Habitat Restoration

CALFED Bay-Delta Program Alternatives
Summary of Actions

Habitat Restoration[1]	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Restore Delta shallow water habitat										
• Leveed to tidal action (acres)	800 to 1,200	4,000 to 6,000	4,000 to 6,000	4,000 to 6,000	8,000 to 12,000	8,000 to 12,000	4,000 to 6,000	4,000 to 6,000	4,000 to 6,000	8,000 to 12,000
• As part of levee reconstruction (miles)	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100	50 to 100
Restore Delta riparian habitat										
• Improve riparian conditions (acres)	75 to 125 (core: 200 to 400)	500 to 700 (core: 200 to 400)	500 to 700 (core: 200 to 400)	500 to 700 (core: 200 to 400)	500 to 700 (core: 200 to 400)	1,400 to 1,600 (core: 200 to 400)	500 to 700 (core: 200 to 400)	500 to 700 (core: 200 to 400)	500 to 700 (core: 200 to 400)	1,400 to 1,600 (core: 200 to 400)
• Acquire/establish new habitat (acres)	400 to 800	1,000 to 2,000	1,000 to 2,000	1,000 to 2,000	1,000 to 2,000	4,000 to 5,000	1,000 to 2,000	1,000 to 2,000	1,000 to 2,000	4,000 to 5,000
• Improve using modified levee maintenance practices (% eligible levees)	--	--	--	--	--	10 to 15 (core: 15 to 25)	--	--	--	10 to 15% (core: 15 to 25%)
Restore Delta non-tidal wetland habitat										
• Protect/enhance existing wetlands (acres)	--	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)	200 to 400 (core: 100 to 300)
• Convert suitable lands to wetlands (acres)	--	3,000 to 5,000	3,000 to 5,000	3,000 to 5,000	3,000 to 5,000	5,000 to 7,000	3,000 to 5,000	3,000 to 5,000	3,000 to 5,000	5,000 to 7,000
Restore Delta terrestrial habitat										
• Protect/enhance existing uplands (acres)	--	600 to 1,000 (core: 1,200 to 2,000)	600 to 1,000 (core: 1,200 to 2,000)	600 to 1,000 (core: 1,200 to 2,000)	600 to 1,000 (core: 1,200 to 2,000)	3,000 to 4,000 (core: 1,200 to 2,000)	600 to 1,000 (core: 1,200 to 2,000)	600 to 1,000 (core: 1,200 to 2,000)	600 to 1,000 (core: 1,200 to 2,000)	3,000 to 4,000 (core: 1,200 to 2,000)
Restore Suisun Bay habitat										
• Restore tidal wetlands (acres)	750 to 1,250	1,500 to 2,500	1,500 to 2,500	1,500 to 2,500	1,500 to 2,500	4,000 to 6,000	1,500 to 2,500	1,500 to 2,500	1,500 to 2,500	4,000 to 6,000
Restore Sacramento River (Verona to Collinsville) and Delta channel riverine habitat										
• Set back levees/restore cross sections (miles)	--	40 to 60	40 to 60	100 to 125	40 to 60	100 to 125	40 to 60	40 to 60	40 to 60	100 to 125
• Reconstruct banks and shallow habitat (miles)	50 to 75	75 to 100	75 to 100	75 to 100	75 to 100	100 to 150	75 to 100	75 to 100	75 to 100	100 to 150
• Protect/enhance channel island riverine habitat (acres)	300 to 500 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	1,500 to 2,000 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	750 to 1,250 (core: 500 to 1,000)	1,500 to 2,000 (core: 500 to 1,000)
Restore upstream Sacramento River and tributaries' riverine features										
• Restore/enhance riparian vegetation (miles; Verona to Colusa)	--	*20 to 40*	*20 to 40*	*20 to 40*	*20 to 40*	*25 to 75*	*20 to 40*	*20 to 40*	*20 to 40*	*50 to 75*
• Relocate levees	--	--	--	--	--	Y[3]	--	--	--	Y[3]
• *Establish meander belts above Colusa* (miles)	--	--	--	--	--	20 to 40	--	--	20 to 40	20 to 40
• Restore habitat above Colusa (acres)	--	--	--	--	--	6,000 to 7,000 (core: 2,000 to 4,000)	--	--	--	6,000 to 7,000 (core: 2,000 to 4,000)
Restore upstream San Joaquin River and tributaries' riverine features										
• Restore channel configurations/depth and temperature improvements (miles)	--	25 to 35	25 to 35	25 to 35	25 to 35	30 to 50	25 to 35	25 to 35	25 to 35	30 to 50
• Isolate in-channel quarry areas from mainstem river and tributary flows	--	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]	prioritized areas[3]

Habitat Restoration

CALFED Bay-Delta Program Alternatives
Summary of Actions

	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative	Alternative
Habitat Restoration[1]	A	B	C	D	E	F	G	H	I	J
Restore floodway corridor habitat										
• Convert agricultural lands to wetland habitat (acres)	5,000 to 7,000	5,000 to 7,000	5,000 to 7,000	5,000 to 7,000	5,000 to 7,000	7,000 to 12,000	5,000 to 7,000	5,000 to 7,000	5,000 to 7,000	7,000 to 12,000
• Reduce fish stranding (percent reduced)	--	30%[2]	30%[2]	30%[2]	30%[2]	50%[2]	30%[2]	30%[2]	30%[2]	50%[2]
Fish Protection and Transport[1]										
• Develop improvements at the head of Old River	Y	Y	Y	Y	Y	Y	Y	--	--	--
• Continue acoustic barrier evaluation at Delta Cross Channel	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Install fish screens on prioritized diversions in Delta, rivers, & tributaries	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Improve fish screening at existing diversions	Y	Y	Y	Y	Y	Y	--	--	--	--
• Construct new screened intake for the State Water Project at Italian Slough	Y	Y	Y	Y	Y	Y	Y	--	--	--
Fisheries Management[1]										
• Mark salmon produced in hatcheries	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Conduct net-pen rearing of striped bass for about 100,000 fish to supplant natural production	Y	Y	Y	Y	Y	Y	Y	--	--	Y
• Increase hatchery production for fall run Chinook Salmon on the San Joaquin River or its tributaries	--	--	--	--	--	--	--	--	--	Y
Institutional Habitat Programs[1]										
• Integrate habitat restoration programs from other federal and state agencies, including the Anadromous Fish Restoration Program	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Establish CALFED Regulatory Team to expedite habitat restoration permits	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Establish program to use clean dredge material for Delta levee and habitat restoration	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Encourage/provide incentives for farmers to leave habitat areas undisturbed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Footnotes

1. Some activities include additional sub-activities explained in greater detail in the detailed descriptions of the alternatives.
2. As indicated in Fish Protection and Transport activities in the detailed descriptions of the alternatives.
3. Indicates that geographic areas, specific locations, and levels of implementation have yet to be determined.

"--" means that the activity is not included as part of the alternative.

The units for each activity can be found in the lefthand column, following the activity description

B-001908

Water Storage/Transport/Diversion Management

CALFED Bay-Delta Program Alternatives
Summary of Actions

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Water Storage [1]										
Convert one or more Delta islands to new environmentally dedicated storage with screened diversion (acre-feet capacity)	100,000	--	--	--	--	300,000 to 400,000	100,000	--	--	--
Construct new/expand existing upstream storage (acre-feet capacity)	--	500,000 to 1,000,000	500,000 to 1,000,000		--	--	--	--	6,000,000 to 8,000,000	--
Construct new/expand existing downstream storage (acre-feet capacity)	--	500,000 to 1,000,000	500,000 to 1,000,000	1,000,000 to 1,500,000	--	--	--	--	--	--
Construct new in-delta storage (acre-feet capacity)	--	--	--	--	--	--	--	300,000 to 600,000	--	--
Water Transport [1]										
Construct a new screened diversion facility with multiple intakes on the Sacramento River upstream of the Delta for a portion of exports (cubic feet per second (cfs) capacity)	--	--	15,000 to 20,000	15,000 to 20,000	--	--	--	--	--	15,000 to 20,000
Construct a new eastside conveyance facility to transport water around the Delta from the new diversion point to existing pumping plants in the south Delta (cfs capacity)	--	--	5,000 to 7,000	--	--	--	--	--	--	15,000 to 20,000
Increase existing eastside channel flow capacity to facilitate through-Delta water transport (in conjunction with *Flood Protection and Levee Stabilization* actions. (miles of channels)	--		priority channels	eligible channels	50 to 100	--	--	--	--	--
Construct a new unscreened diversion on the Sacramento River upstream of the Delta	--	--	--	--	15,000 to 20,000	--	--	--	--	--
Construct, in stages, combined capacity diversion facilities on the Sacramento River (upstream of the Feather River confluence) and on the Feather River (upstream of the Sacramento River confluence) (cfs capacity)	--	--	--	--	--	--	7,000	--	--	--
Construct East Valley conveyance facility in stages along the foothills from new diversions to the Merced River with an intertie constructed to the Delta-Mendota canal and California aqueduct (cfs capacity)	--	--	--	--	--	--	5,000 to 7,000	--	--	--
Construct interconnections with eastside water users and between East Valley conveyance facility and eastside projects (e.g. Mokelumne Aqueduct, Hetch Hetchy, New Melones)	--	--	--	--	--	--	Y	--	--	--
Convert selected Delta islands into an interconnected storage and conveyance system extending from a northern diversion located on the Sacramento River (near Hood or Freeport) to the existing export facilities in the south Delta	--	--	--	--	--	--	--	Y	--	--

Water Storage/Transport/Diversion Management

CALFED Bay-Delta Program Alternatives
Summary of Actions

	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Water Storage [1]										
Construct multiple new screened diversions at various points within the Delta between the existing south Delta facilities and the Sacramento River (cfs capacity)	--	--	--	--	--	--	--	5,000	--	--
Construct a new screened diversion facility on the Feather River system located at Thermolito Afterbay to divert wet weather water and construct a conveyance facility to transport water from the new diversion to new offstream storage on the west side of the Sacramento Valley (cfs capacity of system)	--	--	--	--	--	--	--	--	2,000 to 7,000	--
Construct a new screened diversion facility on the Sacramento River system located at Shasta Lake and a new conveyance facility to transport water from the new diversion to new offstream storage on the west side of the Sacramento Valley (cfs capacity of system)	--	--	--	--	--	--	--	--	5,000 to 10,000	--
Remove Glenn-Colusa Irrigation District and Tehama-Colusa Canal diversions from the Sacramento River and connect those users to new conveyance and storage facilities	--	--	--	--	--	--	--	--	Y	--
Construct a new west-side conveyance facility to transport water from the new offstream storage around the Delta to existing pumping plants in the south Delta (cfs capacity of system)	--	--	--	--	--	--	--	--	10,000 to 15,000	--
Water Diversion Management [1]										
Acquire about 100,000 acre-feet of water from willing sellers in the San Joaquin Valley, or develop 100,000 acre-feet from expanded surface water or groundwater storage	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Improve CVP and SWP operations through predation control and coordinating operations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Improve fish salvage procedures using best available technology	Y [2]	Y [2]	Y [2]	Y [2]	Y [2]	Y [2]	Y [2]	Y [2]	Y [2]	Y [2]
Improve real-time monitoring for fish species of concern and modify diversions to avoid fish entrainment	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Expand permitting pumping capacity of the CVP and SWP south Delta facilities to their full physical capabilities	--	Y	Y	Y	Y	--	--	--	--	--

Footnotes

1. Some activities include additional sub-activities explained in greater detail in the detailed descriptions of the alternatives.
2. Level of improved salvage procedures is dependent on the level of continued export at the existing pumping plants.

"--" means that the activity is not included as part of the alternative.
The units for each activity can be found in the lefthand column, following the activity description

Flood Protection/Levee Stabilization/Management of System Vulnerability

CALFED Bay-Delta Program Alternatives
Summary of Actions

Flood Protection/Levee Stabilization[1]	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Moderately fund a long-term Delta protection plan • Levee maintenance, stabilization, and improvements at or above Hazard Mitigation Plan standards (miles improved to HMP)	140 to 180	140 to 180	140 to 180	140 to 180	140 to 180	140 to 180	140 to 180	200 to 250	200 to 250	200 to 250
• Delta levee/habitat improvements to Corps. P.L. 99 standard (miles)	250 to 290	250 to 290	250 to 290	250 to 290	250 to 290	250 to 290	250 to 290	60 to 90	60 to 90	60 to 90
• Maintain flood conveyance capacity	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Management of System Vulnerability[1]										
• Establish landside buffer zones adjacent to some levees on islands with deep peat soils	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
• Convert agricultural lands on islands below -10 feet elevation (mean sea level) to wetland habitat to implement a long-term subsidence management program (acres of land to be converted)	--	--	--	--	--	8,000 to 12,000	--	--	--	8,000 to 12,000
• Rotate seasonal wetlands with wildlife-friendly agricultural practices on islands between -10 and -3 feet elevation (mean sea level) to implement a long-term subsidence management program (acres to be rotated)	--	--	--	--	--	15,000 to 20,000	--	--	--	15,000 to 20,000
• Establish and fund an emergency levee management program with funding for reclaiming Delta islands in the event of levee failures - to protect system functions	Modest	Modest	Moderate	Modest	Modest	Modest	Moderate	Extensive	Extensive	Extensive
• Provide funding for continued levee maintenance activities	Modest	Modest	Moderate	Modest	Modest	Modest	Moderate	Extensive	Extensive	Extensive

Footnotes

1. Some activities include additional sub-activities explained in greater detail in the detailed descriptions of the alternatives.
2. Indicates that geographic areas or specific locations of implementation have yet to be determined.

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The units for each activity can be found in the lefthand column, following the activity description

Water Supply Management

CALFED Bay-Delta Program Alternatives

Summary of Actions

Water Supply Management[1]	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Drought-period land fallowing incentives (acre-feet water)	1,000,000 to 2,000,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000	300,000 to 500,000
Permanent agricultural land retirement incentives/purchases (acreage retired)	750,000 to 850,000	300,000 to 400,000	300,000 to 400,000	300,000 to 400,000	300,000 to 400,000	300,000 to 400,000	300,000 to 400,000	70,000 to 100,000	70,000 to 100,000	70,000 to 100,000
Expand groundwater banking and conjunctive use (acre-feet capacity)	Y[2]	Y[2]	Y[2]	300,000 to 500,000	300,000 to 500,000	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Increase M&I conservation beyond current commitments (acre-feet water)	200,000 to 400,000	200,000 to 300,000	200,000 to 300,000	200,000 to 300,000	200,000 to 300,000	100,000 to 200,000	200,000 to 300,000	200,000 to 300,000	200,000 to 300,000	200,000 to 300,000
Increase agricultural conservation beyond current commitments (acre-feet water)	400,000 to 600,000	200,000 to 400,000	200,000 to 400,000	200,000 to 400,000	200,000 to 400,000	100,000 to 200,000	200,000 to 400,000	200,000 to 400,000	200,000 to 400,000	200,000 to 400,000
Investigate wholesale block rates and water pricing structures	Y	--	Y	--	--	--	Y	Y	Y	Y
Reclaim urban wastewater using recharge, recycling, etc. (acre-feet water)	800,000 to 1,000,000	300,000 to 700,000	300,000 to 700,000	300,000 to 700,000	300,000 to 700,000	100,000 to 200,000	300,000 to 700,000	300,000 to 700,000	100,000 to 200,000	300,000 to 700,000
Treat/recycle agricultural drainage	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Provide incentives for modifying upstream reservoir releases	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Institutional Water Supply Management Activities[1]										
Long-term planning for drought contingencies by implementing a drought water bank	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Ease institutional barriers to facilitate water transfers	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Improve operational procedures to facilitate water transfers	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Establish a water transfer brokering mechanism or institution	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Improve coordination of land use and water supply planning	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]
Establish incentives for conjunctive use in prioritized areas and ease institutional barriers	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]	Y[2]

Footnotes

1. Some activities include additional sub-activities explained in greater detail in the detailed descriptions of the alternatives.
2. Indicates that geographic areas, specific locations, and levels of implementation have yet to be determined. The level of implementation of some activities (e.g. groundwater banking and conjunctive use, etc.) will be encouraged in response to the physical capabilities of the system planned for construction as part of the alternative.

"--" means that the activity is not included as part of the alternative.

The units for each activity can be found in the lefthand column, following the activity description

B—001912

Water Quality Management

CALFED Bay-Delta Program Alternatives
Summary of Actions

Water Quality Management [1]	Alternative A	Alternative B	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G	Alternative H	Alternative I	Alternative J
Dilute pollutant inflows from San Joaquin River (acre-feet of water used)	--	50,000 to 100,000	50,000 to 100,000	--	--	--	--	50,000 to 100,000	--	50,000 to 100,000
Restrict drainage discharges during low flow periods (percent discharge reduced)	20% to 30%	60% to 70%	40 to 50%	20% to 30%	20% to 30%	20% to 30%	40 to 50%	40% to 50%	40% to 50%	60% to 70%
Retain additional urban stormwater runoff (percent of runoff volume)	20% to 30%	20% to 30%	20% to 30%	20% to 30%	20% to 30%	20% to 30%	20% to 30%	20% to 30%	20% to 30%	20% to 30%
Construct wetlands for treating effluent/ drainage (acre-feet treated)	3,000 to 5,000	10,000 to 15,000	10,000 to 15,000	10,000 to 15,000	10,000 to 15,000	10,000 to 15,000	3,000 to 5,000	3,000 to 5,000	3,000 to 5,000	3,000 to 5,000
Increase agricultural drainage source control regulations (enforcement)	moderate [2]	extensive [2]	moderate [2]	moderate [2]	moderate [2]	extensive [2]	moderate [2]	extensive [2]	moderate [2]	extensive [2]
Implement onsite mine drainage remediation	moderate [2]	moderate [2]	moderate [2]	moderate [2]	moderate [2]	moderate [2]	moderate [2]	extensive [2]	modest [2]	moderate [2]
Treat agricultural drainage to remove pollutants (percent of drainage)	--	20% to 30%	--	--	--	--	--	--	--	--
Provide incentives for filtration upgrades/ watershed protection program development	--	Y [2]	--	Y [2]	Y [2]	Y [2]	--	--	--	--
Provide incentives for treatment facility conversions	--	Y [2]	--	Y [2]	Y [2]	Y [2]	--	--	--	--
Study/implement actions to reduce San Joaquin River salinity	--	Y [2]	--	--	--	--	Y [2]	--	Y [2]	Y [2]
Schedule deliveries in isolated transfer facility to maximize drinking water quality to end users	--	--	Y	--	--	--	--	--	--	--
Shift the timing of diversions so that high volumes are diverted during periods of low salinity	--	--	--	--	--	--	--	--	--	Y
Increase enforcement of urban and industrial source control regulations	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Coordinate with on-going or planned watershed management programs	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Footnotes

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