Chapter 6
Effects of the Proposed Action on NCCP Communities inside the Action Area

6.1 Introduction

This chapter assesses effects on NCCP communities caused by implementation of the Proposed Action. The Proposed Action contains asset acquisition and management actions that include pre-delivery, source shifting, purchasing stored reservoir water, using groundwater substitution and/or storage, purchasing stored groundwater, and crop idling. These actions may affect the following variables: 1) the timing of water releases, 2) river flows, 3) reservoir levels, or 4) water table levels. Effects to plant communities may include changes in water availability, alteration of species composition, and removal, conversion, or fragmentation of communities.

Chapter 5 describes the 15 NCCP communities evaluated in this ASIP. This ASIP does not evaluate in detail inland dune scrub, grassland, valley/foothill woodland and forest, montane woodland and forest, and upland scrub habitats because EWA actions will not affect these habitats. Chapter 4 provides analyses of the effects of EWA actions on fish species based on changes in stream flow, Delta pumping actions, and Delta outflow. This chapter evaluates fish species and their riverine and Delta habitats based on their NCCP fish groups (anadromous fish species and estuarine fish species) designations. Therefore, this ASIP provides for an assessment of effects on these fish groups based upon species-specific analyses and analyses of associated NCCP habitats.

6.2 Determining the Likelihood that EWA Actions would Affect NCCP Habitats

The MSCS provided a programmatic evaluation of CALFED's effects on the evaluated NCCP habitats and similar criteria will be used in this ASIP to determine the EWA-specific effects on these habitats. EWA actions were considered likely to affect evaluated habitats adversely or beneficially if the quality of the habitat to support populations of species is changed or should populations of a species critical for the viability of the habitat be present in the area where actions could be implemented and:

- Implementing one or more actions may affect or could result in take of the species; or

- Implementing the actions would increase or decrease the extent or quality of habitat potentially occupied by the species.

6.3 Tidal Perennial Aquatic

Tidal perennial aquatic (TPA) habitat is defined as deepwater aquatic (greater than 3 meters deep from mean low low tide), shallow aquatic (less than or equal to 3 meters deep from mean low low tide), and unvegetated intertidal (tideflats) zones of estuarine bays, river channels, and sloughs (MSCS 2000).

Open water in the Delta Region includes sloughs and channels in the Delta, flooded islands, ponds, and bays. Deep open-water areas are largely unvegetated; beds of aquatic plants occasionally occur in shallower open-water areas. Open water provides resting and foraging habitat for water birds.

6.3.1 Status in the Action Area

The Tidal Perennial Aquatic community occurs in the western Delta area and Suisun Bay. There has been substantial loss of historic shallow tidal waters, mainly as a result of reclamation and channel dredging and scouring. Many animal and plant species, identified as threatened or endangered under the California and federal Endangered Species Acts, rely on tidal perennial aquatic habitat during some portion of their life cycle. Many leveed lands in the Bay and Delta have subsided and are too low to support shallow tidal perennial aquatic habitat. The greatest subsidence has occurred in the Central and West Delta Ecological Management Unit. All major habitat types in the Delta, Suisun Bay, Suisun Marsh, and San Francisco Bay have been reduced to a small fraction of the area they once occupied, resulting in a large number of at-risk plant and animal species and an increased susceptibility of the remaining areas to irreversible degradation (e.g., invasion by non-native species) (ERPP 2000).

The functions of the Delta sloughs have been degraded severely over the years. Urban and industrial development has moved into areas adjacent to sloughs, destroying historic riparian habitat. Invasion and spread of non-native plant species, such as water hyacinth, reduced water quality, and reduced freshwater outflows have also historically contributed to degradation. Existing natural sloughs require protection and habitat improvement (ERPP 2000).

Midchannel islands and shoals have been shrinking or disappearing from progressive erosion of the remaining habitat. Major factors contributing to the loss of midchannel islands and shoals are gradual erosion from channels conveying water across the Delta to South Delta pumping plants, boat wakes, and dredging within the Delta or on adjacent waters. The Delta formerly supported broad expanses of tule marshes, riparian forests, and shallow-water habitats. Today, intensive agricultural production on levee-bounded islands has replaced most of these habitats (ERPP 2000).

6.3.2 Effect Assessment Methods

Table 6-1 provides a summary of effect indicators (parameters) and evaluation criteria developed to assess potential adverse effects on the tidal perennial aquatic

community and associated covered species that may result from implementation of EWA actions in the Delta. Potential effects on covered fish species associated with this community considered to be adverse if adverse effects were identified for the community. Chapter 4 presents the overall assessment methodology for fish species in the Delta.

Table 6-1. Effect Indicators and Evaluation Criteria for Tidal-Perennial Aquatic Community	
Tidal Perennial Aquatic Assessment Criteria	
Effect Indicator	Evaluation Criteria
Monthly mean flows (cfs) from March through October.	Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation in the lower Sacramento River and Delta for any month of this period over the 72-year period of record.
Position of X_2.	Upstream shift in the position of X_2, relative to the basis of comparison of sufficient magnitude (greater than 1 km) and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation of the Delta for any month of this period over the 72-year period of record.

6.3.3 Project Effects

The following text contains an analysis of potential direct and indirect effects to Delta NCCP communities, including Tidal Perennial Aquatic, Saline Emergent, and Tidal Freshwater Emergent habitats and associated covered species.

EWA acquisitions via groundwater substitution, crop idling, stored reservoir water purchase, stored groundwater purchase, and source shifting change the timing of Delta pumping operations, and have the potential to result in changes to Delta inflows and associated parameters. Potential changes in lower Sacramento River flows can result in changes in the position of X_2. Under the proposed action, long-term average flows in the lower Sacramento River at Freeport would be similar relative to the basis of comparison. Under the proposed action, the long-term average position of X_2 would be maintained through the use of carriage water releases and other EWA asset directed releases controlling X_2, relative to the basis of comparison.

In summary, changes to Delta inflows would not be of sufficient magnitude and frequency to significantly alter existing riparian and wetland habitat dependent of the Delta. Therefore, the proposed action is not likely to adversely affect Delta riparian and wetland vegetation.

6.3.4 Conservation Measures

Because there are no adverse effects on tidal perennial aquatic habitat from EWA actions, no conservation measures are necessary.

6.3.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of tidal perennial aquatic habitat or associated Covered Species.

6.4 Valley Riverine Aquatic

Valley riverine aquatic (VRA) habitat includes the water column of flowing streams and rivers in low-gradient channel reaches below an elevation of approximately 300 feet that are not tidally influenced. Additionally, VRA includes associated shaded riverine aquatic (SRA), pool, riffle, run, and unvegetated channel substrate (including seasonally exposed channel bed) habitat features, and sloughs, backwaters, overflow channels, and flood bypasses hydrologically connected to stream and river channels (MSCS 2000). The dominant vegetation of VRA habitat includes plankton, water moss, algae, and duckweed. Aquatic species include riffle insects such as the nymphs of caddisflies, mayflies, alderflies, and stoneflies; pool insects such as dragonflies, damselflies, and water striders; and mollusks, crustaceans, diving beetles, water boatmen. Avian species associated with VRA habitat include waterfowl, wading birds, shorebirds, and raptors such as gulls, terns, osprey, bald eagles, herons, kingfisher, swallows, swifts, and flycatchers. Mammal species associated with VRA include river otter, muskrat, and beaver.

6.4.1 Status in the Action Area

The VRA habitat includes the streams and the adjacent riparian corridors (providing shaded riverine aquatic habitat). This habitat has been in decline because of agricultural and flood control practices, particularly during the last century.

6.4.2 Effect Assessment Methods

EWA asset acquisition and management actions were considered significant should reductions or increases in stream flows alter stream bank stability, including erosion of stream banks, or should decreases in stream or groundwater water sources supporting aquatic vegetation be interrupted causing the death of riparian vegetation. Reductions in stream flows that alter the quality of habitat (e.g., water temperature) are also considered significant.

6.4.3 Project Effects

This section analyzes the EWA water acquisition and management effects on aquatic habitat within the valley reach of each river system in the Upstream from the Delta Region. Effects would be considered significant should 1) decreases in river flows or reservoir levels reduce the water source for riparian vegetation, thereby decreasing its extent; 2) decreases in stream flow do not allow for temporary flooding of adjacent floodplain thereby inhibiting germination and growth of seedlings; 3) decreases in river flows strand populations of wildlife species (e.g., tadpoles) increasing their loss through predation; 4) increases in stream flow cause erosion of stream banks resulting in a loss of shaded riverine habitat; 5) increases in stream flows flush populations

(non-volitional movement) of wildlife from protected areas or wash seedlings of riparian vegetation away from stream banks/shallow areas causing a loss in recruitment vegetation; or 6) increases and timing of flows are such that natural geomorphic processes such as point bar formation do not occur and establishment of seedlings in adversely affected.

The timing and amount of EWA water releases, will, in general, decrease mean flow peaks in early spring and increase summer water levels available for plants. Peak spring flows typically clear the river channel of debris and unclog sediments, depositing them downstream creating point bars and nutrient rich floodplains essential for early successional plant germination. Decreasing summer water levels ensure that pioneer seedlings are able to match growth with increasingly unavailable water supplies and out compete non-pioneer species for resources. Currently, river regulation in the Central Valley has created artificially stable hydrological conditions and EWA actions would further exacerbate this trend. Affects to riparian habitat include the loss of point bars and other substrates for seed germination and increased water supply availability during the summer allowing non-pioneer species to compete for resources once only available to pioneer species.

Another consequence of altered hydrological conditions is the presence of amphibian species in river mainstems where they were previously confined to tributaries. Dams, particularly those created for power generation have often reduced flows to such a degree that newly created slow moving water habitats attract frogs such as the foothill yellow-legged frog (FYLF). These frogs lay eggs March through May, and the tadpoles metamorphose three to four months later. Frogs at this stage are highly vulnerable to non-volitional movements because of increased flows. However, a search of the CNDDB and current literature did not reveal any occurrences of species such as the FYLF in the mainstems of the rivers being affected by EWA actions.

The following sections provide detailed timing and flow rate discussions for each river and associated EWA actions. The effects on riparian habitats adjacent to each river and associated wildlife are the same as those just discussed, the only difference being the magnitude of the effect. The conservation measure outlined in Section 6.4.4 will ensure that effects on riparian habitat are avoided or minimized.

Sacramento River

EWA acquisition of Sacramento River contractor water via groundwater substitution and crop idling would change Sacramento River flows downstream from Lake Shasta in April through September. EWA acquisition of up to 120,000 acre-feet of water via groundwater substitution and up to 158,000 acre-feet from crop idling would increase Sacramento River flows by 240 cfs between Lake Shasta and the point of diversion in July. Flows in this reach would decrease 133 cfs and 111 cfs in August and September, respectively. Downstream from the diversion point, flows would increase by 289 cfs, 372 cfs, 429 cfs, 1,940 cfs, 777 cfs, and 157 cfs in April through September, respectively.

This represents a 1 to 11 percent increase in flow and is not considered significant to cause adverse effects.

Feather River

EWA acquisition of Feather River contractor water via groundwater substitution, crop idling, and stored reservoir water would change Feather River flows downstream of Oroville Reservoir from July through September relative to the basis of comparison. Under the Flexible Purchase Alternative, crop idling and groundwater substitution transfers would not affect flow in the lower Feather River from April through June (the hold-back period) because this water would typically have been released from the Thermalito Afterbay directly to the water agencies. Crop idling and groundwater substitution transfers would act in conjunction with Oroville-Wyandotte ID stored reservoir water transfers to increase flows in the lower Feather River from July through September. Long-term average flows in the lower Feather River below Oroville Dam during the March through October growing season would increase 2105 cfs (from 5, 896 cfs to 6,497 cfs) in July, increase 850 cfs (from 4,434 cfs to 4,515 cfs) in August, and increase 149 cfs (from 1,600 cfs to 1,421 cfs) in September compared to the basis of comparison. These changes represent a 36 percent increase in July, a 19 percent increase in August, and a 9 percent increase in September. EWA agencies would monitor the releases to ensure that adverse effects do not occur, and institute changes to quantities of water released through adaptive management processes to avoid or minimize any adverse effect.

Yuba River

EWA acquisition of Yuba County WA water via groundwater substitution would decrease Yuba River flows from the power facility discharge upstream from Englebright Dam to the users' diversion points, typically at Englebright and Daguerre Point Dams, from April to June. Yuba River flows would decrease at most by 239 cfs in late spring as farmers use groundwater for irrigation instead of surface water from New Bullards Bar Reservoir. (A total of 12 to 19 percent reduction in April through June compared to the median flow under the basis of comparison.) EWA agencies would monitor the releases to ensure that adverse effects do not occur, and institute changes to quantities of water released through adaptive management processes to avoid or minimize any adverse effect.

EWA acquisition of Yuba County WA water via stored reservoir water and groundwater substitution would increase Yuba River flows from July through September. EWA agencies acquisition of Yuba County WA stored reservoir water and Yuba River contractor water via groundwater substitution would increase Yuba River flows, downstream of Englebright Dam, from July to September relative to the basis of comparison. Flows would increase at most by 1,005 cfs in July through September, approximately 60 percent above the basis of comparison. While this increase would be a noticeable change, releases would be operated to maintain relatively constant flows during this time period in accordance with existing Yuba County WA operations to protect fish and the environment. This increase in flow would have the potential to increase non-

volitional movement of aquatic wildlife that cannot find quieter water to remain in during periods of increase. However, species such as the California red-legged frog and foothill yellow-legged frog are not known to inhabit this reach of the Yuba River. These effects cannot be quantified, but may be considered significant adverse effects if the EWA-related water releases are maintained at significantly higher flows for long periods of time. EWA agencies would monitor the releases to ensure that adverse effects do not occur, and institute changes to quantities of water released through adaptive management processes to avoid or minimize any adverse effect.

American River

EWA acquisition of Placer County WA stored reservoir water would decrease flows in the American River compared to the basis of comparison while the reservoir refills during winter months. During the rainy season after December, Placer County WA would refill its reservoirs, which would decrease the flow that travels downstream of French Meadows, and Hell Hole Reservoirs. These decreases would occur during the winter rainy season, and would not likely have an effect on flow downstream of Folsom Lake.

EWA acquisition of Sacramento Groundwater Authority water via groundwater substitution and Placer County WA stored reservoir water under the Flexible Purchase Alternative would increase flows in the Lower American River compared to basis of comparison from June to December. American River flows would increase from June through December because of increased releases from Folsom Lake because of Sacramento Groundwater Authority groundwater purchase transfers and Placer County WA stored reservoir water. The change in flow is not predicted to adversely affect stream habitat.

Merced and San Joaquin Rivers

EWA acquisition of Merced ID water via groundwater substitution would increase Merced River fall flows relative to the basis of comparison. EWA agency acquisition of Merced ID water via groundwater substitution would increase Merced River flows by a maximum of 210 cfs (from 231 to 441 cfs; 52 percent above the median) below Crocker-Huffman Dam in the fall relative to the basis of comparison as the water is released from Lake McClure. EWA agencies would monitor the releases to ensure that adverse effects do not occur, and institute changes to quantities of water released through adaptive management processes to avoid or minimize any adverse effect.

6.4.4 Conservation Measures

Riverine communities often depend on surface water-groundwater interactions for part or all of their water supply. The following environmental measures would ensure effects on these communities from groundwater substitution actions are avoided or minimized.

- **A Well Adequacy Review.** Before groundwater substitution actions the hydrogeologic conditions of wells used to transfer EWA water will be examined to

minimize the potential risk of depleting surface water sources and adversely affecting associated vegetation; and

- **A Monitoring Program.** The Project Agencies will implement a monitoring program that will provide data to determine if direct or indirect effects exist.

6.4.5 Contribution to Recovery

The EWA program would not contribute to the recovery of valley riverine aquatic habitats or associated Covered Species.

6.5 Montane Riverine Aquatic

The Montane Riverine Aquatic Community reflects the water column of flowing streams and rivers above an elevation of approximately 300 feet. This includes associated SRA, pool, riffle, run, and unvegetated channel substrate habitat features, and sloughs, backwaters, and overflow channels hydrologically connected to stream and river channels. Seasonal changes in flows could potentially affect this habitat type. The MSCS conservation goal is to substantially increase extent and quality of the habitat.

6.5.1 Status in the Action Area

The montane riverine aquatic habitat includes the streams and the adjacent riparian corridors (providing shaded riverine aquatic habitat). This habitat has been in decline because of dams, mining, and forestry practices, particularly during the last century.

6.5.2 Effect Assessment Methods

EWA asset acquisition and management actions were considered significant should reductions or increases in stream flows alter stream bank stability, including erosion of stream banks, or should decreases in stream or groundwater water sources supporting aquatic vegetation be interrupted causing the death of riparian vegetation. Reductions in stream flows that alter the quality of habitat (e.g., water temperature) are also considered significant.

6.5.3 Project Effects

The EWA program could affect Montane Riverine Aquatic habitats that are on the same rivers as the Valley Riverine Aquatic habitats, but at higher elevations. Several of the following sections include abbreviated discussions from the Valley Riverine Aquatic habitat evaluation.

<u>Sacramento River</u>
Montane Riverine Aquatic habitat within the EWA action area on the Sacramento River occurs between approximately Red Bluff, CA and Lake Shasta.

EWA acquisition of Sacramento River contractor water via groundwater substitution and crop idling under the Flexible Purchase Alternative would change Sacramento River flows from June through September. The flow changes would be the same as those described in Section 6.4.3 for Valley Riverine Aquatic habitat. The numbers represent a 1 to 11 percent increase in flow. No adverse effect to habitat is predicted due to the low changes in flow.

Feather River

EWA acquisition of Oroville-Wyandotte ID stored reservoir water would increase Feather River flows below Sly Creek and Little Grass Valley Reservoirs to Lake Oroville in November and December. The water released from Little Grass Valley and Sly Creek Reservoirs into Lake Oroville would get diverted through Woodleaf and Forbestown tunnels to run through the corresponding power generation facilities and end up in Ponderosa Reservoir. Transfer water spills from Ponderosa Reservoir directly into Lake Oroville. Because the water transferred from Little Grass Valley and Sly Creek Reservoirs into Lake Oroville would almost entirely bypass the Feather River, there would be no effects on vegetation and wildlife.

EWA acquisition of Oroville-Wyandotte ID stored reservoir water could decrease flows in the South Fork of the Feather River during the winter. Oroville-Wyandotte ID would deliver stored reservoir water for the EWA agencies from October through December, and store it in Lake Oroville until it could be transferred through the Delta during the following summer. During the rainy season after December, Oroville-Wyandotte ID would refill its reservoirs, which would decrease the flow that travels downstream of Sly Creek and Little Grass Valley Reservoirs. The effect is not considered significant because it does not occur during the growing season for vegetation along the river.

Yuba River

Montane Riverine Aquatic habitat occurs on the Yuba River between approximately Timbuctoo Bend and New Bullards Bar Reservoir.

EWA acquisition of Yuba County WA water via stored reservoir water and groundwater substitution would decrease Yuba River flows downstream of New Bullards Bar Reservoir from April to June and increase flows from July through September. The flow changes would be the same as those described in Section 6.4.3 for Valley Riverine Aquatic habitat. The only stretch of the river that includes Montane Riverine Aquatic habitat is from Englebright Dam downstream to Timbuctoo Bend (between Englebright and Daguerre Point Dams). The increases from July through September would noticeably change river flows. The Yuba County WA would operate the system to maintain relatively constant flows during this time period in accordance with existing Yuba County WA operations to protect fish and the environment.

American River

EWA acquisition of Placer County WA stored reservoir water from French Meadows and Hell Hole Reservoirs would increase flows in the Middle Fork of the American River compared to

the basis of comparison downstream from Oxbow Power House to Folsom Lake from June to October. At a maximum, releases would increase flows from June through August relative to the basis of comparison. Median flows downstream from Oxbow Power House (where the reservoirs' power facilities release water into the river) on the Middle Fork are 790, 793, and 776 cfs during June, July, and August, respectively. EWA agencies would monitor the releases to ensure that adverse effects do not occur, and institute changes to quantities of water released through adaptive management processes to avoid or minimize any adverse effect.

EWA acquisition of Placer County WA stored reservoir water would decrease flows in the Middle Fork of the American River compared to the basis of comparison while the reservoir refills during winter months. During the rainy season after December, Placer County WA would refill its reservoirs, which would decrease the flow that travels downstream of Oxbow Power House. These decreases would occur during the winter rainy season, and would likely not substantially decrease flows in the river.

EWA acquisition of Placer County WA stored reservoir water would decrease flows in the Middle Fork of the American River compared to the basis of comparison while the reservoir refills during winter months. During the rainy season after December, Placer County WA would refill its reservoirs, which would decrease the flow that travels downstream of French Meadows, and Hell Hole Reservoirs.

Merced River

Montane Riverine Aquatic habitat occurs on the Merced River between approximately Merced Falls and Lake McClure.

EWA acquisition of Merced ID water via groundwater substitution would decrease Merced River summer flows and increase Merced River fall flows relative to the basis of comparison. Merced ID would hold the EWA transfer water in Lake McClure until the fall, when it would release the water downstream. This pattern would decrease flows downstream of New Exchequer Dam in the summer by a maximum of 70 cfs, but only for the short distance between New Exchequer Dam and Lake McSwain (the typical diversion point). EWA agency acquisition of Merced ID water via groundwater substitution would increase Merced River flows in fall relative to the basis of comparison as the water is released from Lake McClure. EWA agencies would monitor the releases to ensure that adverse effects do not occur, and institute changes to quantities of water released through adaptive management processes to avoid or minimize any adverse effect.

6.5.4 Conservation Measures

The conservation measure listed in Section 6.4.4 also applies to montane riverine aquatic habitat.

6.5.5 Contribution to Recovery

The EWA program would not contribute to the recovery of montane riverine aquatic habitats or associated Covered Species.

6.6 Lacustrine

Lacustrine habitat includes portions of permanent bodies of water that do not support emergent vegetation and that are not subject to tidal exchange, including lakes, ponds, oxbows, gravel pits, and flooded islands (MSCS 2000). Plankton, water willies, duckweed, pondweed, and smartweeds are the dominant vegetation for openwater lacustrine habitats. The majority of the lacustrine communities with the EWA Action Area are man-made reservoirs operated primarily for water supply management and energy production. For most of the reservoirs, water levels vary widely between the winter refill and summer usage seasons. When water levels are low, exposed shorelines (drawdown zones) are a common feature of lacustrine habitats, and include rocky, sandy, or silty substrates. Aside from ruderal species, these areas are usually devoid of vegetation because of the inundation/dessication cycle associated with fluctuating reservoir water levels. A wide variety of birds, mammals, reptiles, and amphibians use lacustrine habitats for reproduction, food, water, and cover.

6.6.1 Status in the Action Area

This ASIP assesses lacustrine communities that the EWA could affect; including the man-made lakes and reservoirs used to acquire or store EWA water assets. Within the Sacramento and San Joaquin River watersheds (that is, upstream of the Delta), the ASIP considered the following on-stream facilities:

- Lake Shasta (Sacramento River);
- Lake Oroville (Feather River);
- Little Grass Valley Reservoir (South Fork Feather River);
- Sly Creek Reservoir (Lost Creek/South Fork Feather River);
- New Bullards Bar Reservoir (North Fork Yuba River);
- French Meadows Reservoir (Middle Fork American River);
- Hell Hole Reservoir (Rubicon River/Middle Fork American River);
- Folsom Lake (American River);
- Lake McClure (Merced River); and
- Lake McSwain (Merced River).

Within the Export Service Area, the following off-stream facilities that may be involved in EWA asset storage or management actions are addressed in this ASIP:

- San Luis Reservoir (Central Valley);
- Andersen Reservoir (Santa Clara Valley);
- Castaic Lake (southern California);
- Lake Perris (southern California);
- Lake Mathews (southern California); and
- Diamond Valley Lake (southern California).

Historically, these reservoirs did not exist. Since the construction of reservoirs for flood protection and water storage, the acreage of artificial lacustrine habitat has increased dramatically, while the acreage of natural lacustrine environments has decreased due agriculture and urbanization. Although the current political climate may make it difficult for new reservoirs, there are plans for expansion of existing reservoirs and possibly new off-river storage facilities that could increase the acreage of lacustrine habitat in the future.

6.6.2 Effect Assessment Methods

Two EWA asset acquisition and management actions raise concerns for effects to lacustrine habitats. First, groundwater substitution that lowered the groundwater table could affect natural lacustrine habitat created by a high groundwater table. Because, the EWA agencies will use a well adequacy review, prior to groundwater substitution actions, that precludes the use of wells with a surface water interaction as a mitigation measure, groundwater to surface water effects are not addressed in this section.

Second, the other concern for EWA actions is the alteration of reservoir levels causing effects to the lacustrine community. Fluctuations in reservoirs levels, in response to day-to-day operations and changes in runoff patterns, can potentially affect vegetation that has been established at or near the water surface and within the drawdown zone. Vegetation that periodically grows within the drawdown zone or near the waters' edge is commonly inundated and lost during prolonged periods of high storage. Alternatively, plants that establish above the waters' edge during periods of high storage may be lost during periods of reduced reservoir storage or drought. Consequently, the vegetation that develops within the drawdown zone of these reservoirs is characterized by weedy, annual plant species, which do not provide high quality wildlife habitat. No Covered Species are known to be associated with vegetation of the drawdown zone of potentially affected reservoirs. Therefore, potential alterations in the timing and magnitude of reservoir drawdown would not likely affect Covered Species.

CVP and SWP Reservoirs (Shasta, Oroville, and Folsom Reservoirs)
The analysis of potential effects on lacustrine habitat associated with CVP and SWP reservoirs utilized the hydrologic modeling results. Appendix B, the Modeling Description, provides a discussion of the hydrologic modeling process and its application to the EWA program analysis, including 1) the primary assumptions and model inputs that represent hydrologic, regulatory, structural and operational conditions; and 2) the model simulations that helped derive effects.

Upstream of Delta Non-Project Reservoirs
Several non-Project reservoirs upstream of the Delta (Little Grass Valley, Sly Creek, New Bullards Bar, French Meadows, Hell Hole, Lake McClure) could sell water to the EWA agencies. Because the CVP and SWP do not manage these non-Project reservoirs, the CALSIM II hydrologic modeling simulations do not reflect these reservoir operations. Appendix B, the Modeling Description, describes the alternative methodology used to calculate changes in monthly operations based on historic water storage data. The effects analysis compares the changes in storage and elevation to the surrounding vegetation to determine if the reservoir changes would affect the lacustrine community.

6.6.3 Project Effects

Comparing EWA actions to the basis of comparison determines project effects. Reservoirs fluctuate seasonally in response to use and hydrology; therefore, this normal fluctuation creates the basis of comparison. EWA actions further modify these fluctuations, sometimes accentuating changes and other times attenuating changes in reservoir levels. Any change in reservoir level that could reduce the extent of riparian vegetation along the shore of the reservoir or populations of species inhabiting the shoreline environment would be significant. Chapter 9 presents the analyses of effects to fish populations inhabiting reservoir being used to store and manage EWA assets.

<u>Sacramento River</u>
EWA acquisition of Sacramento River contractor water via groundwater substitution and crop idling would change the timing of releases from Lake Shasta. Lake Shasta would hold back at most 68,900 acre-feet that would have been released under the basis of comparison. The lake level would decline faster in July and August compared to the basis of comparison; however, end of month elevation in September would be the same as the basis of comparison because of reduced releases during September (EWA EIS/EIR Figure 14-5). Lake Shasta elevation would be 1.1 feet lower in July, 0.5 of a foot lower in August, and equal to the basis of comparison in September. These small changes of less than 0.5 inches per day would not be enough to affect the lacustrine habitat within the lake or surrounding the lake perimeter. The water source for riparian vegetation will not be affected and the upland scrub vegetation surrounding the reservoir does not rely on the reservoir for its water source. Therefore, the change in Lake Shasta water surface elevation is not likely to adversely affect lacustrine habitat used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries along the water edge.

Feather River

EWA acquisition of Oroville-Wyandotte ID stored reservoir water would decrease surface water elevations from October until refill for Sly Creek and Little Grass Valley Reservoirs. Little Grass Valley and Sly Creek Reservoirs could release a combined maximum of 15,000 acre-feet of water from October to December (a maximum of 12,000 acre-feet from Little Grass Valley and a maximum of 5,000 acre-feet from Sly Creek Reservoir). Reservoir levels within Little Grass Valley would decrease approximately 12 feet because of the maximum potential release. Reservoir levels within Sly Creek Reservoir would decrease approximately 17 feet because of the maximum potential release. These reductions would not affect shoreline vegetation because this vegetation is not dependent upon reservoir levels for water (the shore-line vegetation is not riparian, it is associated with upland scrub that is not dependent on saturated soil for water). In addition, Sly Creek and Little Grass Valley reservoir water levels fluctuate seasonally and annually; therefore, the drawdown zone is vegetated primarily with non-native herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community and would not be affected by decreases in reservoir levels caused by EWA actions (CALFED 1998). Therefore, the EWA agencies' acquisition of Oroville-Wyandotte ID stored reservoir water is not likely to adversely affect lacustrine habitat of Sly Creek and Little Grass Valley reservoirs used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries.

EWA acquisition of Feather River contractor water via crop idling and groundwater substitution would increase the surface water elevation April to June and decrease the surface water elevation in July and August in Lake Oroville compared to the basis of comparison. EWA agencies would acquire 110,000 acre-feet through groundwater substitution and 126,550 acre-feet through crop idling. During April through June, Lake Oroville would hold back water that would have been released under the basis of comparison. By the end of June, the surface water elevation in the reservoir would be, at most, two feet higher than under basis of comparison (EWA EIS/EIR Figure 14-8). Increased releases in July and August as the stored EWA water is released for cross-Delta transfer would cause the lake level to decline faster compared to basis of comparison; however, reduced releases in September would allow end of month elevation in September to be the same as basis of comparison. The increase water surface elevation would result in increased flooding of shoreline habitat. The increased level would come slowly (less than an inch per day) so that wildlife would not be affected and riparian vegetation are accustomed to flooding and will not be adversely affected. Therefore, the change in Lake Oroville water surface elevation is not likely to adversely affect lacustrine habitat used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries along the shoreline.

Yuba River

EWA acquisition of Yuba County Water Agency stored reservoir water would decrease surface water elevations July to refill at New Bullards Bar Reservoir. EWA agencies would acquire up to 100,000 acre-feet by the end of September. The release of this water would

decrease reservoir surface water levels by approximately 24 feet. This reduction would not affect shoreline vegetation because this vegetation is not dependent upon reservoir levels for water (the shore-line vegetation is not riparian, it is associated with upland scrub that is not dependent on saturated soil for water). In addition, New Bullards Bar Reservoir water levels fluctuate seasonally and annually; therefore, the drawdown zone is vegetated primarily with non-native herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community and would not be affected by decreases in water levels caused by EWA actions (CALFED 1998). Therefore, the EWA agency acquisition of Yuba County Water Agency water is not likely to adversely affect lacustrine habitat of New Bullards Bar Reservoir used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries along the shoreline.

The EWA agencies and Yuba County WA could agree to transfer water under a multi-year contract. If full refill occurred, which it has for 85 percent of the past transfers, effects on vegetation and wildlife for subsequent years would be the same as described above. If full refill did not occur, Yuba County WA would consider selling less water the following year.

American River

EWA acquisition of Placer County Water Agency stored reservoir water would decrease surface water elevations June to refill at Hell Hole and/or French Meadows Reservoirs. Hell Hole Reservoir and French Meadows Reservoir would release a combined maximum of 20,000 acre-feet of water. The amount released from each reservoir would be at the discretion of Placer County Water Agency; however, this analysis assumes that releases would be in proportion to the sizes of the reservoirs (61 percent from Hell Hole, the remainder from French Meadows). Releases of reservoir water from French Meadows and Hell Hole could begin as early as June and end as late as October. For the purposes of this analysis, releases were assumed to take place between July and September. Using these assumptions, French Meadows would release 7,800 acre-feet, decreasing water surface levels by approximately eight feet. Hell Hole would release 12,200 acre-feet decreasing water surface levels by 14 feet. These reductions would not affect shoreline vegetation because this vegetation is not dependent upon reservoir levels for water. In addition, French Meadows and Hell Hole Reservoir water levels fluctuate seasonally and annually; therefore, the drawdown zones are vegetated primarily with non-native herbaceous plants and scattered willow shrubs that do not form a contiguous riparian community and would not be affected by decreases in reservoir levels caused by EWA actions (CALFED 1998). Therefore, the EWA agency acquisition of stored reservoir water and the decrease in surface water elevations at French Meadows and Hell Hole Reservoirs is not likely to adversely affect lacustrine habitat used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries along the shoreline.

EWA acquisition of Sacramento Groundwater Authority's water via stored groundwater purchase and Placer County WA's water via stored reservoir water would change surface water elevations in Folsom Lake. During July and August, the surface water elevation at Folsom Lake would be 0.8 of a foot lower than the basis of comparison. The lake level would decline faster in July and August compared to the basis of comparison; however, end of month elevation in September would be the same as the basis of comparison because of reduced releases during September (EWA EIS/EIR Figure 14-12). Therefore, the change in Folsom Lake surface water elevations is not likely to adversely affect lacustrine habitat used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries.

Merced River

EWA acquisition of Merced ID water via groundwater substitution would increase the water surface elevation in Lake McClure compared to the basis of comparison. EWA agencies could acquire 25,000 acre-feet through groundwater substitution. During April through September, Lake McClure would hold back water that would have been released under the basis of comparison. By the end of September, the surface water elevation in the reservoir would be, at most, three feet higher than under basis of comparison (EWA EIS/EIR Figure 14-13). This increase would occur slowly over the six-month period, less than 0.5 inches per day. The increase would not flood sensitive habitats or nesting areas. Therefore, the change in Lake McClure surface water elevations is not likely to adversely affect lacustrine habitat used by Covered Species or other wildlife, particularly as wildlife movement corridors or nurseries along the shoreline.

Source shifting of Anderson Reservoir would decrease the summer water surface elevation of the reservoirs. EWA agencies could acquire up to 20,000 acre-feet of source shifting capability via agreements with Santa Clara Valley Water District (WD). Source shifting would delay the water amounts that the SWP delivers to the Santa Clara Valley WD, which would cause the Santa Clara Valley WD to draw upon other sources of water in the interim period. The Santa Clara Valley WD would typically draw water from storage within Anderson Reservoir or temporarily reduce diversions to groundwater storage facilities. The water amounts drawn from each source would be at the discretion of Santa Clara Valley WD, but it would operate each facility within normal operating parameters. The levels of Anderson Reservoir currently vary widely year-to-year as part of normal Santa Clara Valley WD operations and EWA source shifting would occur within normal Santa Clara Valley WD operational parameters. Source shifting would not have adverse effects on lacustrine habitat at Anderson Reservoir.

EWA management of Santa Clara Valley WD water via predelivery could increase the surface water elevation in Anderson Reservoir in the months prior to the high point[1] in San Luis Reservoir. With the EWA, water would be transferred from San Luis Reservoir to Anderson Reservoir or groundwater storage facilities prior to the high point in San Luis Reservoir. Although the amount of water within Anderson Reservoir would increase compared to the basis of comparison, it would not exceed the existing drawdown zone (for flood control reasons) and inundate established shoreline habitats. Therefore, the effect on vegetation and wildlife would be less than significant.

Borrowing project water from San Luis Reservoir would decrease surface water elevations. Under basis of comparison, surface water elevations in San Luis Reservoir would begin to decrease in mid-April. At approximately 300,000 acre-feet, the "low-point problem" at San Luis Reservoir occurs, whereby warm-season algae growth and decreasing summer levels can affect the quality of the reservoir water. EWA actions would be managed to prevent contributing to or aggravating the low point problem. (See Figure 2-13, Section 2.4.2.3.2.) Therefore, the effect of borrowing project water on lacustrine habitat would be less than significant.

Source shifting by DWR at Metropolitan WD reservoirs would decrease the summer surface water elevation of the targeted reservoirs. Metropolitan WD has many options for source shifting. These options include:

- **Lake Mathews, Lake Perris, Castaic Lake, and Diamond Valley Lake.** Metropolitan WD could delay delivery of SWP water and instead draw its supplies from these storage facilities; accepting the SWP water deliveries at a later date.

- **Semitropic and Arvin Edison.** During wet years, Metropolitan WD could reduce deliveries when they would have otherwise SWP delivered water to storage. Metropolitan WD could then deliver SWP water to Semitropic and Arvin Edison for storage at a later date.

- **Hayfield (upstream aqueduct groundwater storage on the Colorado River).** Metropolitan WD could delay delivery of Colorado River water to Hayfield; the water would be delivered at a later date.

- **Change blend.** Metropolitan WD generally maximizes water sources and quality by blending Colorado River and SWP water 50:50. Metropolitan WD could change the blend to provide water for source shifting.

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[1] High point is the value at which storage has peaked annually. In San Luis Reservoir, high point occurs approximately in mid-April.

Lake Mathews
Because the vegetation surrounding Lake Mathews is not dependent upon reservoir water levels changes to water surface elevations is not likely to adversely affect lacustrine habtiat.

Lake Perris and Castaic Lake
Metropolitan WD has rights to flexible storage in Castaic Lake and Lake Perris allowing the agency to borrow water from the lakes for up to 5 years, subject to DWR approval. The flexible storage in Castaic Lake is 153,940 acre-feet and 65,000 acre–feet in Lake Perris. Metropolitan WD gained these rights as part of the Monterey Amendments[2], signed in 1995, and has exercised the right several times, including in 2001 as part of the source shifting agreement in that year. The amount of water that could be source shifted under the EWA would fall within the recent operating parameters of both Castaic Lake and Lake Perris.

Diamond Valley Lake
Because the vegetation surrounding Lake Mathews is not dependent upon reservoir water levels, changes to water surface elevations is not likely to adversely affect lacustrine habitat.

Metropolitan WD management of EWA water provided as predelivery could increase the surface water elevation in Diamond Valley Lake, Lake Mathews, and other Metropolitan WD storage facilities. If Metropolitan WD were to accept predelivery water and use it to repay its flexible storage debt in Castaic Lake or Lake Perris, predelivery could affect the surface water elevations in those lakes as well. With the EWA, water could be transferred to Metropolitan WD at any of its turnouts and then to storage in Diamond Valley Lake, Lake Mathews, or other Metropolitan WD storage facilities, or used to repay flexible storage in Castaic Lake or Lake Perris. Although the amount of water within these facilities would increase compared to the basis of comparison, water surface elevations would not exceed the existing drawdown zone (for flood control reasons) and inundate shoreline habitats. Therefore, the proposed action is not likely to adversely affect lacustrine habitat.

6.6.4 Conservation Measures

There are no conservation measures proposed for the Lacustrine Habitat Community. EWA actions are not likely to cause adverse effects on lacustrine habitats for the reservoirs and no conservation measures are necessary.

6.6.5 Contribution to Recovery

The EWA program would not contribute to the recovery of lacustrine habitats or associated Covered Species.

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[2] The Monterey Agreement, signed in 1994 by DWR and SWP water contractors, addresses water supply reliability problems, provides greater flexibility in water operations, and provides greater financial stability for SWP contractors.

6.7 Saline Emergent

Saline emergent (SE) habitat includes the portions of Suisun Bays and the Delta that support emergent wetland plant species that are tolerant of saline or brackish conditions within the intertidal zone or on lands that historically were subject to tidal exchange (diked wetlands) (MSCS 2000). The dominant vegetation for saline emergent habitats include cordgrass, pickleweed, and bulrush, glasswort, saltwort, saltgrass, arrowgrass, seablite, hairgrass, cattail, and algae. Wildlife species that use saline emergent habitats include ducks, herons, egrets, and hawks.

6.7.1 Status in the Action Area

Saline emergent wetlands were once continuous from San Francisco Bay into the western Delta. Saline emergent habitat also is found in low-elevation areas of the Central Valley where salts have accumulated and groundwater is near the surface. Most remnant tidal saline emergent wetlands are narrow bands along the margins of San Pablo Bay and Suisun Marsh and Bay. Extensive relict tidal marshes are associated with Cutoff Slough and eastern Hill Slough flank the Potrero Hills in the north-central Suisun Marsh and are especially unique in that there is a wetland continuum from tidal sloughs through low, middle, and high marsh zones and into adjacent uplands which are rich with associated vernal pools (ERPP 2000, page 133).

Land use changes over the past century have reduced the amount of saline emergent wetland habitat and fragmented what was once nearly contiguous habitat. In particular, diking of historic wetlands has substantially reduced the amount of tidally influenced saline emergent wetlands. Large areas of nontidal wetlands that were created largely by diking for reclamation are present in the Suisun Marsh and Bay areas (ERPP 2000, page 133).

6.7.2 Effect Assessment Methods

To assess effects to Delta habitats and associated Covered Species, long-term average flows in the Sacramento River at Freeport were evaluated under the proposed action during the March through October growing season and compared to those under the ESA environmental baseline (CCOMWP 1999). The frequency and magnitude of differences in monthly mean flows also were evaluated. In addition, fluctuations in water salinity were assessed by evaluating monthly mean values for X_2 position under the proposed action and compared to X_2 positions under the ESA environmental basis of comparison. If Delta habitats are affected by flow reductions and shifts in X_2 position, then a finding of the potential effects to covered species dependent on these habitats also was determined.

Table 6-2 provides a summary of effect indicators (parameters) and evaluation criteria developed for use in assessing potential adverse effects on the tidal perennial aquatic community and associated covered species that may result from implementation of EWA actions in the Delta. Potential effects on covered fish species associated with this community considered to be adverse if adverse effects were identified for the

community. Chapter 4 presents the overall assessment methodology for fish species in the Delta.

Table 6-2. Effect Indicators and Evaluation Criteria for Saline Emergent Community	
Saline Emergent Assessment Criteria	
Effect Indicator	Evaluation Criteria
Monthly mean flows (cfs) from March through October.	Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation in the lower Sacramento River and Delta for any month of this period over the 72-year period of record.
Position of X_2.	Upstream shift in the position of X_2, relative to the basis of comparison of sufficient magnitude (greater than 1 km) and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation of the Delta for any month of this period over the 72-year period of record.

6.7.3 Project Effects

The following text contains an analysis of potential direct and indirect effects to Delta NCCP communities, including Tidal Perennial Aquatic, Saline Emergent, and Tidal Freshwater Emergent habitats and associated covered species.

EWA acquisitions via groundwater substitution, crop idling, stored reservoir water purchase, stored groundwater purchase, and source shifting change the timing of Delta pumping operations, and have the potential to result in changes to Delta inflows and associated parameters. Potential changes in lower Sacramento River flows can result in changes in the position of X_2. Under the proposed action, long-term average flows in the lower Sacramento River at Freeport would be similar relative to the basis of comparison. Under the proposed action, the long-term average position of X_2 would be maintained through the use of carriage water releases and other EWA asset directed releases controlling X_2, relative to the basis of comparison.

In summary, changes to Delta inflows would not be of sufficient magnitude and frequency to significantly alter existing riparian and wetland habitat dependent of the Delta. Therefore, the proposed action is not likely to adversely affect saline emergent habitat. Under the proposed action, long-term average flows in the lower Sacramento River at Freeport would be similar relative to the basis of comparison. Under the proposed action, the long-term average position of X_2 would be maintained through the use of carriage water releases and other EWA asset directed releases controlling X_2, relative to the basis of comparison.

In summary, changes to Delta inflows would not be of sufficient magnitude and frequency to significantly alter existing riparian and wetland habitat dependent of the Delta. Therefore, the proposed action is not likely to adversely affect covered species associated with riparian and wetland habitats of the Delta.

6.7.4 Conservation Measures

Because there are no adverse effects on saline emergent habitat from EWA actions, no conservation measures are necessary.

6.7.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of saline emergent habitat or associated Covered Species.

6.8 Tidal Freshwater Emergent

Tidal freshwater emergent habitat includes portions of the intertidal zones of the Delta that support emergent wetland plant species that are not tolerant of saline or brackish conditions (MSCS 2000). The dominant vegetation for tidal freshwater emergent habitat includes big leaf sedge, bulrush, redroot nutgrass, tules, cattails, common reed, and water grass. The following rivers have developed tidal freshwater emergent habitats. Freshwater emergent wetlands are among the most productive wildlife habitats in California. They provide food, cover, and water for more than 160 species of birds and numerous mammals, reptiles, and amphibians (Kramer 2003).

6.8.1 Status in the Action Area

The functions of the Delta sloughs have been degraded severely over the years. Urban and industrial development has moved into areas adjacent to sloughs, destroying historic riparian habitat. Invasion and spread of non-native plant species, such as water hyacinth, reduced water quality, and reduced freshwater outflows have also historically contributed to degradation. Existing natural sloughs require protection and habitat improvement (ERPP 2000).

Midchannel islands and shoals have been shrinking or disappearing from progressive erosion of the remaining habitat. Major factors contributing to the loss of midchannel islands and shoals are gradual erosion from channels conveying water across the Delta to South Delta pumping plants, boat wakes, and dredging within the Delta or on adjacent waters. The Delta formerly supported broad expanses of tule marshes, riparian forests, and shallow-water habitats. Today, intensive agricultural production on levee-bounded islands has replaced most of these habitats (ERPP 2000).

6.8.2 Effect Assessment Methods

To assess effects to Delta habitats and associated Covered Species, long-term average flows in the Sacramento River at Freeport were evaluated under the proposed action during the March through October growing season and compared to those under the ESA environmental baseline (CCOMWP 1999). The frequency and magnitude of differences in monthly mean flows also were evaluated. In addition, fluctuations in water salinity were assessed by evaluating monthly mean values for X_2 position under the proposed action and compared to X_2 positions under the ESA environmental basis of comparison. If Delta habitats are affected by flow reductions and shifts in X_2

position, then a finding of the potential effects to covered species dependent on these habitats also was determined.

Table 6-3 provides a summary of effect indicators (parameters) and evaluation criteria developed for use in assessing potential adverse effects on the tidal perennial aquatic community and associated covered species that may result from implementation of EWA actions in the Delta. Potential effects on covered fish species associated with this community considered to be adverse if adverse effects were identified for the community. Chapter 4 presents the overall assessment methodology for fish species in the Delta.

Table 6-3. Effect Indicators and Evaluation Criteria for Tidal Freshwater Emergent Community

Tidal Freshwater Emergent Assessment Criteria	
Effect Indicator	Evaluation Criteria
Monthly mean flows (cfs) from March through October.	Decrease in flow, relative to the basis of comparison, of sufficient magnitude and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation in the lower Sacramento River and Delta for any month of this period over the 72-year period of record.
Position of X_2.	Upstream shift in the position of X_2, relative to the basis of comparison of sufficient magnitude (greater than 1 km) and frequency to adversely affect the growth, maintenance, and reproductive capacity of vegetation of the Delta for any month of this period over the 72-year period of record.

6.8.3 Project Effects

The following text contains an analysis of potential direct and indirect effects to Delta NCCP communities, including Tidal Perennial Aquatic, Saline Emergent, and Tidal Freshwater Emergent habitats and associated covered species.

EWA acquisitions via groundwater substitution, crop idling, stored reservoir water purchase, stored groundwater purchase, and source shifting change the timing of Delta pumping operations, and have the potential to result in changes to Delta inflows and associated parameters. Potential changes in lower Sacramento River flows can result in changes in the position of X_2. Under the proposed action, long-term average flows in the lower Sacramento River at Freeport would be similar relative to the basis of comparison. Under the proposed action, the long-term average position of X_2 would be maintained through the use of carriage water releases and other EWA asset directed releases controlling X_2, relative to the basis of comparison.

In summary, changes to Delta inflows would not be of sufficient magnitude and frequency to significantly alter existing riparian and wetland habitat dependent of the Delta. Therefore, the proposed action is not likely to adversely affect tidal freshwater emergent habitat. Under the proposed action, long-term average flows in the lower Sacramento River at Freeport would be similar relative to the basis of comparison. Under the proposed action, the long-term average position of X_2 would be maintained

through the use of carriage water releases and other EWA asset directed releases controlling X_2, relative to the basis of comparison.

In summary, changes to Delta inflows would not be of sufficient magnitude and frequency to significantly alter existing riparian and wetland habitat dependent of the Delta. Therefore, the proposed action is not likely to adversely affect covered species associated with riparian and wetland habitats of the Delta.

6.8.4 Conservation Measures

Because there are no adverse effects on tidal freshwater permanent emergent habitat from EWA actions, no conservation measures are necessary.

6.8.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of tidal freshwater permanent habitat or associated Covered Species.

6.9 Nontidal Freshwater Permanent Emergent

Nontidal freshwater permanent emergent (NFPE) includes permanent (natural and managed) wetlands, including meadows, dominated by wetland plant species that are not tolerant of saline or brackish conditions (MSCS 2000). Vegetation and wildlife for nontidal freshwater permanent emergent habitats are essentially the same as for tidal freshwater emergent habitats. Freshwater emergent wetlands are among the most productive wildlife habitats in California. They provide food, cover, and water for more than 160 species of birds and numerous mammals, reptiles, and amphibians (Kramer 2003).

6.9.1 Status in the Action Area

Over the past 150 years, more than 300,000 acres of fresh emergent wetlands have been lost in the Sacramento-San Joaquin Delta Ecological Management Zone. Less than 15,000 acres remain (ERPP 2000, page 140). Prior to the mid-1800s, extensive areas of fresh emergent habitat occurred throughout the Central Valley, particularly in the Delta. A complex network of rivers, sloughs, and channels connected low islands and basins that supported a diverse and dense variety of freshwater emergent vegetation. This freshwater emergent vegetation supported a diversity of fish and wildlife species and ecological functions (ERPP 2000, page 140).

Vast areas of the Sacramento-San Joaquin Valley were commonly flooded in winter by a slow-moving blanket of silt-laden water. Flood control activities and land settlements in the late 1800s and early 1900s led to the development of leveed Delta islands. Levees and other land uses led to the loss of fresh emergent wetlands in the Delta. Loss of wetlands has substantially reduced habitat for wetland wildlife species in the Bay-Delta system. Fresh emergent wetland losses have also substantially reduced the area available for the biological conversion of nutrients in the Delta. The Delta contains insufficient wetland area to provide adequate levels of nutrient

transformation, which results in lower quality water in San Francisco Bay (ERPP 2000, page 140).

6.9.2 Effect Assessment Methods

The methods of assessing effects to the Nontidal Freshwater Permanent Emergent habitat are the same as for the Tidal Freshwater Emergent (Section 6.8.2) with the following exception. Some Nontidal Freshwater Permanent Emergent habitat may be the result of an elevated groundwater table. The lowering of the water table as part of groundwater substitution could affect this habitat. A well adequacy review to preclude groundwater to surface water interactions will occur prior to all groundwater actions to prevent this effect.

6.9.3 Project Effects

No adverse effects are predicted for this habitat within the Delta based on the analyses provided in Section 6.8.3. The well adequacy review will prevent adverse effects to the habitat within the Sacramento and San Joaquin valleys.

6.9.4 Conservation Measures

Wetlands often depend on surface water-groundwater interactions for part or all of their water supply. The following environmental measures would ensure effects on these communities from groundwater substitution actions are avoided or minimized.

- **A Well Adequacy Review.** Before groundwater substitution actions the hydrogeologic conditions of wells used to transfer EWA water will be examined to minimize the potential risk of depleting surface water sources and adversely affecting associated vegetation; and

- **A Monitoring Program.** The Project Agencies will implement a monitoring program that will provide data to determine if direct or indirect effects exist.

6.9.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of nontidal freshwater permanent habitat or associated Covered Species.

6.10 Natural Seasonal Wetland

Natural seasonal wetland habitat includes vernal pools and other nonmanaged seasonal wetlands with natural hydrologic conditions that are dominated by herbaceous vegetation and that annually pond surface water or maintain saturated soils at the ground surface for enough of the year to support facultative or obligate wetland plant species. Alkaline and saline seasonal wetlands that were not historically part of a tidal regime are included in natural seasonal wetlands (MSCS 2000). Dominant natural seasonal wetland vegetation includes big leaf sedge, bulrush, and redroot nutgrass. Examples of special-status plant species associated with natural seasonal wetland habitats include Alkali milk-vetch, Crampton's

tuctoria, Colusa grass, Bogg's lake hedge-hyssop, legenere, Hoover's spurge, Butte County meadowfoam, Greene's tuctoria, slender orcutt grass, hairy orcutt grass.

6.10.1 Status in the Action Area

Historically, seasonal wetlands occurred throughout the Central Valley. The extent and quality of seasonal wetlands has declined because of cumulative effects of many factors involving agriculture and urban developments, lowering of groundwater tables, land reclamation, and flood control projects. Existing wetland regulations have been in effect for several years in an attempt to prevent the further loss of seasonal wetlands. The protected status of wetlands has resulted in an extensive permitting process for construction in wetland areas. Mitigation measures have been developed to offset loss of existing wetlands as a result of construction activities. These efforts have slowed the rate of wetland loss in many areas. Large-scale efforts in areas such as the Suisun Marsh, Grasslands Resource Conservation District, Yolo Bypass, and Butte Sink have been successful in maintaining and restoring seasonal wetlands (ERPP 2000, page 147).

6.10.2 Effect Assessment Methods

Due to the strong groundwater/surface water interaction that create Natural Seasonal Wetlands, any EWA groundwater substitution action that lowered the groundwater table would be considered to have significant adverse effects on this community. The specific locations in the Sacramento and San Joaquin valleys where groundwater substitution and groundwater purchase could occur are not currently identified and can vary year to year based on EWA water acquisition strategies. Therefore, the effect of the EWA water acquisitions can only be assessed in a qualitative sense. The concern for the two acquisition strategies is that under groundwater pumping (either substitution or purchase) where there is direct connection between groundwater and surface water, that groundwater pumping would affect the hydrology (lower the groundwater table) thereby drying up the natural wetland. As a conservation measure, the EWA agencies will revue all groundwater substitution and acquisition proposals to ensure that there is no direct groundwater to surface water connection for any pumping action. The conservation measure includes a mitigation response (e.g., cease pumping or provide alternative surface water source) should the condition arise that a direct groundwater to surface water interaction has occurred.

6.10.3 Project Effects

EWA acquisition of water via groundwater substitution transfers in the Upstream from the Delta Region could lower groundwater levels. As a part of groundwater substitution transfers, the willing sellers would use groundwater to irrigate crops and decrease use of surface water. Pumping additional groundwater would decrease groundwater levels in the vicinity of the sellers' pumps. Some areas of Natural Seasonal Wetland habitat have groundwater as a source of water, and decreasing groundwater levels could reduce the water base for these habitats.

Chapter 6 of the EWA EIS/EIR, Groundwater Resources, analyzes in detail how groundwater substitution transfers could affect groundwater levels and surrounding beneficial users, including the environment. The section concludes that these effects could be potentially significant, and requires several measures. These measures would require monitoring to identify if any effects are occurring, and implementation of additional measures by the seller if any effects should occur. The additional mitigation steps could be cessation of pumping or use of a replacement water source for the affected area. Because the mitigation involves monitoring and the effect may only be determined after the drying of a habitat is observed, groundwater substitution has the potential for an adverse effect on natural seasonal wetlands. The degree of that effect will be dependent on how soon the effect is noted and the response by the willing seller to mitigate that effect. Implementation of conservation measures in Section 6.10.4 will reduce this effect to a less-than-significant level.

6.10.4 Conservation Measures

The conservation measure listed in Section 6.9.4 also applies to Natural Seasonal Wetlands.

6.10.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of natural seasonal wetland habitat or associated Covered Species.

6.11 Managed Seasonal Wetland

Managed seasonal wetland habitat includes wetlands dominated by native or non-native herbaceous plants, excluding croplands farmed for profit (e.g., corn and rice), that land managers flood and drain during specific periods to enhance habitat values for specific wildlife species. Ditches and drains associated with managed seasonal wetlands are included in this habitat type (MSCS 2000). Vegetation and wildlife species associated with managed seasonal wetland habitats are similar to those associated with natural seasonal wetland habitats, with the exception of vernal pool species.

6.11.1 Status in the Action Area

Historically, managed seasonal wetlands did not occur in the Sacramento and San Joaquin valleys. All managed seasonal wetlands now are a result of agricultural practices and the management of water flows for wildlife (waterfowl gun clubs and wildlife refuges). The extent and quality of managed seasonal wetlands varies based on the practices that create and maintain this type of habitat. For the EWA Action Area, this habitat includes all agricultural ditches that support wetland species and return flows used by land managers to support wetlands. The action area includes all locations where crop idling and groundwater substitution can occur in the Sacramento and San Joaquin valleys.

6.11.2 Effect Assessment Methods

The EWA agencies have not identified the specific locations in the Sacramento and San Joaquin valleys where crop idling and groundwater substitution transfers could occur because they can vary year to year based on the location of willing sellers and EWA water acquisition strategies. Therefore, the following section assesses the effect of the EWA water acquisitions in a qualitative sense.

To determine if groundwater substitution transfers affect water in ditches, the analysis qualitatively examines the process that water agencies would use to sell water to the EWA to determine if this process could decrease the water available to managed seasonal wetlands. For crop idling, return flows may decrease if water farmers idle lands that are upstream of managed seasonal wetlands. The analysis qualitatively examines the likelihood that crop idling would reduce flows within agricultural ditches, and compares the locations of ditches with decreased flows to wetlands that receive water from the same sources.

6.11.3 Project Effects

Two EWA water acquisition actions could have adverse effects (dry up) managed seasonal wetlands. These include groundwater substitution and crop idling. Both actions could result in less water in agriculture supply and return flow ditches, potentially resulting in the drying up of managed seasonal wetlands. The specific locations of where EWA agencies would acquire water through groundwater substitution or crop idling are not known. Therefore, this effect can only be addressed in a qualitative sense. Conservation measures (below) would be used as part of water acquisitions to prevent loss of managed seasonal wetlands.

6.11.3.1 Groundwater Substitution Transfers in the Sacramento Valley

Groundwater substitution transfers would decrease flows in agricultural delivery ditches. When water agencies agree to sell water to the EWA agencies through groundwater substitution transfers, the agencies help to identify willing sellers within each area. The sellers then forgo their surface water supplies and substitute groundwater. This change results in less diversion into the agricultural delivery system, which could affect species within the delivery ditches. This decrease is likely to adversely affect the species and vegetation that depend on this flow. The conservation measures in Section 6.11.4 would minimize these effects on species.

6.11.3.2 Crop Idling Transfers

The effects of crop idling transfers on managed seasonal wetlands depend on the location of the transfers. The following section is divided by river system to fully explain these potential effects.

Sacramento River

EWA acquisition of water via crop idling would reduce the water supply for managed seasonal wetlands that rely on return flows from fields that would be idled. Glenn, Colusa, and Yolo Counties could idle up to 47,980 acres. The EWA would purchase approximately 3.3 acre-feet per acre (the amount of water consumed by the crop); however, under the basis of comparison, water agencies divert additional water from the Sacramento River to account for system losses. System losses include conveyance losses (evaporation or percolation within the conveyance system), riparian evapotranspiration (water used by vegetation along the conveyance system), and on-farm losses (deep percolation to groundwater or tailwater runoff). The amount of water diverted varies depending on the amount of system losses.

If farmers idled their crops, their water agency would reduce diversions by the 3.3 acre-feet per acre plus the additional amount that goes to on-farm losses. Of this additional amount that is applied to fields in the basis of comparison, a portion percolates into the groundwater aquifer below and a portion runs off the field back into the conveyance system. This "tailwater" that runs back into the conveyance system could then be used again by managed wetlands downstream on the conveyance system. If farmers idled land, tailwater would no longer be available to downstream users, either other farmers or managed wetlands.

Few managed seasonal wetlands exist downstream of the water agencies that may sell water to the EWA via crop idling. These wetlands, however, have the potential to be adversely affected by the reduction in return flows. The conservation measures in Section 6.11.4 would reduce effects to managed seasonal wetlands.

Feather River

EWA acquisition of water via crop idling would reduce the water supply for managed seasonal wetlands that rely on the return flows from fields that would be idled. Butte and Sutter Counties could idle up to 38, 340 acres. As described above for the Sacramento River, idling these fields would reduce tailwater, which could reduce supplies to downstream wetlands. Several of the agencies within Butte and Sutter Counties discharge return flows from the irrigation systems into Butte Creek, which provides water for several managed seasonal wetlands. The reduction in return flows has the potential to adversely affect these managed seasonal wetlands. The conservation measures in Section 6.9.4 would reduce effects to managed seasonal wetlands.

American River

EWA acquisition of water via crop idling would reduce the water supply for managed seasonal wetlands that rely on return flows from fields that would be idled. Placer County could idle up to 3,280 acres. As described above for the Sacramento River, idling these fields would reduce tailwater, which could reduce supplies to downstream wetlands. The reduction in return flows has the potential to adversely affect managed seasonal wetlands. The conservation measures in Section 6.9.4 would reduce effects to managed seasonal wetlands.

6.11.4 Conservation Measures

The conservation measure listed in Section 6.9.4 also applies to Natural Seasonal Wetlands. Additionally, landowners with managed seasonal wetland communities often depend upon agricultural return flows for part or all of their water supply. The following environmental measure would ensure effects on this wetland community would be avoided or minimized.

- As a part of the contractual agreements, the EWA agencies will require the willing seller of water for crop idling to maintain their drainage systems at a water level that would maintain existing wetlands providing habitat to covered species. As part of monitoring program to ensure compliance with the contractual requirements, EWA agencies will periodically verify that the seller is adhering to the agreement and that no effects are occurring.

6.11.5 Contribution to Recovery

The EWA program would not contribute to the recovery of managed seasonal wetland habitats or associated Covered Species.

6.12 Valley/Foothill Riparian

Valley/foothill riparian habitat includes all successional stages of woody vegetation within the active and historical floodplains of low-gradient reaches of streams and rivers generally below an elevation of 300 feet (MSCS 2000). Valley/Foothill Riparian habitat is dominated by a cottonwood, sycamore, alder, ash, and valley oak tree overstory and a blackberry, poison oak, and wild grape understory. In California over 225 species of birds, mammals, reptiles, and amphibians depend on riparian habitats, and cottonwood-willow riparian areas support more breeding avian species than any other comparable broad California habitat type (Merced River Corridor Restoration Plan 2002 and Sacramento River Advisory Council 2001).

6.12.1 Status in the Action Area

Historically, the Central Valley floor had approximately 922,000 acres of riparian vegetation supported by a watershed of more than 40,000 square miles. Today, approximately 100,000 acres of riparian forest remain. About half of this riparian habitat is in a highly degraded condition, representing a decline of 90 percent. The Sacramento River once supported 500,000 acres of riparian forest; it now supports 10,000 - 15,000 acres, or just 2 - 3 percent of historic levels. From about 1850 to the turn of the century, most of the forest was destroyed for fuel as a result of the Gold Rush and river navigation, and by large-scale agricultural clearing (ERPP 2000, page 152).

Additional clearing in early and mid 1900s coincided with the aftermath of flood control reservoir and levee projects. These projects allowed ongoing clearing of floodplain riparian stands for orchards, crops, flood bypasses, levee construction, and urban areas. Similar patterns occurred along the San Joaquin River, which was also greatly affected when major portions of the river were dried up following

construction of Friant Dam and other large reservoirs in the San Joaquin Basin. Resulting major changes in river flow conditions and sediment deposits triggered channel instability, and downcutting of rivers and streams that caused additional riparian and riverine habitat loss and fragmentation (ERPP 2000, page 152).

6.12.2 Effect Assessment Methods

The effect assessment methods for this community are the same as for Valley Riverine Aquatic (Section 6.4.2)

6.12.3 Project Effects

The project effects conclusions for this community are the same as for Valley Riverine Aquatic (Section 6.4.3) EWA actions may be likely to affect, but with the incorporation of the conservation measure in 6.12.4, are not likely to adversely affect Valley Riparian habitat.

6.12.4 Conservation Measures

The conservation measure proposed for Valley Riverine Aquatic habitat (Section 6.4.4) will also apply to Valley/Foothill Riparian.

6.12.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of Valley/Foothill Riparian habitat or associated Covered Species.

6.13 Montane Riparian

Montane riparian habitat includes all successional stages of woody vegetation within the active floodplains of moderate-to-high-gradient reaches of streams and rivers generally above an elevation of 300 feet (MSCS 2000). Montane Riparian habitat vegetation is dominated by cottonwood (black and Fremont [at lower altitudes]), white alder, big leaf maple, dogwood, box elder, quaking aspen, wild azalea, water birch, and buttonwillow trees. As with valley/foothill riparian habitat, numerous wildlife species depend on montane riparian habitat.

6.13.1 Status in the Action Area

Montane riparian habitats are found in the Klamath, Coast, and Cascade ranges and in the Sierra Nevada south to about Kern and northern Santa Barbara usually below 8,000 feet. Montane riparian habitat also occurs in the Peninsular and Transverse ranges of southern California from about southern Santa Barbara to San Diego counties. This habitat has been in decline because of dams, mining, and forestry practices, particularly during the last century.

6.13.2 Effect Assessment Methods

The effect assessment methods for this community are the same as for Montane Riverine Aquatic (Section 6.5.2)

6.13.3 Project Effects

The project effects conclusions for this community are the same as for Montane Riverine Aquatic (Section 6.5.3)

6.13.4 Conservation Measures

The conservation measure proposed for Valley Riverine Aquatic habitat (Section 6.4.4) will also apply to Montane Riparian.

6.13.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of Montane Riparian habitat or associated Covered Species.

6.14 Upland Cropland

Upland cropland habitat includes agricultural lands farmed for grain field, truck, and other crops for profit that are not seasonally flooded (MSCS 2000). Upland cropland vegetation is dominated by cereal rye, barley, wheat, corn, dry beans, safflower, alfalfa, cotton, tomatoes, lettuce, Bermuda grass, ryegrass, tall fescue, almonds, walnuts, peaches, plums, and grapes. Wildlife use of these areas varies throughout the growing season with crop type, level of disturbance, and available cover. Orchard and vineyard typically support resident species, such as scrub jay, northern mockingbird, yellow-billed magpie, American crow, and northern flicker. During the winter orchard habitats provide foraging habitat and roosting sites for many songbirds species including the white-crowned sparrow, dark-eyed junco, golden-crowned sparrow, lesser goldfinch, and yellow-rumped warbler. Species associated with field and row crops include the red-winged blackbird, European starling, western meadowlark, California vole, black-tailed jackrabbit, western harvest mouse, Botta's pocket gopher, raccoon, striped skunk, and Virginia opossum. Croplands provide foraging habitat for many raptors including the northern harrier, red-tailed hawk, and white-tailed kite. Cotton crops are of limited value to wildlife.

6.14.1 Status in the Action Area

Prior to settlement of the valleys by Europeans, there was no agricultural practice in the valley other than the gathering of native vegetation. Following extensive native habitats loss in the Central Valley to agricultural and urban lands, some wildlife species have adapted to the artificial wetland and upland environments created by some agricultural practices. Once adapted, species became dependent on these agricultural areas to sustain their populations (ERPP 2000, page 176).

6.14.2 Effect Assessment Methods

The effect assessment methods for this community were based on the relative value of a particular crop as wildlife habitat and forage. The EWA agencies propose to purchase water that would have been used to irrigate cotton farmland. This would idle the land resulting in bare fields. Neither the cotton land nor bare field would

provide for significant wildlife habitat. Dust suppression plans may involve the use of a substitute crop providing some wildlife value. However, the growing of substitute crops will not be an EWA water acquisition requirement and is thus not factored into the effects analysis. However, given that cotton land provides extremely marginal habitat and forage, no assessment of this habitat was performed.

6.14.3 Project Effects

Given that cotton land provides extremely marginal habitat and forage to wildlife, no adverse effects due to crop idling are predicted.

6.14.4 Conservation Measures

No conservation measures are proposed for this community.

6.14.5 Contribution to Recovery

The EWA program is not expected to contribute to the recovery of Upland Cropland.

6.15 Seasonally Flooded Agricultural Land

Seasonally flooded agricultural (SFA) land habitat includes agricultural lands farmed for profit with grain, rice, field, truck, and other crops that require seasonal flooding for at least 1 week at a time as a management practice (e.g., for pest control and irrigation) or are purposely flooded seasonally to enhance habitat values for specific wildlife species (e.g., ducks for duck clubs). Agricultural ditches and drains associated with maintaining seasonally flooded agricultural land are included in this habitat type (MSCS 2000).

EWA actions include crop idling of rice and cotton. For the purposes of the EWA ASIP, SFA consists of rice land, which landowners flood during the summer months to grow rice as a crop. The farmers then drain the fields in the fall to harvest the rice. Farmers reflood some fields during the winter to decompose the rice stubble and then drain them again in the spring so they can be prepared for growing rice. A number of bird species use the flooded fields for resting (cover), forage, and nesting in the summer and as winter forage and resting habitat for migrating birds. Flooded rice fields also comprise an important habitat for the threatened giant garter snake.

6.15.1 Status in the Action Area

For the EWA Action Area, the EWA agencies may purchase water from crop idling of rice fields in the Sacramento Valley (Butte, Colusa, Glenn, Placer, Sutter, and Yolo counties). These counties typically harvest a total of 496,820 acres of rice (USDA, 1997), although farmers would idle only a fraction of this acreage for EWA actions. Historically these areas would most likely have been permanent and seasonal wetlands. Since the cultivation of rice in the Sacramento Valley began, the current acreage of rice grown and harvested fluctuates, but remains relatively high.

6.15.2 Effect Assessment Methods

Potential effects on Covered Species associated with SFA were determined based on an analysis of changes in the amount of habitat and forage provided by rice fields within each county having water agencies that potentially would sell water to EWA agencies.

6.15.2.1 Changes in Habitat Availability

This SFA effects analysis addresses water acquisitions that would result in the maximum potential quantities available from crop idling. The SFA effect analysis includes the following steps:

- Derivation of the acquisition quantity for each county by the evapotranspiration of applied water[3] to determine the amount of idled acreage required to obtain the acquisition amount;
- Comparing the total acreage required for EWA crop idling to the amount in the rice land in the 1997 Agricultural Census data to obtain the change in rice acreage per county; and
- Calculating the absolute and relative change in rice habitat availability using the changes in rice acreage numbers.

The analysis presents change in rice habitat availability both as an absolute quantity (number of acres) and relative value (percent of rice acreage).

6.15.2.2 Changes in Forage Availability

Waste grain remaining after rice harvest serves as a food resource for wildlife species, including the Covered Species associated with rice fields identified in Table 5-2. Consequently, changes in the amount of rice acreage would change the availability of forage for Covered Species associated with rice fields. Each acre of rice provides approximately 300 to 350 pounds per acre (lbs/ac) of waste grain (Brouder and Hill 1995). Although newer technologies used for harvesting generate less waste grain per acre, this analysis uses 350 lbs/acre to provide a conservative estimate for the amount of waste grain lost due to rice idling (Brouder and Hill 1995). This analysis presents the total amount of waste grain lost due to rice idling for each county, and expressed as an absolute quantity (lbs) and relative value (percent of forage provided by rice in the county).

Rice fields also provide approximately 250 lbs/ac of other food (not waste rice grain), which is comprised primarily of invertebrates (Brouder and Hill 1995). This analysis assumed that some plant species (weeds and other plant species that could colonize

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[3] The Evapotranspiration of Applied Water (ETAW) represents the amount of applied water that is used by the crop for evapotranspiration. This number is defined in Section 2, Program Description, and is approximately 3.3 acre-feet per acre for rice.

idled fields) and invertebrates would still be available in idled fields, and that crop idling would not substantially reduce this food source. Accordingly, potential effects on other food available to wildlife species were considered to be insignificant and are not further analyzed in this section.

6.15.2.3 Habitat Fragmentation

A decrease in the availability of SFA under the EWA program has the potential to contribute to fragmentation and isolation of wetland habitats within an individual county on a temporary basis. Because the EWA is a program, and the specific fields where idling will occur cannot be predicted and will change from year to year, the degree of fragmentation within a county cannot be quantified. In addition, EWA program crop idling actions are dependent upon hydrologic year type and more than likely will not occur every year. Consequently, this section does not include an analysis of habitat fragmentation and isolation. Potential temporary fragmentation and isolation effects, however, will be avoided through crop idling conservation measures. Specifically, the EWA agencies will minimize crop idling in adjacent fields within each county.

6.15.3 Project Effects

Crop idling would reduce the rice acreage in the Sacramento Valley. Table 6-4 displays seasonally flooded agriculture (SFA) acreage and waste grain reduction for the maximum acreage of crop idling anticipated for all counties where idling action could occur for the EWA program. These numbers reflect the maximum water transfers (for all water programs acquiring water through crop idling) based on the project limitation of 20% maximum crop acreage idled per county. Idling this acreage would reduce the extent of habitat available to those Covered Species dependent upon SFA for some portion of their lifecycle (identified with an * in Table 5-2), which is likely to adversely affect those species. Section 6.15.4 proposes conservation measures to help minimize any adverse effects to Covered Species.

Table 6-4 also displays the reduction in the availability of waste grain as forage to wildlife by county and total for all crop idling actions (depending on agricultural practices). This amount represents a potentially adverse effect to those Covered Species dependent upon waste grain for a large portion of their forage (identified with an * in Table 5-2). Conservation measures proposed in Section 6.14.4 help to minimize any adverse effects to Covered Species.

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[4] The Evapotranspiration of Applied Water (ETAW) represents the amount of applied water that is used by the crop for evapotranspiration. This number is defined in Section 2, Program Description, and is approximately 3.3 acre-feet per acre for rice.

Table 6-4. Seasonally Flooded Agriculture Acreage and Waste Grain Reductions in Each County Based on Crop Idling Maximum Purchases under the Proposed Action

	Rice Acreage (97 Ag Census) (AC)	Idled Acreage (AC)	Percent Rice Acreage (%)	Waste Grain per Acre (lbs)	Total Waste Grain (million lbs)	Waste Grain Loss (million lbs)	Percent Waste Grain Loss (%)	Total Acre-Feet of Water Available for EWA Fish Actions (TAF)	Potential Square Miles Idled
Butte	95,120	19,000	20%	350	33.3	6.6	20%	62.7	30
Colusa	132,338	26,460	20%	350	46.3	9.2	20%	87.3	41
Glenn	83,777	16,750	20%	350	29.3	5.7	20%	55.2	26
Placer	16,379	3,280	20%	350	5.7	1.1	20%	10.8	5
Sutter	96,722	19,340	20%	350	33.9	6.8	20%	63.8	30
Yolo	23,822	4,770	20%	350	8.3	1.7	20%	15.7	7
Total	448,158	89,608	20%	350	156.9	31.1	20	295.7	140

Associated with the idling of SFA is the potential loss of water within adjacent irrigation and return ditches in all 6 counties. EWA water would not enter water agencies' distribution systems because it is no longer being delivered to the agricultural users, and unused flows from the fields would not return to the delivery system. These changes have the potential to reduce flow in these ditches, thereby reducing the value of habitat provided. Some irrigation ditches provide forage, resting, and nesting habitat and serve as migration corridors. Devaluing or losing this habitat could affect giant garter snakes, herons, egrets, western pond turtles, etc. This decrease to water in agricultural ditches is potentially an adverse effect to these Covered Species. Conservation measures proposed in Section 6.2.4 help to minimize any adverse effects to Covered Species.

Associated with the idling of SFA is the potential for fragmentation of seasonally flooded agriculture land habitat. Assuming the maximum acreage is fallowed (20% of rice within each county), a total of 140 square miles of formerly flooded land would be dry in all 6 counties over the late spring, summer, and early fall months. This effect would be significant if it occurred as one contiguous block of SFA. The idled land would have the potential to interfere with wildlife migration and the dispersal of individuals within a metapopulation (hence a loss of genetic diversity). The inability of a snake to migrate to more suitable habitat would potentially be an adverse effect to this Covered Species, especially those populations that are succumbing to other population pressures. Conservation measures proposed in Section 6.2.4 help to minimize any adverse effects to Covered Species.

6.15.4 Conservation Measures

Conservation measures for seasonally flooded agricultural lands are provided for the giant garter snake.

6.15.5 Contribution to Recovery

EWA crop idling of rice land actions are considered to be temporary. Conservation measures will minimize effects on this habitat during the temporary EWA agency water acquisition actions. EWA water acquisition and management actions will not lead to the recovery of species inhabiting seasonally flooded agriculture habitat.

6.16 Anadromous Fish Species Community

The Anadromous fish species addressed in this ASIP are the Sacramento River winter-run Chinook salmon, Central Valley fall-/late-fall-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and Central California Coast steelhead evolutionary significant units (ESUs); and green sturgeon. Associated habitat types for these species are tidal perennial aquatic, valley riverine aquatic, montane riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent. Seasonal changes in flows and changes in reservoir water surface elevations could potentially affect these fish species. The MSCS conservation goal is to substantially increase extent and quality of populations and habitat.

For the purposes of this ASIP, the anadromous fish community is essentially the fish species addressed in Chapter 4. The reader is referred to that chapter for a discussion on the effect assessment methodology, effects, and conservation measures related to the fish species.

6.17 Estuarine Fish Species Community

Estuarine fish species addressed in this ASIP are the tidewater goby, Delta smelt, longfin smelt, Sacramento splittail, and Sacramento perch. Associated habitat types for these species are tidal perennial aquatic, valley riverine aquatic, lacustrine, saline emergent, and tidal freshwater emergent. Seasonal changes in flows could potentially affect these fish species. The MSCS conservation goal is to substantially increase extent and quality of populations and habitat.

For the purposes of this ASIP, the estuarine fish community is essentially the fish species addressed in Chapter 4. The reader is referred to that chapter for a discussion on the effect assessment methodology, effects, and conservation measures related to the fish species.