Table B-1. Valley Riverine Aquatic Communities: Potential CALFED Effects and Conservation Measures

Summary Effect of Implementing CALFED Actions with Conservation Measures on Valley Riverine Aquatic Communities: Potential for substantial increases in shaded riverine aquatic and instream habitats and improved stream temperatures along the Sacramento and San Joaquin Rivers and their tributaries and the North Bay tributaries as a result of enhancing or restoring riparian habitat along up to 235 miles of stream channels; restoration of floodplain and channel meander processes along major tributaries in the Sacramento River and San Joaquin River Regions; and improvement in passage of anadromous fish to and from habitat areas. Potential for permanent fragmentation of valley riverine aquatic habitat corridors if new reservoirs are constructed in existing habitat areas.

Associated Evaluated Species: Bald eagle, California red-legged frog, Central Coast Steelhead Evolutionarily Significant Unit (ESU), Central Valley Steelhead ESU, winter-run chinook salmon, winter-run chinook salmon critical habitat, bank swallow, black tern, Sacramento splittail, Central Valley fall-run chinook salmon, Central Valley spring-run chinook salmon, osprey, western pond turtle, foothill yellow-legged frog, hardhead, Sacramento perch, green sturgeon, and eel-grass pondweed.

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Delta Region					
CALFED actions proposed for the Delta Region would not affect valley riverine aquatic communities.					
Bay Region					
Associated Evaluated Species: Bald eagle, California red-legged frog, Central Coast Steelhead ESU, Central Valley Steelhead ESU, winter-run chinook salmon, California freshwater shrimp, Central Valley fall-run chinook salmon, Central Valley spring-run chinook salmon, osprey, western pond turtle, foothill yellow-legged frog, and hardhead.					
Summary Programmatic Action Outcomes E1, E5b, E7, E10b, E12, E13b, E14, E16b, E24, E25, E28, E30, Q2, Q7, W3, and W4 are likely to have no discernable effect on valley riverine aquatic communities in the Bay Region.					
Ecosystem Restoration Program					
E15b. Restoration of 50-75 miles of riparian habitat along channels and reduction of populations of invasive non-native riparian plants by 50%.	E021601, E025301, E025302	Potential for improved SRA habitat, instream habitat, and stream temperature conditions for populations of native aquatic species (BE1).	Potential for temporary increase in turbidity resulting from implementing restoration actions (AE1).	None.	Potential for improved SRA habitat, instream habitat, and temperature conditions for populations of native aquatic species.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
E21. Reduction in the probability of introduction and establishment of non-native aquatic species into the Bay-Delta.	E025401, E025402	Reduction in the likelihood for introductions of non-native species into the Bay-Delta estuary will reduce potential for future adverse effects of such introductions on valley riverine aquatic communities and evaluated species (BE2).	Likely to be no discernable adverse effects on existing habitat areas and associated evaluation species (N/E).	None.	Reduction in the potential for future degradation of valley riverine communities that could occur with introductions of invasive non-native species.
E22. Reduction in the adverse effects of diversions on fish.	E024701	Reducing diversions from tributaries could improve flow conditions for sustaining populations of native fish and could reestablish floodplain processes associated with flow to more historical conditions (BE3). Increased survival of native aquatic species during life stages when species are susceptible to being entrained in diversions (BE4).	N/E	None.	Potential for improved flow conditions for native species and restoration of floodplain processes. Increased survival during some life stages of aquatic species that are susceptible to entrainment.
Water Quality Program					

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Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Q4. Reduction of pesticide loadings in the aquatic environment.	Q020501	Reduction in contaminant loadings in valley riverine aquatic habitats could improve the survivability of some species and increase aquatic invertebrate populations that are adversely effected by toxic agents (BE5).	N/E	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.
Q8. Reduction of sediment loadings to levels that do not adversely effect beneficial uses of surface water.	Q020901	Potential beneficial effects of the program are not analyzed. The type and magnitude of potential beneficial effects would depend on the type of specific program actions that are implemented (N/A).	Potential adverse effects of the program are not analyzed. The type and magnitude of potential adverse effects would depend on the type of specific program actions that are implemented (N/A).		Potential program effects cannot be evaluated.
Water Use Efficiency Program					
W1. Support implementation of water management techniques that increase the effectiveness of water use management and efficiency for agricultural uses.	None.	N/A	N/A		Potential program effects cannot be evaluated.
W2. Support implementation of measures that increase agricultural production per unit of water used, protect water quality, or increase environmental benefits while meeting agricultural needs.	None.	N/A	N/A		Potential program effects cannot be evaluated.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Water Transfer Program					
T1. Implement a framework of actions, policies, and processes that will facilitate transfers and the further development of a statewide water transfer market.	None.	Potential for improvement in flow conditions for native aquatic species if water transfers result in establishing flow conditions that more closely emulate the natural historical flow conditions in affected tributaries (BE6).	Potential for degradation of flow conditions for native aquatic species if water transfers result in establishing flow conditions that are less similar to the natural historical flow conditions in affected tributaries (AE2).	To the extent consistent with program objectives, avoid implementing transfers of water from sources that support flows that are beneficial to maintaining populations of native aquatic species (M1). To the extent practicable, augment flows from other sources to maintain existing flow conditions (M2).	Potential for improved flow conditions for native aquatic species.
Watershed Management Program					
M1. Fund and implement watershed restoration, maintenance, conservation, and monitoring activities.	None.	N/A	N/A		Potential program effects cannot be evaluated.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Sacramento River Region					
Associated Evaluated Species: Bald eagle, California red-legged frog, Central Valley Steelhead ESU, winter-run chinook salmon, winter-run chinook salmon critical habitat, bank swallow, Sacramento splittail, Central Valley fall-run chinook salmon, Central Valley spring-run chinook salmon, osprey, western pond turtle, foothill yellow-legged frog, hardhead, green sturgeon, and eel-grass pondweed.					
Summary Programmatic Action Outcomes E13c, E16c, E18b, E26, W3, W4, and S2 are likely to have no discernable effect on valley riverine aquatic communities in the Sacramento River Region.					
Ecosystem Restoration Program					
E1. Provide for more natural river flows and Bay-Delta freshwater inflow peaks in fall, winter, and spring of all but critical years.	E030101, E030102, E040101, E040102, E040103, E040104, E044701, E044703, E050101, E070101, E070102, E070103, E070104, E070105, E070106, E080101, E080102, E080103, E080104, E090101, E090102, E090103, E090104, E090105, E090106, E090107, E100101, E100102	Improved streamflows in streams and rivers would improve flow conditions for sustaining populations of native aquatic species and could reestablish floodplain processes associated with flow similar to the natural historical conditions (BE7).	N/E	None.	Improved flow conditions for native species and restoration of floodplain processes.
E2. Improvement in the supply of sediment to rivers and streams necessary for providing spawning gravels and rehabilitation of related ecological processes (e.g., stream meander) and floodplain habitats (e.g., riparian habitats).	E030201, E030202, E030301, E030302, E030303, E030604, E031602, E040201, E040202, E040203, E040301, E040402, E050201, E050202, E050203, E060401, E070201, E070202, E070203, E080201, E080202, E080203, E080303, E090201, E090401, E090403, E090404, E090407, E090409, E100201, E100202, E105101	Improving sediment supplies in streams and rivers could improve spawning conditions for some species and would contribute to restoring floodplain processes (BE8).	Potential for temporary increase in turbidity resulting from implementing actions necessary to increase sediment supplies (AE3).	None.	Improved sediment supplies in streams and rivers could improve spawning conditions for some species and contribute to restoring floodplain processes. Potential for short-term loss of SRA overhead cover. Some long-term increase in SRA overhead cover as a result of implementing conservation measures.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
		Potential for improved SRA habitat, instream habitat, and stream temperature conditions if increased sediment supplies increase the number and area of point bars and other depositional features along channels that would provide suitable substrates for the natural establishment of riparian vegetation (BE9).	Potential for loss or degradation of existing SRA overhead cover along channels if construction activities result in removal of riparian vegetation adjacent to channels (AE4).	To the extent practicable, avoid disturbance to existing SRA overhead cover (M3). Restore or enhance 1 to 3 times the linear footage of SRA overhead cover for every linear foot of existing affected habitat near affected areas (M4). To the extent consistent with ERP objectives, include project design features that allow tor onsite reestablishment and long-term maintenance of SRA overhead cover following project construction (M5).	
			Construction-related activities associated with implementing actions could result in take of evaluated species (AE5).	To the extent practicable, avoid implementing actions that could result in take of evaluated species during periods when evaluated species are present in habitat areas that could be affected by the actions (M6).	

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
				Remove or exclude evaluated amphibian and reptile species from construction corridors before construction is initiated (M7).	
E3. Maintenance of stream temperatures necessary to maintain anadromous fishes through management of reservoir releases or structural solutions (i.e., does not include the effect of restoration of riparian vegetation on maintaining stream temperatures).	E030501, E080501, E080502, E080503, E080504, E080505, E080506, E090501, E090502, E090503	Improved reservoir operations could improve valley riverine aquatic water temperatures for native aquatic species (BE10).	N/E	None.	Improved water temperatures in valley riverine aquatic habitats would improve habitat conditions for anadromous fish and other native aquatic species.
E6. Restoration and maintenance of riverine aquatic habitats.	E031602, E030301, E030302, E030303, E030604, E040301, E040402, E050201, E050202, E050203, E050301, E050401, E050402, E050403, E050404, E050405, E060401, E070201, E070202, E070203, E080301, E080302, E080303, E080401, E080402, E090401, E090402, E090403, E090404, E090407, E090408, E090408, E091604, E091605, E090201	BE8.	AE1.	None.	Potential for improved SRA habitat, instream habitat, and temperature conditions for populations of native aquatic species. Potential for short-term loss of SRA overhead cover. Some long-term increase in SRA overhead cover as a result of implementing conservation measures.
		BE9.	AE4.	M3. M4. M5.	

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
			AE5.	M6. M7.	
E15c. Protection and enhancement of 9,000–13,000 acres of riparian habitat in meander zones along the Sacramento River and its tributaries; protection, enhancement, and restoration of riparian habitat and shaded riverine aquatic (SRA) cover along other reaches of the Sacramento River and its tributaries; and reduction of populations of non-native invasive plants.	E031601, E031602, E031603, E031604, E031605, E030302, E030303, E030304, E035301, E035302, E040301, E040401, E041601, E041602, E041603, E051601, E051602, E051603, E061601, E065301, E071601, E071603, E071604, E080301, E080302, E080303, E080401, E081601, E081602, E081603, E090401, E090403, E090404, E090407, E091601, E091602, E091603, E091606, E095301, E101601, E101602, E101603, E101604, E105301	Potential for substantial increase and enhancement of SRA habitat, instream habitat, and stream temperature conditions for populations of native aquatic species (BE11).	AE1. AE4. AE5.	None. M3. M4. M5. M6. M7.	Potential for improved SRA habitat, instream habitat, and temperature conditions for populations of native aquatic species. Potential for short-term loss of SRA overhead cover. Some long-term increase in SRA overhead cover as a result of implementing conservation measures.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
E22. Reduction in the adverse effects of diversions on fish.	E034701, E034702, E034703, E034704, E044701, E044702, E044703, E044801, E044802, E044803, E074701, E074702, E074703, E074704, E084701, E084703, E084704, E094701, E094702, E104701	BE3. BE4.	N/E	None.	Potential for improved flow conditions for native species and restoration of floodplain processes. Increased survival during some life stages of aquatic species that are susceptible to entrainment.
E23. Improvement in passage of anadromous fish to and from spawning areas and reduction in levels of fish straying as a result of reducing the effects of structural impediments to fish movement.	E034801, E034802, E044702, E044801, E044802, E044803, E044804, E044805, E074801, E074802, E074803, E074804, E074805, E074806, E080501, E084801, E084802, E084803, E104701	Potential for increasing numbers of all life stages of anadromous fish as a result of increasing access to or restoring historical spawning habitats, reducing mortalities to straying, and increasing the number of juveniles successfully passing downstream of barriers (B12).	AE1.	None.	Potential for increased populations of anadromous fish.
E24. Reduction in levels of predation on juvenile anadromous fish.	E035601, E084801	Potential for increasing numbers of juvenile anadromous fish successfully outmigrating to the Bay-Delta (BE13).	AE1.	None.	Potential for increased populations of anadromous fish.
E25. Reduction in the adverse effects of harvest on fish and wildlife populations.	E035801, E035802, E035803, E045801, E045802, E045803, E075801, E075802, E075803, E085801, E085802, E085803, E095801, E095802	Potential for increasing spawning populations of anadromous fish and other native fish (BE14).	N/E	None.	Potential for increased populations of anadromous fish and other native fish.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
E27b. Reduction in the concentrations and loadings of contaminants in the aquatic environment.	E035702, E035703, E035704, E095701, E095702, E105701, E105702	BE5.	N/E	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.
Water Quality Program					
Q1. Reduction of oxygen-depleting substances in the aquatic environment.	Q090101	N/A	N/A		Potential program effects cannot be evaluated.
Q2. Maintenance of pathogen loadings at or below mandated levels and reduce levels of total organic carbon, bromide, and total dissolved solids to increase the availability of water for beneficial uses.	Q030201, Q040201, Q050201, Q060201, Q070201, Q080201, Q090201, Q090202	N/A	N/A		Potential program effects cannot be evaluated.
Q3. Reduction of mercury loadings in water and sediment.	Q030301, Q030302, Q040301, Q040302, Q050301, Q050302, Q060301, Q060302, Q070301, Q070302, Q080301, Q080302, Q090301, Q090302, Q100301, Q100302	BE5..	AE1.	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.
Q4. Reduction of pesticide loadings in the aquatic environment.	Q030501, Q040501, Q050501, Q060501, Q070501, Q080501, Q090501, Q100501	BE5.	N/E	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Q7. Reduction of cadmium, copper, and zinc loadings to levels that do not adversely affect Bay-Delta species or beneficial uses of water.	Q030801, Q040801, Q040802, Q050801, Q050802, Q060801, Q060802, Q070801, Q070802, Q080801, Q080801, Q090801, Q090802, Q100801, Q100802	BE5..	AE1.	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.
Water Use Efficiency Program					
W1. Support implementation of water management techniques that increase the effectiveness of water use management and efficiency for agricultural uses.	None.	N/A	N/A		Potential program effects cannot be evaluated.
W2. Support implementation of measures that increase agricultural production per unit of water used, protect water quality, or increase environmental benefits while meeting agricultural needs.	None.	N/A	N/A		Potential program effects cannot be evaluated.
Water Transfer Program					
T1. Implement a framework of actions, policies, and processes that will facilitate transfers and the further development of a statewide water transfer market.	None.	BE6.	AE2.	M1. M2.	Potential for improved flow conditions for native aquatic species.

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Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Watershed Management Program					
M1. Fund and implement watershed restoration, maintenance, conservation, and monitoring activities.	None.	N/A	N/A		Potential program effects cannot be evaluated.
Storage Facilities					
S1. Construct and operate enlarged or new surface storage facilities.	None.	Likely to be no discernable beneficial effects on existing habitat areas and associated evaluation species (N/E).	Permanent loss of habitat if storage facilities and associated infrastructure are constructed in drainages that support valley riverine habitat (AE6). Potential for permanent loss or degradation of valley riverine habitat downstream of storage reservoirs if storage operations reduce current patterns of flow (AE7). Fragmentation of riverine habitat and disruption of fish movement patterns (AE8).	Avoid constructing storage reservoirs on tributaries that support important spawning populations of anadromous fish (M8). To the extent practicable, design storage facilities to allow passage of anadromous fish to and from spawning habitat located above reservoirs (M9). Provide sufficient outflow from storage reservoirs sufficient to maintain existing aquatic habitat conditions downstream of storage reservoirs (M10). M9.	Potential for loss or degradation of valley riverine aquatic habitat. Potential for permanent fragmentation of stream corridors and disruption in movement patterns of evaluated species.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
			AE5.	M6. M7. To the extent practicable, trap and relocate to suitable nearby habitat areas evaluated wildlife species that would be unlikely to escape from the inundation area of new or enlarged reservoirs (M11).	
			Recreation-related activities potentially associated with new storage facilities could result in take of evaluated species (AE9).	Manage recreational uses to avoid or reduce the likelihood for recreation-related impacts on important valley riverine aquatic habitat areas and evaluated plant and animal species (M12).	
Water Operations					
01. Implement operating criteria needed to improve water management for beneficial uses.	None.	N/A	N/A		Potential program effects cannot be evaluated.
02. Implement an Environmental Water Account to provide operational flexibility to achieve environmental benefits.	None.	N/A	N/A		Potential program effects cannot be evaluated.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
San Joaquin River Region					
Associated Evaluated Species: Bald eagle, California red-legged frog, Central Valley Steelhead ESU, bank swallow, Sacramento splittail, Central Valley fall-run chinook salmon, osprey, western pond turtle, foothill yellow-legged frog, and hardhead.					
Summary Programmatic Action Outcomes E13d, E18c, E26, E29, Q5, Q6, W3, W4, and S2 are likely to have no discernable effect on valley riverine aquatic communities in the San Joaquin River Region.					
Ecosystem Restoration Program					
E1. Provide for more natural river flows and Bay-Delta freshwater inflow peaks in fall, winter, and spring of all but critical years.	E110101, E110102, E110103, E110104, E110105, E110106, E110107, E110108, E110109, E110110, E110205, E110502, E120101, E130103, E130101, E130102, E130104, E130105, E140101, E140102, E140103, E140104	BE7.	N/E	None.	Improved flow conditions for native species and restoration of floodplain processes.
E2. Improvement in the supply of sediment to rivers and streams necessary for providing spawning gravels and rehabilitation of related ecological processes (e.g., stream meander) and floodplain habitats (e.g., riparian habitats).	E110201, E110202, E110203, E110204, E110205, E110206, E110207, E110208, E110209, E130201, E130202, E130203, E130301, E130302, E130303, E130304, E130305, E130306, E130307, E130402, E135601, E140401, E140403	BE8. BE9.	AE4. AE4.	None. M3. M4.	Improved sediment supplies in streams and rivers could improve spawning conditions for some species and contribute to restoring floodplain processes. Potential for short-term loss of SRA overhead cover. Some long-term increase in SRA overhead cover as a result of implementing conservation measures.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
			AE5.	M5. M6. M7.	
E6. Restoration and maintenance of riverine aquatic habitats.	E110401, E110401, E130301, E130302, E130303, E130304, E130305, E130306, E130307, E130402, E135601, E131601, E131602, E131603, E140401, E140402, E140403	BE8.	AE1.	None.	Potential for improved SRA habitat, instream habitat, and temperature conditions for populations of native aquatic species. Potential for short-term loss of SRA overhead cover. Some long-term increase in SRA overhead cover as a result of implementing conservation measures.
		BE9.	AE4.	M3. M4.	
			AE5.	M5. M6. M7.	

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
E15d. Restore up to 4,720 acres of riparian and shaded riverine aquatic habitat; protection and enhancement of up to 1,000 acres of riparian habitat in meander zones along San Joaquin River tributaries; restoration of up to 75 miles of riparian habitat along the San Joaquin River and its tributaries; protection, enhancement, and restoration of riparian habitat and SRA cover along other reaches of the San Joaquin River and its tributaries; and reduction of populations of non-native invasive plants along the northern tributaries to the San Joaquin River.	E110401, E111601, E111602, E111603, E111604, E111605, E111606, E111607, E111608, E111609, E111610, E111611, E111612, E111613, E111614, E111615, E115301, E121601, E121602, E121603, E124901, E130301, E130302, E130303, E130304, E130305, E130306, E130307, E130401, E131601, E131602, E131603, E134101, E134103, E140401, E140402, E140403, E141601	BE11.	AE1. AE4. AE5.	None. M3. M4. M5. M6. M7.	Potential for improved SRA habitat, instream habitat, and temperature conditions for populations of native aquatic species. Potential for short-term loss of SRA overhead cover. Some long-term increase in SRA overhead cover as a result of implementing conservation measures.

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Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
E22. Reduction in the adverse effects of diversions on fish.	E114701, E114702, E114703, E114704, E124701, E124702, E134701, E134702, E134703	BE3. BE4.	N/E	None.	Potential for improved flow conditions for native species and restoration of floodplain processes. Increased survival during some life stages of aquatic species that are susceptible to entrainment.
E23. Improvement in passage of anadromous fish to and from spawning areas and reduction in levels of fish straying as a result of reducing the effects of structural impediments to fish movement.	E114801, E114802, E114803, E114804, E134801, E134802	BE12.	AE1.	None.	Potential for increased populations of anadromous fish.
E24. Reduction in levels of predation on juvenile anadromous fish.	E115601, E115602, E135601	BE13.	AE1.	None.	Potential for increased populations of anadromous fish.
E25. Reduction in the adverse effects of harvest on fish and wildlife populations.	E115801, E115802, E135801, E135802	BE14.	N/E	None.	Potential for increased populations of anadromous fish and other native fish.
E27b. Reduction in the concentrations and loadings of contaminants in the aquatic environment.	E115701, E115702, E115703, E125701, E125702	BE5.	N/E	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Water Quality Program					
Q1. Reduction of oxygen-depleting substances in the aquatic environment.	Q130101	N/A	N/A		Potential program effects cannot be evaluated.
Q2. Maintenance of pathogen loadings at or below mandated levels and reduce levels of total organic carbon, bromide, and total dissolved solids to increase the availability of water for beneficial uses.	Q120201, Q130201, Q140201, Q140202, Q140203, Q140204, Q140205	N/A	N/A		Potential program effects cannot be evaluated.
Q4. Reduction of pesticide loadings in the aquatic environment.	Q120501, Q130501, Q140501, Q140502	BE5.	N/E	None.	Implementation of the proposed actions would most likely have no discernable effect on evaluation species' numbers or distribution.
Q7. Reduction of cadmium, copper, and zinc loadings to levels that do not adversely affect Bay-Delta species or beneficial uses of water.	Q110801, Q110802, Q120801, Q120802, Q130801, Q130802, Q140801, Q140802	BE5.	AE1.	None.	Reduced pollutants should improve the valley riverine aquatic habitats and communities.
Q8. Reduction of sediment loadings to levels that do not adversely affect beneficial uses of surface water.	Q130901, Q130902	N/A	N/A		Potential program effects cannot be evaluated.

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Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Water Use Efficiency Program					
W1. Support implementation of water management techniques that increase the effectiveness of water use management and efficiency for agricultural uses.	None.	N/A	N/A		Potential program effects cannot be evaluated.
W2. Support implementation of measures that increase agricultural production per unit of water used, protect water quality, or increase environmental benefits while meeting agricultural needs.	None.	N/A	N/A		Potential program effects cannot be evaluated.
Water Transfer Program					
T1. Implement a framework of actions, policies, and processes that will facilitate transfers and the further development of a statewide water transfer market.	None.	BE6.	AE2.	M1. M2.	Potential for improved flow conditions for native aquatic species.
Watershed Management Program					
M1. Fund and implement watershed restoration, maintenance, conservation, and monitoring activities.	None.	N/A	N/A		Potential program effects cannot be evaluated.

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Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
Storage Facilities					
S1. Construct and operate enlarged or new surface storage facilities.	None.	N/E	AE6. AE7. AE8. AE5. AE9.	M8. M9. M10. M9. M6. M7. M11. M12.	Potential for loss or degradation of valley riverine aquatic habitat. Potential for permanent fragmentation of stream corridors and disruption in movement patterns of evaluated species.
Water Operations					
01. Implement operating criteria needed to improve water management for beneficial uses.	None.	N/A	N/A		Potential program effects cannot be evaluated.

Table B-1. Continued

Summary Programmatic Action Outcomes	Applicable Programmatic Actions	Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program	Overall Effect of Summary Programmatic Action Outcomes with Conservation Measures
02. Implement an Environmental Water Account to provide operational flexibility to achieve environmental benefits.	None.	N/A	N/A		Potential program effects cannot be evaluated.

Contributors to the development of this table: Tom Cannon and Pete Rawlings of Jones & Stokes Associates.

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Table B-2. Key to Table B-1 Potential Beneficial Effects, Potential Adverse Effects, and Conservation Measures Codes

Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program
Potential for improved SRA habitat, instream habitat, and stream temperature conditions for populations of native aquatic species (BE1).	Potential for temporary increase in turbidity resulting from implementing restoration actions (AE1).	To the extent consistent with program objectives, avoid implementing transfers of water from sources that support flows that are beneficial to maintaining populations of native aquatic species (M1).
Reduction in the likelihood for introductions of non-native species into the Bay-Delta estuary will reduce potential for future adverse effects of such introductions on valley riverine aquatic communities and evaluated species (BE2).	Potential for degradation of flow conditions for native aquatic species if water transfers result in establishing flow conditions that are less similar to the natural historical flow conditions in affected tributaries (AE2).	To the extent practicable, augment flows from other sources to maintain existing flow conditions (M2).
Reducing diversions from tributaries could improve flow conditions for sustaining populations of native fish and could reestablish floodplain processes associated with flow to more historical conditions (BE3).	Potential for temporary increase in turbidity resulting from implementing actions necessary to increase sediment supplies (AE3).	To the extent practicable, avoid disturbance to existing SRA overhead cover (M3).
Increased survival of native aquatic species during life stages when species are susceptible to being entrained in diversions (BE4).	Potential for loss or degradation of existing SRA overhead cover along channels if construction activities result in removal of riparian vegetation adjacent to channels (AE4).	Restore or enhance 1 to 3 times the linear footage of SRA overhead cover for every linear foot of existing affected habitat near affected areas (M4).
Reduction in contaminant loadings in valley riverine aquatic habitats could improve the survivability of some species and increase aquatic invertebrate populations that are adversely effected by toxic agents (BE5).	Construction-related activities associated with implementing actions could result in take of evaluated species (AE5).	To the extent consistent with ERP objectives, include project design features that allow tor onsite reestablishment and long-term maintenance of SRA overhead cover following project construction (M5).

Table B-2. Continued

Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program
Potential for improvement in flow conditions for native aquatic species if water transfers result in establishing flow conditions that more closely emulate the natural historical flow conditions in affected tributaries (BE6).	Permanent loss of habitat if storage facilities and associated infrastructure are constructed in drainages that support valley riverine habitat (AE6).	To the extent practicable, avoid implementing actions that could result in take of evaluated species during periods when evaluated species are present in habitat areas that could be affected by the actions (M6).
Improved streamflows in streams and rivers would improve flow conditions for sustaining populations of native aquatic species and could reestablish floodplain processes associated with flow similar to the natural historical conditions (BE7).	Potential for permanent loss or degradation of valley riverine habitat downstream of storage reservoirs if storage operations reduce current patterns of flow (AE7).	Remove or exclude evaluated amphibian and reptile species from construction corridors before construction is initiated (M7).
Improving sediment supplies in streams and rivers could improve spawning conditions for some species and would contribute to restoring floodplain processes (BE8).	Fragmentation of riverine habitat and disruption of fish movement patterns (AE8).	Avoid constructing storage reservoirs on tributaries that support important spawning populations of anadromous fish (M8).
Potential for improved SRA habitat, instream habitat, and stream temperature conditions if increased sediment supplies increase the number and area of point bars and other depositional features along channels that would provide suitable substrates for the natural establishment of riparian vegetation (BE9).	Recreation-related activities potentially associated with new storage facilities could result in take of evaluated species (AE9).	To the extent practicable, design storage facilities to allow passage of anadromous fish to and from spawning habitat located above reservoirs (M9).
Improved reservoir operations could improve valley riverine aquatic water temperatures for native aquatic species (BE10).	Potential adverse effects of the program are not analyzed. The type and magnitude of potential adverse effects would depend on the type of specific program actions that are implemented (N/A).	Provide sufficient outflow from storage reservoirs sufficient to maintain existing aquatic habitat conditions downstream of storage reservoirs (M10).

Table B-2. Continued

Potential Beneficial Effects	Potential Adverse Effects	Conservation Measures Incorporated into the Program
Potential for substantial increase and enhancement of SRA habitat, instream habitat, and stream temperature conditions for populations of native aquatic species (BE11).	Likely to be no discernable adverse effects on existing habitat areas and associated evaluation species (N/E).	To the extent practicable, trap and relocate to suitable nearby habitat areas evaluated wildlife species that would be unlikely to escape from the inundation area of new or enlarged reservoirs (M11).
Potential for increasing numbers of all life stages of anadromous fish as a result of increasing access to or restoring historical spawning habitats, reducing mortalities to straying, and increasing the number of juveniles successfully passing downstream of barriers (B12).		Manage recreational uses to avoid or reduce the likelihood for recreation-related impacts on important valley riverine aquatic habitat areas and evaluated plant and animal species (M12).
Potential for increasing numbers of juvenile anadromous fish successfully outmigrating to the Bay-Delta (BE13).		
Potential for increasing spawning populations of anadromous fish and other native fish (BE14).		
Potential beneficial effects of the program are not analyzed. The type and magnitude of potential beneficial effects would depend on the type of specific program actions that are implemented (N/A).		
Likely to be no discernable beneficial effects on existing habitat areas and associated evaluation species (N/E).		