of tidal freshwater emergent wetland	E010401, E010402, E010403, E010404, E010405, E010407, E010601, E010602, E010603, E011101, E011102, E011201, E011202, E011401, E011402, E011403, E011404, E011405, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	1. Construction impacts such as short-term loss of riparian, SRA, and shallow-water habitat 2. Short-term increases in turbidity in construction zones
2. Restore 7,000 acres of shallow tidal perennial aquatic habitat	E010407, E010901, E010902, E010903, E010904, E010905, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	1. Disturbance associated with habitat restoration activities
3. Protect existing tidal freshwater emergent wetlands from loss to erosion and dredging	E011201, E016001, E016002, E016003, E016004, E016005	None.
4. Implement annual programs to eradicate invasive non-native aquatic plants from sloughs and channels	E015201	1. Application of herbicides may directly or indirectly affect survival of delta smelt
5. Improve water quality	E015001, E015002, E015003, E015004, E015701, E015702, W170201, W170202, W170203, W020301, W120302, W170401, W170601, W270701	None.

Table 10a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
6. Enhance first fall-early winter pulse of riverflow	E010102	1. Pass inflow through reservoirs rather than potentially storing water (may lead to subsequent shortfalls) 2. Reducing diversions in the Delta during event (may lead to later increased diversions)
7. Increase spring riverflows	E010101	1. Pass inflow through reservoirs rather than potentially storing water (may lead to subsequent shortfalls) 2. Reducing diversions in the Delta during event (may lead to later increased diversions)
8. Improve riparian and SRA habitat in the Delta.	E010401, E010407, E010501, E010502, E010601, E010603, E010607, E010901, E010902, E010903, E010904, E010905, E010906, E011101, E011102, E011201, E011202, E011401, E012402, E011403, E011404, E011404, E011405, E011501, E011502, E011503, E011601, E011602, E011602, E011603, E011604, E011605, E011606, E011607, E011608, E014901, E015001, E015002, E015003, E015004, E015201, E016001, E016002, E016003, E016004, E016005, C3E0102, C3E0103	1. Short-term disturbance and turbidity
9. Improve downstream (juvenile) and upstream (adult) passage through the Delta by reducing barriers to migration	E010601, E010603, E010604, E010605, E010607, E010608	Short-term construction disturbance and turbidity

Table 10a. Continued

Summary Outcomes (General Program Objectives and Targets)	Applicable Programmatic Actions	Activities Potentially Affecting the Species (Take)
10. Increase positive downstream flow in San Joaquin River by operation of Old River barrier	E010606	Increase central-Delta water conveyed to south-Delta pumping plants
11. Enhancement of striped bass population	E012701	Increase numbers of striped bass in the basin
12. Reduce loss of delta smelt at water diversions and other structures from predation and entrainment	E014701, E014702, E014703, E015601, E015602, E015603, C3E0105, C3E0107, C3E0108, C3E0110	None
14. Other program objectives that potentially could adversely affect the species as a result of construction activities	E014701, E010607, E010608, S3E0101, C3E0106, C3E0110, C3E0111	
15. Program objectives that are not expected to affect the species	Large list of remaining action codes to be inserted here	

Preliminary Draft Assessment of Effects of CALFED Actions on Delta Species
October 13, 1997

Type	Common Name	Scientific Name	Status			Potential Effects on Delta Species in the Delta Region				Potential Effects outside the Delta Region
			Federal	State	Other	Likely to Be Affected	May Be Affected	Not Affected	Not Enough Information	
Federally Listed as Endangered or Threatened										
A	California red-legged frog	<i>Rana aurora draytonii</i>	T			A,B				
B	Aleutian Canada goose	<i>Branta canadensis leucopareia</i>	T				A,B			
B	American peregrine falcon	<i>Falco peregrinus anatum</i>	E	CE/FP			A,B			
B	Bald eagle	<i>Haliaeetus leucocephalus</i>	T	CE/FP			B			
B	California clapper rail	<i>Rallus longirostris obsoletus</i>	E	CE/FP		A,B				
B	California least tern	<i>Sterna antillarum (=albifrons) browni</i>	E	CE/FP			A,B			
F	Delta smelt	<i>Hypomesus transpacificus</i>	T	CT		A,B				
F	Delta smelt (critical habitat)		T	CT		A,B				
F	Winter-run chinook salmon	<i>Oncorhynchus tshawytscha</i>	E	CSC		A,B				
F	Winter-run chinook salmon (critical habitat)		E	CSC		A,B				
I	Conservancy fairy shrimp	<i>Branchinecta conservatio</i>	E					X2		SC,SJ,B
I	Delta green ground beetle	<i>Elaphrus viridis</i>	T					X2		
I	Delta green ground beetle (critical habitat)		T					X2		
I	Lange's metalmark butterfly	<i>Apodemia mormo langei</i>	E					X2		
I	Longhorn fairy shrimp	<i>Branchinecta longiantenna</i>	E				A,B			SJ
I	Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	T			A,B				SC,SJ
I	Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	T				A,B			SC,SJ
I	Vernal pool tadpole shrimp	<i>Lepidurus packardi</i>	E				A,B			SC,SJ,B
M	Salt marsh harvest mouse	<i>Reithrodontomys raviventris</i>	E	CE/FP		A,B				
M	San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	E	CT			A			
P	Antioch Dunes evening-primrose	<i>Oenothera deltooides ssp. howellii</i>	E	CE	1B			X2		B
P	Antioch Dunes evening-primrose (critical habitat)		E	CE	1B			X2		B
P	Colusa grass	<i>Neostapfia colusana</i>	T	CE	1B			X2		B,SC,SJ
P	Contra Costa goldfields	<i>Lasthenia conjugens</i>	E		1B		A			B,SC

D-050008
D-050007

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region							Potential Effects outside the Delta Region
			Status			Likely to Be Affected	May Be Affected	Not Affected	Not Enough Information	
			Federal	State	Other					
P	Contra Costa wallflower	<i>Erysimum capitatum</i> ssp. <i>angustatum</i>	E	CE	1B			X2		B
P	Contra Costa wallflower (critical habitat)		E	CE	1B			X2		B
P	Green's tuctoria	<i>Tuctoria greenei</i>	E	R	1B		A,B			B,SC
P	Large-flowered fiddleneck	<i>Amsinckia grandiflora</i>	E	CE	1B			X2		B,SJ
P	Palmate-bracted bird's-beak	<i>Cordylanthus palmatus</i>	E	CE	1B		A,B			B,SC,SJ
P	Sacramento Orcutt grass	<i>Orcuttia viscida</i>	E	E	1B		A,B			SC
P	Slender Orcutt grass	<i>Orcuttia tenuis</i>	T	E	1B		A,B			SC
P	Solano grass	<i>Tuctoria mucronata</i>	E	CE	1B			X2		B,SC
R	Giant garter snake	<i>Thamnophis gigas</i>	T	CT			A,B			
State Listed as Endangered, Threatened, or Rare										
B	California black rail	<i>Laterallus jamaicensis coturniculus</i>			CT/FP		A,B			
B	Greater sandhill crane	<i>Grus canadensis tabida</i>			CT/FP		A,B			
B	Little willow flycatcher	<i>Empidonax traillii brewsteri</i>			CE		A,B			
B	Swainson's hawk	<i>Buteo swainsoni</i>			CT		A,B			
B	Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>			CE			A,B		
M	Riparian brush rabbit	<i>Sylvilagus bachmani riparius</i>	C	CE		B				
P	Boggs lake hedge-hyssop	<i>Gratiola heterosepala</i>		CE	1B			B		B,SC,SJ
P	Delta button-celery	<i>Eryngium racemosum</i>		CE	1B			A,B		SJ
P	Mason's lilaeopsis	<i>Lilaeopsis masonii</i>		Rare	1B	A,B				B,SC,SJ
P	Mt. Diablo bird's-beak	<i>Cordylanthus nidularius</i>		Rare	1B			X2		B
P	Rock sanicle	<i>Sanicula saxatilis</i>		Rare	1B			X2		B
P	Soft bird's-beak	<i>Cordylanthus mollis</i> ssp. <i>mollis</i>	PE	Rare	1B		A,B			B,SC
R	Alameda whipsnake	<i>Masticophis lateralis euryxanthus</i>	PE	CT				A		
Federally Proposed										
F	Central Valley steelhead	<i>Oncorhynchus mykiss</i>	PE				A,B			
F	Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	PT	CSC			A,B			
P	Showy Indian clover	<i>Trifolium amoenum</i>	PE		1B			X2		B,SC

D-050009
D-050008

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region							Potential Effects outside the Delta Region
			Status			Likely to Be Affected	May Be Affected	Not Affected	Not Enough Information	
			Federal	State	Other					
State Candidate										
F	Spring-run chinook salmon	<i>Oncorhynchus tshawytscha</i>		SCT		A,B				
Federal Candidate										
A	California tiger salamander	<i>Ambystoma californiense</i>		C				X2		
B	Mountain plover	<i>Charadrius montanus</i>		C	CSC				X	
M	San Joaquin Valley woodrat	<i>Neotoma fuscipes riparia</i>		C	CSC		A,B			
P	Congdon's tarplant	<i>Hemizonia parryi ssp. congdonii</i>		C		1B				B
California Species of Special Concern, California Fully Protected, or CNPS List 1 or 2										
A	Foothill yellow-legged frog	<i>Rana boylei</i>			CSC				X3	
B	American white pelican	<i>Pelecanus erythrorhynchos</i>			CSC		B			
B	Bell's sage sparrow	<i>Amphispiza belli belli</i>			CSC				X1	
B	Black tern	<i>Chlidonias niger</i>			CSC		A,B			
B	California gull	<i>Larus californicus</i>			CSC		A,B			
B	California yellow warbler	<i>Denfroica petechia brewsteri</i>			CSC		A,B			
B	Cooper's hawk	<i>Accipiter cooperii</i>			CSC		A,B			
B	Double crested cormorant (rookery site)	<i>Phalacrocorax auritus</i>			CSC		B			
B	Ferruginous hawk	<i>Buteo regalis</i>			CSC			A,B		
B	Loggerhead shrike	<i>Lanius ludovicianus</i>			CSC			A,B		
B	Long-billed curlew	<i>Numenius americanus</i>			CSC		A,B			
B	Merlin	<i>Falco columbarius</i>			CSC				X1	
B	Northern harrier	<i>Circus cyaneus</i>			CSC		A,B			
B	Osprey	<i>Pandion haliaetus</i>			CSC			A,B		
B	Prairie falcon	<i>Falco mexicanus</i>			CSC				X1	
B	Saltmarsh common yellowthroat	<i>Geothlypos trichas sinuosa</i>			CSC		A,B			
B	San Pablo song sparrow	<i>Melospiza melodia samuelis</i>			CSC		A,B			
B	Sharp-shinned hawk	<i>Accipiter striatus</i>			CSC				X1	

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region								Potential Effects outside the Delta Region
			Status			Likely to Be Affected	May Be Affected	Not Affected	Not Enough Information		
			Federal	State	Other						
B	Short-eared owl	<i>Asio flammeus</i>		CSC		A,B					
B	Suisun song sparrow	<i>Melospiza melodia maxillaris</i>		CSC		A,B					
B	Western burrowing owl	<i>Athene cunicularia hypugea</i>		CSC			A,B				
B	Western least bittern	<i>Ixobrychus exilis hesperis</i>		CSC		A,B					
B	White-faced ibis	<i>Plegadis chihi</i>		CSC		A,B					
B	White-tailed kite	<i>Elanus leucurus</i>		FP			A				
F	Green sturgeon	<i>Acipenser medirostris</i>		CSC		A,B					
F	Kern brook lamprey	<i>Lampetra hubbsi</i>		CSC				X2			
F	Longfin smelt	<i>Spirinchus thaleichthys</i>		CSC		A,B					
F	River lamprey	<i>Lampetra ayresi</i>		CSC					X		
F	Sacramento perch	<i>Archoplites interruptus</i>		CSC				X2			
F	San Joaquin fall-run chinook salmon	<i>Oncorhynchus tshawytscha</i>		CSC		A,B					
F	San Joaquin roach	<i>Lavinia symmetricus</i> ssp. (San Joaquin)		CSC				X2			
M	Greater western mastiff-bat	<i>Eumops perotis californicus</i>		CSC				X3			
M	Hoary bat	<i>Lasiurus cinereus</i>		CSC				X1			
M	Pacific western big-eared bat	<i>Plecotus townsendii townsendii</i>		CSC					X		
M	Pale Townsend's big-eared bat	<i>Plecotus townsendii pallescens</i>		CSC				X1			
M	San Francisco dusky-footed woodrat	<i>Neotoma fuscipes annectens</i>		CSC			A,B				
M	Silver-haired bat	<i>Lasiurus noctivagans</i>		CSC				X1			
M	Suisun ornate shrew	<i>Sorex ornatus sinuosus</i>		CSC			A,B				
P	Adobe lily	<i>Fritillaria pluriflora</i>			1B		A				SC
P	Alkali milk-vetch	<i>Astragalus tener</i> var. <i>tener</i>			1B		A,B				B,SC,SJ
P	Baker's navarretia	<i>Navarretia leucocephala</i> ssp. <i>bakeri</i>			1B		B				B,SC
P	Bearded popcorn-flower	<i>Plagiobothrys hystericulus</i>			1A				X		B
P	Big tarplant	<i>Blepharizonia plumosa</i> ssp. <i>plumosa</i>			1B			X2			B,SJ
P	Brewer's dwarf-flax	<i>Hesperolinon breweri</i>			1B		A				B
P	Bristly sedge	<i>Carex comosa</i>			2	A,B					B,SC,SJ
P	Brittlescale	<i>Atriplex depressa</i>			1B		A,B				B,SC,SJ

D-050011

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region					Potential Effects outside the Delta Region		
			Status			Likely to Be Affected	May Be Affected		Not Affected	Not Enough Information
			Federal	State	Other					
P	Caper-fruited tropidocarpum	<i>Tropidocarpum capparideum</i>			1A			X	B,SC,SJ	
P	Carquinez goldenbush	<i>Isocoma arguta</i>			1B			X2	B	
P	Contra Costa buckwheat	<i>Ertogonum truncatum</i>			1A			X2	B	
P	Contra Costa manzanita	<i>Arctostaphylos manzanita ssp. laevigata</i>			1B			X2	B	
P	Delta mudwort	<i>Limosella subulata</i>			2	A,B			B,SC,SJ	
P	Delta tule-pea	<i>Lathyrus jepsonii var. jepsonii</i>			1B	A,B			B,SC,SJ	
P	Diablo rock-rose	<i>Helianthella castanea</i>			1B		A		B	
P	Diamond-petaled poppy	<i>Eschscholzia rhombipetala</i>			1A			X2	B,SC,SJ	
P	Dwarf downingia	<i>Downingia pusilla</i>			2		B		B,SC,SJ	
P	Eel-grass pondweed	<i>Potamogeton zosteriformis</i>			2		A,B		B,SC	
P	Ferris's milk-vetch	<i>Astragalus tener var. ferrisiae</i>			1B			X2	SC	
P	Fragrant fritillary	<i>Fritillaria liliacea</i>			1B		A		B	
P	Hall's bush mallow	<i>Malacothamnus hallii</i>			1B			X2	B,SJ	
P	Heartscale	<i>Atriplex cordulata</i>			1B		A		B,SC,SJ	
P	Heckard's pepper-grass	<i>Lepidium latipes var. heckardii</i>			1B		A		SC	
P	Hispid bird's-beak	<i>Cordylanthus mollis ssp. hispidus</i>			1B	A,B			B,SC,SJ	
P	Interior California larkspur	<i>Delphinium californicum ssp. interius</i>			1B		A,B		B,SJ	
P	Legenere	<i>Legenere limosa</i>			1B		B		B,SC,SJ	
P	Mad-dog skullcap	<i>Scutellaria lateriflora</i>			2		A,B		SJ	
P	Marsh skullcap	<i>Scutellaria galericulata</i>			2			X	SC	
P	Most beautiful (uncommon) jewelflower	<i>Streptanthus albidus ssp. peramoenus</i>			1B		A		B	
P	Mt. Diablo fairy-lantern	<i>Calochortus pulchellus</i>			1B		A		B	
P	Mt. Diablo jewelflower	<i>Streptanthus hispidus</i>			1B			X2	B	
P	Mt. Diablo manzanita	<i>Arctostaphylos auriculata</i>			1B			X2	B	
P	Mt. Diablo phacelia	<i>Phacelia phacelloides</i>			1B			X2	B,SJ	
P	Mt. Hamilton coreopsis	<i>Coreopsis hamiltonii</i>			1B			X2	B,SJ	
P	Northern California black walnut (Native stands)	<i>Juglans californica var. hindsii</i>			1B	A,B			B,SC	

D-050012

D-050011

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region							Potential Effects outside the Delta Region
			Status		Likely to Be Affected	May Be Affected	Not Affected	Not Enough Information		
			Federal	State Other						
P	Parish's brittlestale	<i>Atriplex parishii</i>		1B			X2		None	
P	Pincushion navarretia	<i>Navarretia myersii</i>		1B			X3		SC,SJ	
P	Rayless ragwort	<i>Senecio aphanactis</i>		2		A			B,SJ	
P	Recurved larkspur	<i>Delphinium recurvatum</i>		1B		A			B,SJ	
P	Rose-mallow	<i>Hibiscus lasiocarpus</i>		2	A,B				B,SC,SJ	
P	Showy madia	<i>Madia radiata</i>		1B		A			B,SJ	
P	Slough thistle	<i>Cirsium crassicaule</i>		1B		A,B			SJ	
P	Suisun marsh aster	<i>Aster lentus</i>		1B			X2		B,SC,SJ	
P	Suisun thistle	<i>Cirsium hydrophilum</i> var. <i>hydrophilum</i>		1B	A,B				B	
P	Valley sagittaria	<i>Sagittaria sanfordii</i>		1B	A,B				B,SC,SJ	
P	Valley spearscale	<i>Atriplex joaquiniana</i>		1B		A,B			B,SC,SJ	
P	Wright's trichocoronis	<i>Trichocoronis wrightii</i> var. <i>wrightii</i>		2			X2		SC,SJ	
R	California horned lizard	<i>Phrynosoma coronatum frontale</i>		CSC			X2			
R	Northwestern pond turtle	<i>Clemmys marmorata marmorata</i>		CSC	A,B					
R	San Joaquin whipsnake	<i>Masticophis flagellum ruddocki</i>		CSC		A				
R	Silvery legless lizard	<i>Anniella pulchra pulchra</i>		CSC			X2			
R	Southwestern pond turtle	<i>Clemmys marmorata pallida</i>		CSC		A,B				

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A	Western spadefoot toad	<i>Scaphiopus hammondi</i>		SC		A,B			
B	California horned lark	<i>Eremophila alpestris actia</i>		SC		A			
B	Tricolored blackbird	<i>Agelaius tricolor</i>		SC	A,B				
F	Pacific lamprey	<i>Lampetra tridentata</i>		SC					X
I	Antioch andrenid bee	<i>Perdita scitula antiochenis</i>		SC			X2		
I	Antioch cophuran robberfly	<i>Cophura huxdi</i>		SC			X2		
I	Antioch Dunes anthicid beetle	<i>Anthicus antiochenis</i>		SC			X2		
I	Antioch efferian robberfly	<i>Efferia antiochi</i>		SC			X2		
I	Antioch mutillid wasp	<i>Myrmosula pacifica</i>		SC			X2		
I	Antioch sphecid wasp	<i>Philanthus nasilis</i>		SC			X2		

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region							Potential Effects outside the Delta Region
			Status		Likely to Be Affected	May Be Affected	Not Affected	Not Enough Information		
			Federal	State Other						
I	Bridges' Coast Range shoulderband snail	<i>Helminthoglypta nicklintoni bridgesi</i>		SC			X2			
I	Ciervo aegialian scarab beetle	<i>Aegialia concinna</i>		SC			X2		SJ	
I	Curved-foot hygrotus diving beetle	<i>Hygrotus curvipes</i>		SC		A			B	
I	Hurd's metapogon robberfly	<i>Metapogon hurdi</i>		SC				X		
I	Sacramento tiger beetle	<i>Cicindela horticollis abrupta</i>		SC	A,B				SC	
I	San Joaquin tiger beetle	<i>Cicindela tranquebarica</i> ssp.		SC	A,B				SJ	
I	Middlekauf's shieldback katydid	<i>Idiostatus middlekaufi</i>		SC			X2			
I	Moestan blister beetle	<i>Lytta moesta</i>		SC			X2		SC,SJ	
I	Molestan blister beetle	<i>Lytta molesta</i>		SC			X2		SC,SJ	
I	Ricksecker's water scavenger beetle	<i>Hydrochara rickseckeri</i>		SC			X2		SC,B	
I	Sacramento anthicid beetle	<i>Anthicus sacramento</i>		SC		A,B			SC,SJ	
I	San Joaquin dune beetle	<i>Coelus gracilis</i>		SC			X2		SJ	
I	Yellow-banded andrenid bee	<i>Perdita hirticeps luteocincta</i>		SC			X2			
M	American badger	<i>Taxidea taxus</i>		SC		A				
M	Berkeley kangaroo rat	<i>Dipodomys heermanni berkeleyensis</i>		SC			X3			
M	Fringed myotis bat	<i>Myotis thysanodes</i>		SC			X1			
M	Long-eared myotis bat	<i>Myotis evotis</i>		SC			X1			
M	Long-legged myotis bat	<i>Myotis volans</i>		SC			X1			
M	San Joaquin pocket mouse	<i>Perognathus inornatus</i>		SC			X1			
M	Small-footed myotis bat	<i>Myotis ciliolabrum</i>		SC			X1			
M	Yuma myotis bat	<i>Myotis yumanensis</i>		SC			X1			
P	California sycamore	<i>Platanus racemosa</i>			A,B				B,SC,SJ	
P	Little mouse-tail	<i>Myosurus minimus</i> ssp. <i>apus</i>		3			X		B,SC,SJ	
P	Stinkbells	<i>Fritillaria agrestis</i>		4			X		B,SC,SJ	
P	Woolly-headed lessingia	<i>Lessingia hololeuca</i>		3			X		B,SC	
P	Crownscale	<i>Atriplex coronata</i> var. <i>coronata</i>		4			X		B,SJ	
P	Small-flowered morning-glory	<i>Convolvulus simulans</i>		4			X		B,SJ	
P	Hoover's cryptantha	<i>Cryptantha hooveri</i>		4			X		B,SJ	

Type	Common Name	Scientific Name	Potential Effects on Delta Species in the Delta Region					Potential Effects outside the Delta Region		
			Status			Likely to Be Affected	May Be Affected		Not Affected	Not Enough Information
			Federal	State	Other					
P	Gypsum-loving larkspur	<i>Delphinium gypsophilum</i> ssp. <i>gypsophilum</i>			4		X			SJ
P	Small spikerush	<i>Eleocharis parvula</i>			4	X				B
P	Tuolumne button-celery	<i>Eryngium pinnatisectum</i>			4			X		SC, SJ
P	Marsh gumplant	<i>Grindelia stricta</i> var. <i>angustifolia</i>			4	X				B
P	Serpentine linanthus	<i>Linanthus ambiguus</i>			4			X		B, SJ
P	Gardner's yampah	<i>Perideridia gairdneri</i> ssp. <i>gairdneri</i>			4			X		B, SC, SJ
P	Delta woolly-marbles	<i>Psilocarphus brevissimus</i> var. <i>multiflorus</i>			4			X		B, SC, SJ
P	Lobb's aquatic buttercup	<i>Ranunculus lobbii</i>			4			X		B
B	Black-crowned night heron	<i>Nycticorax nycticorax</i>								SC, A, B
B	Great blue heron	<i>Ardea herodias</i>								SC, A, B
B	Great egret	<i>Casmerodius albus</i>								SC, A, B
B	Snowy egret	<i>Egretta thula</i>								SC, A, B

Notes:

Type: A = Amphibian, B = Bird, F = Fish, I = Invertebrate, M = Mammal, P = Plant, R = Reptile

 Not included as HCP-covered species

Federal Status:

- E = Listed as endangered under federal ESA
- T = Listed as threatened under federal ESA
- PE = Proposed for listing as endangered under ESA
- PT = Proposed for listing as threatened under ESA
- C = Candidate for listing under ESA

State Status:

- CE = Listed as endangered under CESA
- CT = Listed as threatened under CESA
- SCE = Candidate for listing as endangered under CESA
- SCT = Candidate for listing as threatened under CESA
- R = Listed as rare under California NPPA
- CSC = California species of special concern
- FP = Fully protected under California Department of Fish and Game Codes

Other Status:

- 1A = California Native Plant Society List 1A
- 1B = California Native Plant Society List 1B
- 2 = California Native Plant Society List 2
- 3 = California Native Plant Society List 3
- 4 = California Native Plant Society List 4
- SC = Species of Concern identified by CALFED

Potential Effects:

- A = Adverse
- B = Beneficial

Not Affected:

- X1 = CALFED actions do not affect species' because habitat is not limiting and species is mobile
- X2 = Species occurs in areas that would not be affected by CALFED actions
- X3 = Species does not occur in Delta Region

Potential Effects outside Delta Region:

- SC = Sacramento River Region
- SJ = San Joaquin River Region
- B = Bay Region
- None = No effects outside of Delta region

Criteria for Inclusion on this List

This is a list of special-status species in the Delta Region. The list was developed and culled based on the criteria described below.

Special-Status Species

Special-status species are any species with some form of endangerment or concern status.

Special-status species include:

- federally listed as threatened and endangered
- California listed as threatened and endangered
- proposed for federal listing
- California candidates
- federal candidates
- California fully protected species
- California species of special concern
- CNPS List 1A, List 1B, List 2, List 3, and List 4
- CALFED species of concern

The list includes all special-status species known to occur or with the potential to occur in the Delta Region. The determination that a species has the potential to occur was based on the species' known range and the presence of suitable habitat in the Delta Region.

HCP-Covered Species

HCP-covered species are those species that would be covered under the Section 10 Permit action. HCP-covered species include federally listed species covered under the incidental take permit and unlisted species covered by "no surprises" assurances. Criteria for selection of HCP-covered species are:

- the species is federally listed as threatened or endangered,
- the species could become federally listed as threatened or endangered during the term of CALFED implementation,
- the species could be affected by CALFED actions, and
- there is sufficient ecological information available to assess impacts of CALFED actions on the status of the species such that assurances can be provided.

Species considered to have the potential to become federally listed as threatened or endangered during the term of CALFED implementation are:

- California listed as threatened and endangered
- proposed for federal listing
- California candidates
- federal candidates
- California fully protected species
- California species of special concern (each species considered individually for inclusion)
- CNPS List 1 and List 2 (each species considered individually for inclusion)
- CALFED species of concern (each species considered individually for inclusion)

Species shaded in gray are those special-status species that do not meet the criteria for HCP-covered species and would not be included for take authorization or assurances under the HCP.

Water Quality Program

The Water Quality Program is described in detail in the Summary of Common Programs and the associated Appendix B. The entire Water Quality Program would be implemented for Alternative 3E with the following additions:

- Evaluate relocating water supply intakes (such as North Bay Aqueduct, Tracy, and Contra Costa Water District intakes) to avoid salts and organic carbon that reduce the ability to recycle water and that complicate disinfection and are sources of disinfection byproducts.
- Actions to deal with Delta island drainage (TOC control) would not be needed with this alternative.

Water Use Efficiency Program

Same as Alternative 3A.

Levee System Integrity Program

Same as Alternative 3A.

Conveyance

North Delta Channel Modifications would provide for widening the Mokelumne River channel to improve water conveyance and flood control in the northern Delta. These modifications include:

- Purchase of 600-foot wide alignment along Mokelumne River from I-5 to the San Joaquin River **CSE0101**
- Replacement of existing levees on one side of the existing channel with new setback levees approximately 500 feet back from the existing channel **CSE0102**
- Removal of existing levees where they obstruct the new channel and convert remaining portions into channel islands **CSE0103**
- Relocation/replacement of existing improvements displaced by the widened channel **CSE0104**

South Delta Modifications would provide for increasing the permitted capacity of existing export pumps up to their physical capacity. These improvements include:

- A new Clifton Court Forebay intake structure **CSE0105**



C3E0106 Operable barrier or equivalent at the head of Old River to maintain a positive flow down the San Joaquin River. Downstream flow/stage control structures would not be constructed.

CVP-SWP improvements provide for further improvements in operational flexibility. These improvements include:

- C3E0107** • New fish screens at the Skinner Fish facility (or at the head of Clifton Court Forebay)
- C3E0108** • New fish screens at the Tracy Pumping Plant intake (or at the head of Clifton Court Forebay)
- C3E0109** • Interconnection between Tracy Pumping Plant and Clifton Court Forebay

15,000 cfs isolated facility would provide for improved operational flexibility for use in conjunction with the through-Delta improvements. The isolated facility includes:

- C3E0110** • New screened intake at Hood
- C3E0111** • Pumping plant to open channel
- C3E0112** • 2000-foot wide alignment from Hood to Clifton Court Forebay along the eastern side of the Delta
- C3E0113** • 15,000 cfs open channel from Hood to Clifton Court Forebay with siphons under all major stream crossings
- C3E0114** • Relocation/replacement of existing improvements displaced by the new facility

Storage

Same as Alternative 3B.

200 TAF In-Delta storage = **S3E0101**

Operations

Same as Alternative 3B.

Alternative 3F

Alternative 3F combines and integrates the four common programs with a combined isolated storage and conveyance facility to transfer Sacramento River flow across the Delta to Clifton Court Forebay. A connected chain of up to eight lakes, created by flooding Delta islands, would

APPENDIX D

LEVEE SYSTEM INTEGRITY PROGRAM

PROGRAMMATIC ACTIONS

Long-term actions necessary to reduce the vulnerability of the Delta estuary and levee system include the following:

PL-99 Funding Program

- Provide funding equitably distributed to participating local agencies for levee improvements to the PL-99 standard. L1

Special Habitat Improvements and Levee Stabilization Program

- Implement special levee stabilization projects according to priorities based on island importance relative to water quality, agricultural production, life and personal property, recreation, cultural resources, ecosystem, local and statewide infrastructure, and impacts to adjacent islands. Special habitat improvements on the North and South Forks of the Mokelumne River (identified in the ERPP) will be given the highest priority. L2
- perform levee and habitat improvement projects linking program objectives with that of the Ecosystem Restoration and Water Quality Programs

Subsidence Control

- Control and reverse the effects of subsidence through shallow flooding of between 30,000 to 60,000 acres of central and western Delta farmland to managed wetlands in order to reduce the probability of levee failures. L3

Levee Associated Habitat

- Incorporate habitat improvement elements such as landside and waterside berms (identified in the ERPP) into levee stabilization projects and into projects associated with other program elements. L4

Beneficial Reuse of Dredge Material

Develop a program which identifies material produced by dredging in the Delta and Suisun Marsh/Bay (where that material contains acceptable levels of salinity and other constituents of concern) which can be reused for levee rehabilitation and habitat creation L5

in the Bay Delta. This program shall:

- Investigate the feasibility of bringing San Francisco Bay dredge material upland for use in the Delta for levee rehabilitation and habitat creation.
- Investigate the feasibility of developing sediment traps in the Delta to retain a portion of river sediment load in areas that can be readily accessed and reused for levee and habitat improvements.
- Develop a process in which a clearing house composed of appropriate member CALFED agencies provides information on beneficial reuse opportunities.
- Investigate the feasibility of a GIS database for management of dredge material data such as sediment quality and historical monitoring results.
- Develop and propose recommendations for dredge material testing protocol and sediment quality criteria.

Delta Levee Emergency Response

L6

- Consistent with existing flood management systems such as the Standardized Emergency Management System, a command structure will be developed that will include communications, planning, strategic, logistics, and finance elements.
- A centralized coordination Center will be developed to lead Delta flood emergency actions and resource dispatching in coordination with the State and Federal Flood Center and local jurisdictions.
- Create a Web site for information dissemination.
- Establish levee qualifying standards, a multi-agency response team, documentation criteria, an emergency fund, and flood fight materials stockpile site(s) in the Delta.
- Ensure adequate marine equipment is available to respond to a seismic event that may result in many Delta islands being flooded.

Delta Levee Seismic Susceptibility

L7

- Continue and expand research to define the relative risk of catastrophic events on the Delta levees and critical facilities of the water transport system. Prepare a seismic risk analysis of Delta levees.
- Incorporate seismic retrofit elements in the Levee Stabilization Program. Such elements may include increasing the width and height of the levee section, adding buttresses, and using appropriate construction materials to reduce seismic susceptibility.

Delta In-Channel Islands

L8

- Develop a program to coordinate available resources and information for restoration efforts of in-channel islands.
- Restore and rehabilitate in-channel islands where feasible in conjunction with the



Special Habitat Improvements and Levee Stabilization Program.

Levee Associated Recreation

- Develop beach slope associated with levees for recreational boating and facilities that are compatible with other CALFED Delta programs. 49
- Enhance current recreational opportunities and create new areas for passive and active recreation which will redirect recreational uses in a manner which is protective of Program improvements for ecosystem restoration, water quality, levee system integrity and water supply reliability.

Delta Flood Conveyance Improvements

- Incorporate flood conveyance improvements into the Program alternatives so as to safely pass inflows into the Delta from the Cosumnes, Sacramento, San Joaquin rivers and other Delta tributaries. These improvements may include levee modifications, setback levees, and islands converted to bypass systems. 110

Summary of Ecosystem Restoration Plan Programmatic Actions

Action Code	Ecological Zone	Ecosystem Element	Programmatic Action
E 010101	Sacramento-San Joaquin Delta	Central Valley Streamflow	Prescribed outflows in March should be met by the cumulative flows of prescribed flows for the Sacramento, Feather, Yuba, and American Rivers. It will be necessary to obtain assurances (e.g., limit Delta diversions) that these prescribed flows will be allowed to contribute to Delta outflow. A portion of the inflow would be from base (minimum) flows from the east Delta tributaries and the San Joaquin River and its tributaries.
E 010102	Sacramento-San Joaquin Delta	Central Valley Streamflow	Prescribed outflows in late April and early May should be met by the cumulative flows of prescribed flows from the Stanislaus, Tuolumne, and Merced Rivers (see East San Joaquin Basin Ecological Zone), and Mokelumne and Calaveras Rivers (see Eastside Delta Tributaries Ecological Zone). It will be necessary to obtain assurances that these prescribed flows will be allowed to contribute to Delta outflow. The flow event would be made up of base flows from the Sacramento River, its tributaries, and the Cosumnes River, plus Mokelumne, Calaveras, and San Joaquin tributary pulsed flows prescribed under the May 1995 Water Quality Control Plan, and by additional supplemental flows.
E 010103	Sacramento-San Joaquin Delta	Central Valley Streamflow	Allow the first "significant" natural flow into the Delta (most likely from rainfall or from unimpaired flows from tributaries and lower watersheds below storage reservoirs or from flows recommended by DFG and Anadromous Fish Restoration Program (AFRP) to pass through the Delta to the San Francisco Bay by limiting water diversions from the Delta for up to 10 days. (No supplementary release of stored water from reservoirs would be required above that required to meet flows prescribed by DFG and AFRP.)
E 010104	Sacramento-San Joaquin Delta	Central Valley Streamflow	Supplement flows in May of all but critical years as needed from Shasta, Oroville, and Folsom Reservoirs to maintain an inflow of 13,000 cfs to the Delta.
E 010401	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	Convert leveed lands to tidal wetland/slough complexes in the North Delta Ecological Unit. Permanently convert island tracts (Little Holland, Liberty, and Prospect) at the south end of the Yolo Bypass to tidal wetlands/slough complexes. Convert small tracts along Snodgrass Slough to tidal wetland/slough complexes. Construct setback levees along Minor, Steamboat, Oxford, and Elk Sloughs.
E 010402	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	In the East Delta Ecological Unit, construct setback levees along the South Mokelumne River and connecting dead-end sloughs (Beaver, Hog, and Sycamore).

Action Code	Ecological Zone	Ecosystem Element	Programmatic Action
E 010403	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	Convert deeper subsided (sunken) lands between dead-end sloughs in the East Delta Ecological Unit east of the South Mokelumne River channel to overflow basins and nontidal wetlands or land designated for agricultural use.
E 010404	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	Remove levees that inhibit tidal and floodflows in the headwater basins of east Delta dead-end sloughs (Beaver, Hog, and Sycamore) and allow these lands to be subject to flood overflow and tidal action.
E 010405	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	Construct setback levees in the South Delta Ecological Unit along the San Joaquin River between Mossdale and Stockton.
E 010406	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	Convert adjacent lands along the San Joaquin River between Mossdale and Stockton to overflow basins and nontidal wetlands or land designated for agricultural use.
E 010407	Sacramento-San Joaquin Delta	Natural Floodplain and Flood Processes	Construct setback levees on corners of Delta islands along the San Joaquin River channel in the Central and West Delta Ecological Unit. Open leveed lands to tidal action where possible along the margins of West Delta Ecological Unit.
E 010501	Sacramento-San Joaquin Delta	Central Valley Stream Temperatures	Improve riparian (bankside) woodland habitats along migrating channels and sloughs of the Delta.
E 010502	Sacramento-San Joaquin Delta	Central Valley Stream Temperatures	Improve SRA habitat along migration routes in Delta.
E 010601	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Reduce velocities in selected Delta channels by increasing cross-sectional areas of channel via setback levees or by providing constrictions to flows into and out of the channels.
E 010602	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Restore 3,000 to 4,000 acres of tidal perennial aquatic habitat and 20,000 to 25,000 acres of tidally influenced freshwater marsh. (Note: these recommendation are contained within programmatic actions presented in this vision for tidal perennial aquatic habitat and fresh emergent wetland habitat (tidal) and are not additive to acreages presented in the targets and programmatic actions for habitat.)
E 010603	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Restrict tidal flow and cross-Delta transfer of water to south Delta pumping plants to selected channels to lessen flow through other channels.
E 010604	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Manage the operation of existing physical barriers so that resulting hydraulics upstream and downstream of the barrier are more similar to levels in the mid-1960s.

Action Code	Ecological Zone	Ecosystem Element	Programmatic Action
E 010605	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Close the DCC when opportunities allow, as specified in the 1995 Water Quality Control Plan and recommended by USFWS (U.S. Fish and Wildlife Service 1995), in the period from November through January when appropriate conditions trigger closure (i.e., internal Delta exports are occurring).
E 010606	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Operate a fully operational barrier at the head of Old River in the period from August through November.
E 010607	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Construct a network of channels within the Yolo Bypass that connect Putah and Cache Creek sinks, and potentially the Colusa drain to the Delta. Channels should effectively drain all flooded lands in the bypass after floodflows cease entering the bypass from Fremont and Sacramento weirs. Channels would maintain a base flow through the spring to allow juvenile anadromous and resident fish to move from rearing and migratory areas.
E 010608	Sacramento-San Joaquin Delta	Bay-Delta Hydraulics	Reduce flow constrictions in Yolo Bypass such as openings in the railway causeway that parallels Interstate 80.
E 010701	Sacramento-San Joaquin Delta	Bay-Delta Aquatic Foodweb	Actions described above to restore streamflow, floodplain inundation, Delta hydraulics, tidal wetlands and sloughs, and riparian habitat would increase primary and secondary productivity in the Delta. Relocating the intake of the South Delta pumping plants to the North Delta would also increase Delta productivity.
E 010901	Sacramento-San Joaquin Delta	Tidal Perennial Aquatic	Restore 500 acres of shallow-water habitat at Prospect Island in the North Delta Ecological Unit.
E 010902	Sacramento-San Joaquin Delta	Tidal Perennial Aquatic	Restore 1,000 acres of shallow-water habitat in the downstream (south) end of the Yolo Bypass (Little Holland and Liberty Island) within the North Delta Ecological Unit.
E 010903	Sacramento-San Joaquin Delta	Tidal Perennial Aquatic	Restore 1,000 acres of shallow-water habitat at the eastern edge of the East Delta Ecological Unit where existing land elevations range from 5 to 9 feet below mean sea level.
E 010904	Sacramento-San Joaquin Delta	Tidal Perennial Aquatic	Restore 2,000 acres of shallow-water habitat at the south and eastern edge of the South Delta Ecological Unit where existing land elevations range from 5 to 9 feet below mean sea level.
E 010905	Sacramento-San Joaquin Delta	Tidal Perennial Aquatic	Restore 2,500 acres of shallow-water habitat in the Central and West Delta Ecological Unit where existing land elevations range from 5-9 feet below mean sea level. A program of fill placement or longer term subsidence reversal may be needed to accomplish this action.

Action Code	Ecological Zone	Ecosystem Element	Programmatic Action
E 010906	Sacramento-San Joaquin Delta	Tidal Perennial Aquatic	Implement a sediment management program which results in deposition and accretion within portions of Central and West Delta channels and bays, forming 500 acres of shallow shoal habitat restored to tidal influence.
E 011001	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 100 acres of open-water areas within restored fresh emergent wetland habitats in the West and Central Delta Ecological Unit such as on Twitchell or Sherman Islands.
E 011002	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 200 acres of open-water areas within restored fresh emergent wetland habitats in the East Delta Ecological Unit.
E 011003	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 200 acres of open-water areas within restored fresh emergent wetland habitats in the South Delta Ecological Unit.
E 011004	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 500 acres of shallow, open-water areas within restored fresh emergent wetland habitats in the Central and West Delta Ecological Unit such as on Twitchell or Sherman Islands.
E 011005	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 300 acres of shallow, open-water areas within restored fresh emergent wetland habitats in the East Delta Ecological Unit.
E 011006	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 300 acres of shallow, open-water areas within restored fresh emergent wetland habitats in the South Delta Ecological Unit.
E 011007	Sacramento-San Joaquin Delta	Nontidal Perennial Aquatic	Develop 1,000 acres of shallow, open-water areas within restored fresh emergent wetland habitats in the North Delta Ecological Unit.
E 011101	Sacramento-San Joaquin Delta	Delta Sloughs	To replace lost slough habitat and provide high-quality habitat areas for fish and associated wildlife, the short-term solution for the Central and West Delta Ecological Unit is to restore 20 miles of slough habitat and the long-term solution is to restore 50 miles of slough habitat; in both the North Delta and East Delta Ecological Units, the short-term solution is to restore 10 miles of slough habitat and the long-term solution is to restore 30 miles of slough habitat; and in the South Delta Ecological Unit, the short-term solution is to restore 25 miles of slough habitat and the long-term solution is to restore 50 miles of slough habitat.
E 011102	Sacramento-San Joaquin Delta	Delta Sloughs	Restore tidal action to portions of islands and tracts in the North and East Delta Ecological Units with appropriate elevation, topography, and hydrogeomorphic conditions to sustain tidally influenced freshwater emergent wetland with 20 to 30 linear miles of narrow, serpentine shaped sloughs within the wetlands and floodplain.
E 011201	Sacramento-San Joaquin Delta	Midchannel Islands and Shoals	Actively protect and improve existing channel islands in the Delta.

Action Code	Ecological Zone	Ecosystem Element	Programmatic Action
E 011202	Sacramento-San Joaquin Delta	Midchannel Islands and Shoals	Restore 50 to 200 acres of channel islands in the Delta, where channel islands once existed.
E 011401	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Tidal)	Develop tidal wetlands on Prospect, Little Holland, and Liberty Islands in the North Delta Ecological Unit.
E 011402	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Tidal)	Develop tidal wetlands on small tracts of converted leveed lands along Snodgrass Slough.
E 011403	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Tidal)	Develop tidal wetlands along the upper ends of dead-end sloughs in the east Delta.
E 011404	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Tidal)	Develop tidal wetlands along all setback levees and levees with restored riparian habitat.
E 011405	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Tidal)	Develop tidal wetlands on restored channel island habitat.
E 011406	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Nontidal)	Restore 1,000 acres of nontidal fresh emergent wetland on Twitchell Island.
E 011407	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Nontidal)	Restore 1,000 acres of nontidal emergent wetland in the Yolo Bypass.
E 011408	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Nontidal)	Restore 1,000 acres of nontidal emergent wetlands in leveed lands designated for floodplain overflow adjacent to the dead-end sloughs in the East Delta Ecological Unit.
E 011409	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Nontidal)	Restore 4,000 acres of nontidal emergent wetlands in the South Delta in lands designated for floodplain overflow.
E 011410	Sacramento-San Joaquin Delta	Fresh Emergent Wetland (Nontidal)	Restore 10,000 acres of nontidal wetlands on Delta Islands of the Central and West Delta Ecological Unit.
E 011501	Sacramento-San Joaquin Delta	Seasonal Wetland	Improve management of 1,000 acres of existing, degraded seasonal wetland habitat in the Yolo Bypass.
E 011502	Sacramento-San Joaquin Delta	Seasonal Wetland	Restore and manage 2,000 acres of additional seasonal wetland habitat in association with the Yolo Bypass Wildlife Area.
E 011503	Sacramento-San Joaquin Delta	Seasonal Wetland	Restore and manage 2,00 acres of additional seasonal wetland habitat in association with the Yolo Basin Wildlife Area.
E 011504	Sacramento-San Joaquin Delta	Seasonal Wetland	Restore and manage 1,000 acres of additional seasonal wetland habitat on Canal Ranch.

Action Code	Ecological Zone	Ecosystem Element	Programmatic Action
E 011505	Sacramento-San Joaquin Delta	Seasonal Wetland	Restore and manage 5,000 acres of additional seasonal wetland habitat.
E 011506	Sacramento-San Joaquin Delta	Seasonal Wetland	Improve management of 1,000 acres of existing degraded seasonal wetland habitat.
E 011507	Sacramento-San Joaquin Delta	Seasonal Wetland	Restore and manage 4,000 acres of additional seasonal wetland habitat on both Twitchell Island.
E 011508	Sacramento-San Joaquin Delta	Seasonal Wetland	Restore and manage 4,000 acres of additional seasonal wetland habitat on Sherman Island.
E 011509	Sacramento-San Joaquin Delta	Seasonal Wetland	Develop a cooperative program to improve management of 1,500 acres of existing degraded seasonal wetland habitat.
E 011510	Sacramento-San Joaquin Delta	Seasonal Wetland	Develop a cooperative program to restore and manage 12,000 acres of additional seasonal wetland habitat.
E 011511	Sacramento-San Joaquin Delta	Seasonal Wetland	Develop a cooperative program to improve management of 500 acres of existing degraded seasonal wetland habitat.
E 011512	Sacramento-San Joaquin Delta	Seasonal Wetland	Develop a cooperative program to restore and manage additional seasonal wetland habitats throughout the Sacramento-San Joaquin Delta Ecological Zone in addition to the acreages presented in Targets 1-4.
E 011601	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Develop a cooperative program to restore riparian habitat by obtaining conservation easements or by purchase from willing sellers.
E 011602	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Develop a cooperative program to restore riparian habitat by obtaining conservation easements or by purchase from willing sellers.
E 011603	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Obtain conservation easements for, or purchase from willing sellers, land needed to restore 10 to 15 linear miles of riparian habitat along the Sacramento River in the North Delta Ecological Unit. Obtain conservation easements for, or purchase from willing sellers, land needed to create corridors of riparian vegetation.
E 011604	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Obtain conservation easements for, or purchase from willing sellers, land needed to restore 5 to 10 linear miles along the Mokelumne River and 3 to 5 miles along the Cosumnes River in the East Delta Ecological Unit to create corridors of riparian vegetation.
E 011605	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Obtain conservation easements for, or purchase from willing sellers, land needed to restore riparian habitat along newly created sloughs and sloughs with new levee setbacks.

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E 011606	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Obtain conservation easements for, or purchase from willing sellers, land needed to restore riparian habitat along new or upgraded Delta levees.
E 011607	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Expand the Stone Lakes and Cosumnes River Preserves from their current size by an additional 500 acres of existing woodland habitat. Share costs with the Nature Conservancy to acquire in fee-title the lands needed from willing landowners.
E 011608	Sacramento-San Joaquin Delta	Riparian and Riverine Aquatic	Purchase riparian woodland property or easements.
E 011701	Sacramento-San Joaquin Delta	Inland Dune Scrub	Support programs for protecting and restoring inland dune scrub habitat at existing ecological preserves in the Central and West Delta Ecological Unit.
E 011702	Sacramento-San Joaquin Delta	Inland Dune Scrub	Protect and restore inland dune scrub habitat areas adjacent to existing ecological preserves in the Central and West Delta Ecological Unit through conservation easements or purchase from willing sellers.
E 011801	Sacramento-San Joaquin Delta	Perennial Grassland	Develop a cooperative program to restore 1,000 acres of perennial grassland in the North Delta Ecological Unit through conservation easement or purchase from willing sellers.
E 011802	Sacramento-San Joaquin Delta	Perennial Grassland	Develop a cooperative program to restore 1,000 acres of perennial grassland in the East Delta Ecological Unit through conservation easement or purchase from willing sellers.
E 011803	Sacramento-San Joaquin Delta	Perennial Grassland	Develop a cooperative program to restore 2,000 acres of perennial grassland in the South Delta Ecological Unit through conservation easement or purchase from willing sellers.
E 011901	Sacramento-San Joaquin Delta	Agricultural Lands	Increase the area of winter and spring flooded corn fields and pastures in the Delta to provide high-quality foraging habitat for wintering and migrating waterfowl and shorebirds, and other associated wildlife.
E 011902	Sacramento-San Joaquin Delta	Agricultural Lands	Periodically flood pasture from October-March in portions of the Delta relatively free of human disturbance to create suitable roosting habitat for wintering greater sandhill crane, and other wintering sandhill crane subspecies.
E 011903	Sacramento-San Joaquin Delta	Agricultural Lands	Create permanent or semipermanent ponds in farmed areas of the Delta that provide suitable waterfowl nesting habitat, but lack suitable brooding habitat, to increase resident dabbling duck production.
E 011904	Sacramento-San Joaquin Delta	Agricultural Lands	Increase the acreage farmed for wheat and other crop types that provide suitable nesting habitat for waterfowl and other ground nesting species in the Delta.

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E 011905	Sacramento-San Joaquin Delta	Agricultural Lands	Convert agricultural lands in the Delta that are farmed from crop types that have relatively low forage value for wintering waterfowl, wintering sandhill cranes, and other wildlife to production of crop types that provide greater forage value.
E 011906	Sacramento-San Joaquin Delta	Agricultural Lands	Defer fall tillage on corn fields in the Delta to increase the available forage for wintering waterfowl, wintering sandhill cranes, and associated wildlife.
E 011907	Sacramento-San Joaquin Delta	Agricultural Lands	Develop a cooperative program to improve management on 8,000 acres of corn and wheat fields in the Delta and to reimburse farmers for leaving a portion of the crop in each field unharvested to provide forage for waterfowl, sandhill cranes, and other wildlife.
E 012001	Sacramento-San Joaquin Delta	Delta Smelt	Restoration of delta smelt will come indirectly from increasing March to May Delta inflow and outflow, improving Delta water temperature, improving Delta channel hydraulics, improving the Delta aquatic foodweb, improving aquatic wetland, and riparian habitats, and reducing stressors including effects of water diversions and contaminants.
E 012101	Sacramento-San Joaquin Delta	Longfin Smelt	Restoration of longfin smelt will come indirectly from increasing March to May Delta inflow and outflow, improving Delta water temperature, improving Delta channel hydraulics, improving the Delta aquatic foodweb, improving aquatic wetland, and riparian habitats, and reducing stressors including effects of water diversions, contaminants, and the stocking of striped bass and chinook salmon in longfin smelt nursery areas of North San Francisco Bay.
E 012201	Sacramento-San Joaquin Delta	Splittail	Restoration of splittail will come indirectly from increasing March to May Delta inflow and outflow, improving Delta water temperature, improving Delta channel hydraulics, improving the Delta aquatic foodweb, improving aquatic wetland, and riparian habitats, and reducing stressors including effects of water diversions and contaminants.
E 012301	Sacramento-San Joaquin Delta	Sturgeon, Green and White	Restoration of sturgeon will come indirectly from increasing March to May Delta inflow and outflow, improving Delta channel hydraulics, improving the Delta aquatic foodweb, and reducing stressors including effects of water diversions and contaminants.
E 012501	Sacramento-San Joaquin Delta	Chinook Salmon (general)	Restoration of will chinook salmon populations come indirectly from increasing March to May Delta inflow and outflow, improving Delta channel hydraulics, improving the Delta aquatic foodweb, increasing shallow water, riparian, and wetland habitats in the Delta, and reducing stressors including effects of water diversions and contaminants.

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E 012701	Sacramento-San Joaquin Delta	Striped Bass	Restoration of striped bass will come indirectly from increasing March to May Delta inflow and outflow, improving Delta channel hydraulics, improving the Delta aquatic foodweb, increasing shallow water, riparian, and wetland habitats in the Delta, and reducing stressors including effects of water diversions and contaminants. To meet target population level may require, at least in short-term, supplementing young production through artificial rearing and stocking of young striped bass salvaged at south Delta fish facilities or raised in hatcheries.
E 012801	Sacramento-San Joaquin Delta	American Shad	Restoration of American shad populations will come indirectly from increasing March to May Delta inflow and outflow, improving Delta channel hydraulics, improving the Delta aquatic foodweb, and reducing stressors including effects of water diversions and contaminants.
E 012901	Sacramento-San Joaquin Delta	Resident Fish Species	Restoration of native resident species will come indirectly from increasing March to May Delta inflow and outflow, improving Delta channel hydraulics, improving the Delta aquatic foodweb, improving aquatic, wetland, and riparian habitats, and reducing stressors including effects of water diversions and contaminants.
E 013001	Sacramento-San Joaquin Delta	Marine/Estuarine Fishes and Large Invertebrates	General programmatic actions that will contribute to the target include improving winter/spring Delta outflow, restoring tidal wetland habitat, improving the aquatic foodweb, reducing losses of larvae and juvenile marine/estuarine fishes at water diversions in the Bay and Delta, limiting the introductions of non-native species, and reducing the input of toxic substances into Central Valley waterways.
E 013101	Sacramento-San Joaquin Delta	Western Spadefoot and California Tiger Salamander	These species will benefit indirectly from restoration of natural flood plains. A regulated management grazing program could benefit vernal pool habitats that support these species. Mowing and cattle grazing should be minimized near seasonal wetlands utilized by either species from October to March. Reduce mortality from vehicle deaths, especially during the brief window when tiger salamanders and spadefoots are migrating by locating restored habitat in areas well removed from regular vehicle traffic. Reduce fumigants to control rodents should be used only from October to March in known occupied habitats since rodent burrows are required during the summer. Draining pertinent water ways during the native species' dormant season could result in a reduction in populations of large, introduced, predatory fish and bullfrogs.
E 013201	Sacramento-San Joaquin Delta	California Red-legged Frog	Develop watershed management plans to protect riparian and wetland areas occupied by red-legged frogs.

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E 013202	Sacramento-San Joaquin Delta	California Red-legged Frog	Reduce exotic predators such as bullfrogs, black bass, sunfish, and crayfish and restore habitat by creating canals, side channels, and backflow pools containing emergent vegetation. Provide the critical components of reproductive, forage and escape cover.
E 013301	Sacramento-San Joaquin Delta	Swainson's Hawk	Restore riparian woodlands and improve wildlife habitat values on agricultural lands. (Note: Please refer to the implementation objectives, targets and programmatic actions in the Habitat section of the Sacramento-San Joaquin Delta Ecological Zone for acreages and general areas for restoration of riparian, perennial grassland, and agricultural lands.)
E 013501	Sacramento-San Joaquin Delta	California Black Rail	Restoration of tidal emergent wetland habitat would indirectly benefit California black rail population.
E 013601	Sacramento-San Joaquin Delta	Greater Sandhill Crane	Restoration of non-tidal emergent wetland, perennial grasslands, and agricultural foraging habitat would indirectly benefit greater sandhill crane population.
E 013701	Sacramento-San Joaquin Delta	Western Yellow-billed Cuckoo	Improve and restore riparian forest habitat.
E 014101	Sacramento-San Joaquin Delta	Riparian Brush Rabbit	Reestablish 500 acres of large contiguous areas of riparian forest habitat that have dense brushy understories with adjacent upland habitat. These restored/reestablished riparian forests would have adjacent upland habitat with sufficient cover. Establish five additional populations elsewhere within the historic range of the riparian brush rabbit; each population should have a self-sustaining populations with a minimum of 250 individuals each. Maintain and establish connectivity between key habitats.
E 014102	Sacramento-San Joaquin Delta	Riparian Brush Rabbit	Prohibit ground cover and litter removal to allow for dense brushy and herbaceous areas of a minimum size of 550 square yards within the riparian forest.
E 014103	Sacramento-San Joaquin Delta	Riparian Brush Rabbit	More closely approximate the natural hydrological regime which allows for establishment and maintenance of mature riparian forest habitat. Additionally, encourage growth of wild rose, coyote bush, blackberries, elderberries, wild grape, box elder, valley oak, and cottonwoods to provide habitat.
E 014104	Sacramento-San Joaquin Delta	Riparian Brush Rabbit	Provide high ground adjacent to current and expanded habitat with cover for protection from floods. Existing flood control levees adjacent to the Park could be utilized for this escape habitat in this area to provide sufficient vegetative growth of grasses, forbs, and shrubs to lower predation pressure during these times.

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E 014105	Sacramento-San Joaquin Delta	Riparian Brush Rabbit	Provide fire breaks around current and expanded habitat to protect habitat destruction due to wildfire and control feral cat and dog population with yearly control efforts within and adjacent to the Park. Prohibit dogs within Caswell Memorial State Park.
E 014201	Sacramento-San Joaquin Delta	Shorebird and Wading Bird Guild	Shorebirds and wading birds will indirectly benefit from restoration of wetlands and tidal and non-tidal perennial aquatic habitat.
E 014301	Sacramento-San Joaquin Delta	Waterfowl	Waterfowl will indirectly benefit from restoration of sloughs, wetlands, riparian, and tidal and non-tidal perennial aquatic habitat.
E 014401	Sacramento-San Joaquin Delta	Upland Game	Provide high ground adjacent to current and expanded habitat with cover for protection from floods. Existing flood control levees adjacent to agricultural lands could be utilized for this escape habitat in this area to provide sufficient vegetative growth of grasses, forbs, and shrubs to lower predation pressure during these times and when adjacent lands are fallow.
E 014501	Sacramento-San Joaquin Delta	Neotropical Migratory Bird Guild	<p>The following types of general programmatic actions will assist in meeting the target for neotropical migratory birds:</p> <ul style="list-style-type: none"> <input type="checkbox"/> increase wetland, riparian, grassland, and agricultural habitats, <input type="checkbox"/> improve watershed health, <input type="checkbox"/> improve specific nesting habitats for individual species within their existing and restored habitats, and <input type="checkbox"/> protect nesting habitats from predators and human disturbance.
E 014601	Sacramento-San Joaquin Delta	VELB et. al.	Consolidate and screen agricultural diversions in the Delta.
E 014701	Sacramento-San Joaquin Delta	Water Diversion	Consolidate and screen agricultural diversions in the Delta.
E 014702	Sacramento-San Joaquin Delta	Water Diversion	Replace or upgrade the screens at the SWP and CVP intakes with positive barrier, fish bypass screens and state-of-the-art fish holding and transportation systems.
E 014703	Sacramento-San Joaquin Delta	Water Diversion	Upgrade screens at Pacific Gas & Electric Company's Contra Costa power plant with fine-mesh, positive barrier, fish bypass screens.
E 014901	Sacramento-San Joaquin Delta	Levees, Bridges, and Bank Protection	Enter into agreements with willing levee reclamation districts to implement modified levee and berm vegetation management practices that promote establishment and maturation of shoreline riparian vegetation to restore and maintain the health of aquatic resources in and dependent on the Delta. Reimburse districts for any additional maintenance and inspection costs.

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E 015001	Sacramento-San Joaquin Delta	Dredging and Sediment Disposal	Use alternate sources (rather than Delta inchannel sources) of levee maintenance material, such as excavation of abandoned nonessential levees, excavation material from the restoration of secondary tidal channels, dry-side island interior borrow pits, upland borrow sites, Cache Creek settling basin and Yolo Bypass sediment deposits, and deep water dredging sites in the San Francisco Bay.
E 015002	Sacramento-San Joaquin Delta	Dredging and Sediment Disposal	Restrict or minimize effects of dredging activities near existing midchannel tule islands and shoals that are vulnerable to erosion and exhibit clear signs of area reduction in response to channel and bar incision (cutting).
E 015003	Sacramento-San Joaquin Delta	Dredging and Sediment Disposal	Follow DFG guidelines for dredging in the estuary.
E 015004	Sacramento-San Joaquin Delta	Dredging and Sediment Disposal	Provide stockpiles of levee maintenance materials in three or more selected land side areas to avoid the need to obtain material from Delta channels during restricted periods.
E 015201	Sacramento-San Joaquin Delta	Invasive Aquatic Plants	Conduct large-scale, annual weed eradication programs throughout existing and restored dead-end and open-ended sloughs and channels within each of the Delta's ecological units so that less than 1% of the surface area of these sloughs and channels is covered by invasive non-native aquatic plants within 10 years.
E 015202	Sacramento-San Joaquin Delta	Invasive Aquatic Plants	Provide funding to the California Department of Food and Agriculture to expand the current state border inspection process to include a comprehensive program of exclusion, detection, and management of invasive aquatic species such as the zebra mussel, purple loosestrife, and hydrilla.
E 015301	Sacramento-San Joaquin Delta	Invasive Riparian and Salt Marsh Plants	Control non-native riparian plants.
E 015302	Sacramento-San Joaquin Delta	Invasive Riparian and Salt Marsh Plants	Implement a program throughout the Delta to remove and suppress the spread of invasive non-native plants that compete with native riparian vegetation by reducing the aerial extent of species such as False Bamboo and eucalyptus by 50%.
E 015303	Sacramento-San Joaquin Delta	Invasive Riparian and Salt Marsh Plants	Implement a program throughout the Delta that, prior to taking restoration actions, eliminates invasive woody plants, which could interfere with the restoration of native riparian vegetation
E 015401	Sacramento-San Joaquin Delta	Invasive Aquatic Organisms	Fund additional inspection staff to enforce existing regulations.
E 015402	Sacramento-San Joaquin Delta	Invasive Aquatic Organisms	Help fund research on ballast water treatment techniques, which could eliminate non-native species before ballast water is released.

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E 015601	Sacramento-San Joaquin Delta	Predation and Competition	Develop a cooperative program to reevaluate the need to remove predatory fish from Clifton Court Forebay.
E 015602	Sacramento-San Joaquin Delta	Predation and Competition	Evaluate alternative methods to remove predator fish from Clifton Court Forebay with emphasis in predator removal near the fish facility.
E 015603	Sacramento-San Joaquin Delta	Predation and Competition	Evaluate alternate operational strategies to reduce entrainment of juvenile fish into Clifton Court Forebay.
E 015701	Sacramento-San Joaquin Delta	Contaminants	Reduce the input of herbicides, pesticides, fumigants, and other agents toxic to fish and wildlife in the Delta by modifying land management practices and chemical dependency on 50,000 acres of urban and agricultural lands that drain untreated into Delta channels and sloughs. Actions will focus on modifying agricultural practices and urban land uses on a large scale basis. To reduce the concentration of pesticide residues, the amount applied will be reduced and the amount of pesticide load reaching the Delta's aquatic habitats will be further reduced by taking advantage of biological and chemical processes within wetland systems, which can help break down harmful pesticide residues.
E 015702	Sacramento-San Joaquin Delta	Contaminants	Reduce levels of hydrocarbons and other contaminants entering the Delta foodweb from elevated releases into the estuary at oil refineries.
E 015801	Sacramento-San Joaquin Delta	Harvest of Fish and Wildlife	Provide additional funding to the DFG for additional enforcement.
E 015802	Sacramento-San Joaquin Delta	Harvest of Fish and Wildlife	Provide additional funding to the local county sheriff's departments and State and local park agencies to support additional enforcement efforts.
E 015803	Sacramento-San Joaquin Delta	Harvest of Fish and Wildlife	Provide rewards for the arrest and conviction of poachers of fish and wildlife.
E 016001	Sacramento-San Joaquin Delta	Disturbance	In the Central and West Delta Ecological Unit, establish and enforce no wake zones of 1 to 3 miles in Disappointment Slough, 1 to 2 miles in White Slough, and 3 to 4 miles in Middle and Old Rivers in areas with remnant berms and midchannel islands.
E 016002	Sacramento-San Joaquin Delta	Disturbance	In the East Delta Ecological Unit, establish and enforce no wake zones of 1 to 3 miles of the Mokelumne River, 2 to 4 miles in Snodgrass Slough, and 3 to 4 miles in Beaver, Hog, and Sycamore Sloughs in areas with remnant berms and midchannel islands.
E 016003	Sacramento-San Joaquin Delta	Disturbance	Establish and enforce no wake zones within 50 yards of important California black rail nesting areas in the Delta from March to June.

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E 016004	Sacramento-San Joaquin Delta	Disturbance	Establish and enforce no motorized boating zones in 5 to 25 miles of existing dead-end channels in the Delta from March to June.
E 016005	Sacramento-San Joaquin Delta	Disturbance	Establish and enforce no motorized boating zones in the small tidal channels created in restored tidal fresh emergent wetlands and Delta floodplains of levee setbacks.
E 016201	Sacramento-San Joaquin Delta	Lange's Metalmark, Delta Green Ground Beetle, VLB	<p>Increase populations of Delta Green Ground Beetle by establishing and securing habitat to support three additional viable and self-sustaining colonies of the Delta green ground beetle and maintain the existing populations.</p> <p>Increase populations of Valley Elderberry Longhorn Beetle by expanding and linking isolated areas supporting populations of Valley elderberry longhorn beetle along portions of Putah Creek and Delta channels; minimizing the use of herbicides, insecticides, and other toxic substances; and promoting elderberry habitat by removing 50% of the exotic plants (e.g. Chinese tree-of-heaven, black locust, scotch broom) found in existing elderberry beetle habitat. Minimizing the use of herbicides, insecticides, and other toxic substances and preventing or minimizing activities that are incompatible with habitat maintenance: including riprapping levee construction, agricultural land conversion, overgrazing, and dredging will all help increase the populations of this species.</p>
E 016301	Sacramento-San Joaquin Delta	Giant Garter Snake and Western Pond Turtle	Enhance existing poor habitats and restore new habitats in historical wetlands, grasslands, and upland areas.