

Draft Habitat Restoration Conservation Measures by Working Biological Objective

Habitat Restoration Category	Proposed Biological Objective	Conservation Measure	Covered Species Expected to Benefit from Conservation Measures ¹	Working Biological Objectives Addressed ²
Inundated Floodplain	FLOO1: Increase the frequency that the Yolo Bypass floodplain is inundated for at least 45 consecutive days to approximately [redacted] percent of years based on current hydrology.	FLOO1.1: Modify and operate the Freemont Weir to increase the frequency that the Yolo Bypass floodplain is inundated.	Delta smelt (F) Longfin smelt (F) Central Valley steelhead (F, R, P) Sacramento Valley Chinook salmon (F, R, P, H) Sacramento splittail (S, R) Green sturgeon (P, H) White sturgeon (P, H)	5, 7, 9, 15, 17, 19
	FLOO2: Restore at least [redacted] acres of inundated floodplain surface that provides habitat and ecological functions in support of covered species.	FLOO2.1: Coordinate with flood control agencies to identify, fund, and implement flood control projects designed and managed to restore and maintain floodplain, channel margin, freshwater intertidal, and transitional grassland habitats.	Delta smelt (F) Longfin smelt (F) Central Valley steelhead (F, R, P) Chinook salmon (all runs) (F, R, P) Sacramento splittail (S, R)	
		FLOO2.2: Restore between [redacted] and [redacted] acres of inundated floodplain habitat in the South Delta Restoration Opportunity Area.	Delta smelt (F) Longfin smelt (F) Central Valley steelhead (F, R) San Joaquin Chinook salmon (F, R) Sacramento splittail (S, R) Delta button celery	

Habitat Restoration Category	Proposed Biological Objective	Conservation Measure	Covered Species Expected to Benefit from Conservation Measures ¹	Working Biological Objectives Addressed ²
Freshwater Intertidal Marsh	<p>FIMA1: Restore, manage, and protect at least [redacted] acres of freshwater intertidal marsh in the Delta that provides habitat and ecological functions in support of covered species.</p>	<p>FIMA1.1: Restore a mosaic of [redacted] to [redacted] acres of freshwater intertidal marsh, shallow subtidal, and transitional grassland habitat within the Yolo Bypass/Cache Slough Complex Restoration Opportunity Area.</p>	<p>Delta smelt (F, S) Longfin smelt (F) Central Valley steelhead (F, R) Sacramento Valley Chinook salmon (F, R) Sacramento splittail (R) Giant garter snake California black rail Tricolored blackbird Suisun Marsh aster Soft bird's-beak Delta tule pea Mason's lilaepsis Delta mudwort</p>	5, 7, 8, 10, 12, 13, 19
		<p>FIMA1.2: Restore a mosaic of [redacted] to [redacted] acres of freshwater intertidal marsh, shallow subtidal aquatic, and transitional habitat within the Consumnes/Mokelumne Restoration Opportunity Area.</p>	<p>Delta smelt (F) Longfin smelt (F) Central Valley steelhead (F, R) Sacramento Valley Chinook salmon (F, R) Sacramento splittail (R) Giant garter snake California black rail Tricolored blackbird Suisun Marsh aster Delta tule pea Mason's lilaepsis Delta mudwort</p>	

Habitat Restoration Category	Proposed Biological Objective	Conservation Measure	Covered Species Expected to Benefit from Conservation Measures ¹	Working Biological Objectives Addressed ²
		<p>FIMA1.3: Restore a mosaic of [redacted] to [redacted] acres of intertidal marsh and shallow subtidal aquatic habitat within the West Delta Restoration Opportunity Area.</p>	<p>Delta smelt (F, R) Longfin smelt (F) Central Valley steelhead (F, R) Sacramento Valley Chinook salmon (F, R) Sacramento splittail (R) California black rail Tricolored blackbird Suisun Marsh aster Soft bird's-beak Delta tule pea Mason's lilaepsis Delta mudwort</p>	
		<p>FIMA1.4: Restore a mosaic of [redacted] to [redacted] acres of intertidal marsh, shallow subtidal aquatic, and transitional grassland habitat within the South Delta Conservation Opportunity Area.</p>	<p>Delta smelt (F, R) Longfin smelt (F) Central Valley steelhead (F, R) San Joaquin Chinook salmon (F, R) Sacramento splittail (R) California black rail Tricolored blackbird Suisun Marsh aster Delta button celery Delta tule pea Mason's lilaepsis Delta mudwort</p>	

Habitat Restoration Category	Proposed Biological Objective	Conservation Measure	Covered Species Expected to Benefit from Conservation Measures ¹	Working Biological Objectives Addressed ²
		<p>FIMA1.5: Restore a mosaic of [redacted] to [redacted] acres of intertidal marsh, shallow subtidal aquatic, and transitional grassland habitat within the East Delta Restoration Opportunity Area.</p>	<p>Delta smelt (F) Longfin smelt (F) Central Valley steelhead (F, R) Sacramento Valley Chinook salmon (F, R) Sacramento splittail (R) Giant garter snake California black rail Tricolored blackbird Suisun Marsh aster Delta tule pea Mason's lilaeopsis Delta mudwort</p>	
Brackish Intertidal Marsh	<p>BIMA1: Restore, manage, and protect [redacted] acres of brackish intertidal marsh in Suisun Marsh/Bay to provide habitat and ecological functions in support of covered species.</p>	<p>BIMA1.1: Restore a mosaic of [redacted] to [redacted] acres of brackish intertidal marsh, shallow subtidal aquatic, and transitional grassland habitat within the Suisun Marsh Restoration Opportunity Area.</p>	<p>Delta smelt (F, R) Longfin smelt (F, R) Central Valley steelhead (F, R) Chinook salmon (all runs) (F, R) Sacramento splittail (R) Salt marsh harvest mouse Suisun shrew California black rail California clapper rail Tricolored blackbird Suisun Marsh aster Soft bird's-beak</p>	5, 7, 8, 10, 12, 13, 19

Habitat Restoration Category	Proposed Biological Objective	Conservation Measure	Covered Species Expected to Benefit from Conservation Measures ¹	Working Biological Objectives Addressed ²
Channel Margin/Corridor	<p>CHMA1: Enhance at least [redacted] acres of existing channel margin habitats in the Delta to improve their habitat and ecological functions in support of covered species.</p>	<p>CHMA1.1: Support development and implementation of levee construction and maintenance designs that incorporate aquatic and riparian habitat features.</p>	<p>Central Valley steelhead (R) Chinook salmon (all runs) (R) Sacramento splittail (R, S) Swainson's hawk Yellow breasted chat Valley elderberry longhorn beetle Suisun Marsh aster Delta tule pea Mason's lilaepsis Delta mudwort</p>	7, 10, 11, 13, 14, 19
		<p>CHMA1.2: Design levees constructed under the BDCP to incorporate design features that support and enhance covered species habitats.</p>	<p>Central Valley steelhead (R) Chinook salmon (all runs) (R) Sacramento splittail (R, S) Swainson's hawk Yellow breasted chat Valley elderberry longhorn beetle Suisun Marsh aster Delta tule pea Mason's lilaepsis Delta mudwort</p>	
		<p>CHMA1.3: Enhance channel margin habitats along [redacted] to [redacted] miles of Steamboat and Sutter Sloughs to improve habitat conditions for covered fish species.</p>	<p>Central Valley steelhead (R) Sacramento Valley Chinook salmon (R) Sacramento splittail (R, S) Swainson's hawk Yellow breasted chat Valley elderberry longhorn beetle Suisun Marsh aster Delta tule pea Mason's lilaepsis Delta mudwort</p>	6, 7, 10, 11, 13, 19

Habitat Restoration Category	Proposed Biological Objective	Conservation Measure	Covered Species Expected to Benefit from Conservation Measures ¹	Working Biological Objectives Addressed ²
Riparian	RIPA1: Restore at least __ acres of riparian forest and scrub within the Delta to provide habitat and ecological functions in support of covered species.	RIPA1. 1: Restore between [redacted] and [redacted] acres of riparian forest and scrub communities as a component of restored floodplain, freshwater intertidal marsh, and channel margin habitats.	Central Valley steelhead (R) Chinook salmon (all runs) (R) Sacramento splittail (R, S) Swainson's hawk Yellow breasted chat Valley elderberry longhorn beetle Suisun Marsh aster Delta tule pea	7, 14

¹Stressor codes for covered fish species shown in parentheses:

- F = food production and availability
- H = harvest reduction
- P = passage
- R = rearing habitat
- S = spawning habitat

²This column indicates the number of each working biological objective for which the conservation measure is expected to fully or partially address. Working Biological Objectives as of 1/25/08 are:

- Objective 1:** Provide hydrodynamic and water quality conditions within the Delta sufficient for the downstream transport of larval and juvenile life stages of covered fish species to rearing habitats and the upstream migration of the adult life stage to spawning habitats.
- Objective 2:** Reduce to an acceptable level of risk the load of contaminants entering the Delta ecosystem to provide sufficient aquatic foodweb productivity to support covered species.
- Objective 3:** Reduce to an acceptable level of risk the adverse effects of introduced mollusks and other non-native species on the foodweb throughout the Delta and Suisun Bay to increase food supplies for covered fish species.
- Objective 4:** Reduce to an acceptable level of risk the future colonization and establishment of non-native species in the Delta.
- Objective 5:** Provide hydrodynamic and water quality conditions within the Delta and Suisun Marsh/Bay sufficient to support production, quantity, quality, availability, and distribution of food supplies for covered fish species.
- Objective 6:** Reduce to an acceptable level the extent of non-native aquatic vegetation to improve conditions for covered species (e.g., turbidity, predation).

Objective 7: Maintain connectivity among habitats of covered species sufficient to sustain and enhance the effective movement and genetic exchange of covered species and other within and among natural communities both inside and outside of the BDCP planning area.

Objective 8: Manage habitat areas to control the future colonization and establishment and existing abundance of non-native species that can substantially impede ecosystem functions provided by these habitats.

Objective 9: Increase the extent, frequency, and duration of floodplain inundation in the Delta to provide sufficient spawning and rearing habitats for covered fish species and other native aquatic organisms and to provide sufficient aquatic foodweb productivity.

Objective 10: Increase the diversity and complexity of subtidal habitats and the range of subtidal environmental gradients within the Delta and Suisun Marsh/Bay.

Objective 11: Protect existing covered fish species habitat areas in the Delta from loss and degradation.

Objective 12: Provide sufficient extent and quality of spawning and rearing habitats for delta smelt and longfin smelt in the Delta and Suisun Bay.

Objective 13: Provide sufficient rearing and foraging habitat conditions for covered fish species by increasing the extent, diversity, and complexity of functioning shallow subtidal, tideflat, intertidal wetland habitats in the Delta and Suisun Marsh/Bay.

Objective 14: Provide sufficient near shore habitat for salmonids and Sacramento splittail by increasing the extent of riparian communities along Delta channels.

Objective 15: Reduce to an acceptable level the risk of vulnerable life stages of covered fish species to mortality from entrainment at in-Delta diversions and pumping facilities.

Objective 16: Reduce loads of contaminants entering the Delta from in-Delta sources to reduce the risk for direct toxic effects on covered species and the biological uptake of toxics by covered fish species to an acceptable level.

Objective 17: Manage legal and reduce illegal harvest of Chinook salmon, steelhead, green sturgeon, white sturgeon, and Sacramento splittail to support adequate levels of survival and production.

Objective 18: Support the implementation of management practices that minimize the ecological, demographic, or genetic effects from current or past hatchery operations on wild populations of Chinook salmon and steelhead.

Objective 19: Reduce to an acceptable level the adverse effects of non-native predators on covered fish species.