

SAIC Draft Work Product

BDCP Natural Community Biological Goals and Objectives

[Note to Reviewers: The information presented in this handout includes descriptions of the approach to and information supporting the establishment of natural community biological goals and objectives. This information will be disaggregated and placed into the appropriate corresponding sections of Chapter 3, Conservation Strategy. Acreage numbers for objectives are presented on where SC has identified such, proposed acreage numbers for objectives will be provided to SC in later drafts of goals and objectives.]

The Bay Delta Conservation Plan is being developed in the context of other regional conservation plans that have either been approved or are under development. The BDCP participants recognize the need for close coordination with the sponsors of surrounding regional conservation plans to ensure compatibility between planning efforts and advance effective regional conservation outcomes. The fish and wildlife agencies and other BDCP participants have met on an ongoing basis with the sponsors of these adjacent and overlapping conservation planning programs to identify issues of mutual interest and potential areas for long-term collaboration.

The draft BDCP biological goals and objectives for non-tidal natural communities and covered wildlife and plant species presented in this document have been presented for consideration by the Steering Committee. To work effectively with the surrounding conservation planning programs to coordinate conservation actions and future implementation, the BDCP participants will develop a well-described conservation strategy, consistent with the requirements of the NCCPA and the ESA. The following guidance will help further discussions with the surrounding conservation planning participants on how best to coordinate development of the BDCP conservation strategy with the surrounding local plans.

Introduction

This handout presents draft biological goals and objectives for the BDCP natural communities. Natural community goals and objectives have been revised and expanded from those presented in the July 2009 Draft Chapter 3, *Conservation Strategy* to ensure that they address the habitat-related needs of the covered wildlife and plant species and other native species dependent on the Planning Area habitats. As described in Section 3.3.1 of Chapter 3, the biological goals and objectives are organized hierarchically on the basis of the following ecological scale:

- **Ecosystem Goals and Objectives.** Ecosystem goals and objectives are focused on improvements to the overall condition of hydrological, physical, chemical, and biological processes in the Delta in support of achieving goals and objectives for natural communities and covered species.
- **Natural Community Goals and Objectives.** Natural community goals and objectives are focused on maintaining or enhancing ecological functions and values of natural communities. Achieving natural community goals and

objectives also serve to conserve habitat of associated covered species and other native species.

- **Species-Specific Goals and Objectives.** Species-specific goals and objectives address species-specific stressors and habitat needs that are not addressed under the higher order ecosystem and natural community goals and objectives and, for the covered fish species, species-specific viability parameters as they relate to life stage occurrence of covered fish species in the Delta.

Approach to Developing Draft Natural Community Goals and Objectives

Natural community goals and objectives were developed to address the following conservation approaches:

- protecting each natural community in quantities and locations that contribute to the conservation of associated covered and other native species,
- maintaining and enhancing the habitat functions and values supported by protected habitats to provide for sustaining and increasing the abundance and distribution of associated covered and other native species; and
- restoring natural communities to increase the extent and availability of covered and other native species habitats to accommodate increases in abundance and distribution.

Information used to develop the draft natural community goals and objectives included:

- Current spatial distribution and extent of each natural community within the BDCP Planning Area, Suisun Marsh, and the portion of the Yolo Bypass extending from upstream of the Planning Area to the Fremont Weir (hereafter collectively referred to as the Evaluation Area; see Figure 1);
- Preliminary estimates of the extent of each natural community that could be affected with implementation of BDCP covered activities and conservation measures;
- Condition of habitat functions and values supported by existing patches of natural communities;
- Function of existing patches natural communities as habitat corridors supporting the movement of covered and other native wildlife among habitat areas inside and outside of the Evaluation Area;
- Spatial distribution of patches of natural communities relative to existing protected habitat areas;
- The spatial distribution covered species habitats within the Evaluation Area and distribution of known occurrences of covered species; and
- The habitat-related conservation needs of covered and other native species within and adjacent to the Evaluation Area.

Each natural community supports habitat for multiple species and multiple natural communities may provide the same habitat functions for a particular covered species. For example, grassland supports foraging habitat for the Swainson's hawk and breeding and foraging habitat for the western burrowing owl. Agricultural lands also support foraging habitat for these species. Consequently, conservation of foraging habitat for these species can be accomplished by protecting, enhancing, and/or restoring a specified quantity of either natural community or a combination thereof. The strategy for conservation of natural communities, therefore, is predicated on being able to contribute to the conservation of each covered species through conserving an appropriately distributed mix of natural communities such that all of the Evaluation Area-dependent life history requirements for each covered species are provided for into the future. The natural communities that support habitat for each of the covered species by general life history requirement are presented in Table 1.

Conservation Zones and Restoration Opportunity Areas (ROAs)

The BDCP has established seven ROAs within the Evaluation Area within which tidal perennial aquatic, tidal mudflat, tidal brackish emergent, and tidal freshwater emergent communities will be restored. These ROAs delineate specific portions of the Evaluation Area that support physical characteristics (e.g., land surface elevations) that render them suitable for restoration of tidal communities. To address conservation of natural communities that cannot be exclusively accommodated within the ROAs, the Evaluation Area was subdivided into 10 Conservation Zones (inclusive of the ROAs) within which conservation objectives for non-tidal natural communities are established (see Figure 1). Conservation Zones were delineated based conservation opportunities afforded by different geographic locations. Criteria used to establish each Conservation Zone included:

- Distribution of covered species within and adjacent to the Planning Area;
- Distribution of natural communities supporting covered species habitats;
- Differences in the condition of covered species habitats supported by natural communities in different portions of the Planning Area;
- Locations of barriers to covered species movement among habitats; and
- Connectivity with existing habitat areas adjacent to the Planning Area.

The existing extent of each natural community within each Conservation Zone is presented in Table 2. The distribution of each natural community, except tidal mudflat, by Conservation Zone is shown in Figures 2 to 13.¹

Coordination with Overlapping and Adjacent HCP/NCCPs

Several Delta counties (Yolo, Solano, Sacramento, Contra Costa, and San Joaquin) have developed or are in the process of developing regional HCPs and NCCPs that are

¹ The tidal mudflat community is not delineated within the BDCP GIS land cover data base. Existing tidal mudflats are subsumed within the delineated extend of tidal brackish and freshwater emergent wetland and tidal perennial aquatic communities.

intended to address many of the proposed BDCP natural communities and covered wildlife and plant species (see Figure 14). Because these other regional plans are focused on terrestrial biological resources, the BDCP conservation strategy for terrestrial natural communities and covered wildlife and plant species is designed to complement and support the conservation strategies of these overlapping and adjacent conservation plans. BDCP biological goals and objectives for these resources are intended to be consistent, to the extent appropriate, with these plans. The BDCP Management Entity will coordinate during BDCP implementation with the conservation planning authorities of these surrounding counties to ensure that implementation of BDCP conservation measures complement and support the implementation of those other plans.

Natural Community Goals and Objectives

Tidal Perennial Aquatic Community

Conservation Approach

The overall biological goals for the tidal perennial aquatic natural community are designed to restore functional shallow subtidal aquatic habitat (i.e., tidally influenced areas of open water that are less than 9 feet below MLLW) in conjunction with restored tidal mudflat, brackish and freshwater marsh plain, and transitional upland habitats such that the historical gradient of habitats extending from the tidal pelagic zone to uplands is reestablished. This approach will increase shallow subtidal aquatic habitat area for associated covered and other native species, provide for the restoration of tidal marsh plain and space for future upslope establishment of tidal marsh to accommodate sea level rise, provide upland refugia for marsh wildlife during flood events, provide for the production of nutrients and food in support of the aquatic food web, and promote native biodiversity.

Tidal Perennial Aquatic Community Restoration

Shallow subtidal aquatic habitat will be restored in the Cache Slough, Cosumnes/Mokelumne, East, South, West Delta, and Suisun Marsh ROAs (see Figure). Methods and considerations for selecting restoration sites and restoring tidal perennial aquatic communities are described in conservation measure HRCM16 in Section 3.4.2.

Tidal Perennial Aquatic Community Enhancement and Management

Existing tidal channels that are currently present in sites acquired to restore tidal marsh will be incorporated into the design and management of restored marshes. BDCP restored shallow subtidal aquatic habitats will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain their intended habitat functions over the term of the BDCP (e.g., control of non-native aquatic vegetation and predators). Enhancement and management of existing and restored shallow subtidal aquatic habitats will be fully integrated with enhancement of

contiguous restored tidal marsh plain, tidal mudflat, grassland, and valley/foothill riparian communities to ensure that environmental gradients, desired habitat functions and mosaics, and native biodiversity are maintained.

Species Benefits

Tidal perennial aquatic communities in the Delta and Suisun Marsh provide habitat for many native fish and wildlife species (e.g., waterfowl, gulls and terns, wading birds, aquatic mammals), including habitat for the giant garter snake, western pond turtle, delta smelt, longfin smelt, Chinook salmon (all runs), Central Valley steelhead, Sacramento splittail, green sturgeon, white sturgeon, river lamprey, and Pacific lamprey) that are covered under the BDCP. Restoring shallow subtidal aquatic habitat will increase the spatial extent and distribution of habitat available to associated covered and other native fish and wildlife species and will increase the diversity and complexity of the mosaic of habitats supported in the Delta and Suisun Marsh.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Fremont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures are not anticipated to remove tidal perennial aquatic communities, but proposed water operations are expected to affect the existing hydrologic, hydrodynamic, and salinity conditions and tidal ranges. Construction and maintenance associated with implementation of the covered activities and conservation measures could also result in temporary disturbances to channel substrates and banks that could result in temporary localized changes in turbidity and water quality. Results of hydrodynamic modeling of hypothetical marsh restoration scenarios indicate that the tidal range would dampen as tidal marsh restoration projects are implemented. BDCP proposes to restore 65,000 acres of tidal marsh, comprised of a mosaic of tidal marsh plain, shallow subtidal aquatic and transitional upland habitats. To contribute to the conservation of the tidal perennial aquatic community, BDCP estimates that the shallow subtidal aquatic habitat component of restored tidal marsh will range between about 24,900 and 31,600 acres. The actual extent of restored habitat will depend on site-specific tidal marsh restoration designs and will be expected to change over time with effects of sea level rise and evolution of tidal channels.

Biological Goals and Objectives

[Note to Reviewers: Biological goals and objectives for the tidal perennial aquatic natural community only address community restoration and subsequent management of restored tidal perennial aquatic habitats. Biological objectives under ecosystem goals ECSY1-5 address conservation of the hydrologic, hydrodynamic, biological, and water quality components of existing tidal perennial aquatic communities.]

Goal TANC1: Restore or create tidal perennial aquatic communities that support habitats for covered and other native species and that support aquatic food web processes.

Problem Statement: The historical functions of tidal perennial aquatic communities of the Delta have been substantially reduced from historical conditions. Increasing the extent of functioning shallow subtidal aquatic habitat area will increase the availability of habitat for various life stages of dependent aquatic organisms and open-water associated wildlife species and will produce aquatic foods for these species.

Covered Species Benefiting: Giant garter snake, western pond turtle, delta Smelt, longfin smelt, Sacramento splittail, all runs of Chinook salmon, Central Valley steelhead, green sturgeon, and white sturgeon.

Objective TANC1.1: Restore an estimated 24,900 to 31,600 acres shallow subtidal aquatic habitat within the BDCP ROAs that supports habitat for covered and other native species and aquatic food web processes within 40 years of BDCP implementation in accordance with the BDCP implementation schedule for tidal marsh restoration presented in Chapter 6, *BDCP Implementation*.

Objective TANC1.2: Maintain and improve the habitat functions of BDCP restored shallow subtidal aquatic habitats for covered fish and other native aquatic species over the term of the BDCP.

Tidal Mudflat Community

Conservation Approach

The overall biological goals for the tidal mudflat natural community are designed to restore functional tidal mudflat habitat in conjunction with restoration of shallow subtidal aquatic habitat, brackish and freshwater marsh plain, and transitional upland habitats such that the historical gradient of habitats extending from the tidal pelagic zone to uplands is reestablished. Tidal mudflat habitat is expected to establish between extreme low water and marsh plain elevations in restored marshes. This approach will increase tidal mudflat habitat area for associated covered and other native species, provide space for future upslope establishment of tidal marsh to accommodate sea level rise, provide upland refugia for marsh wildlife during flood events, provide for the production of nutrients and food in support of the aquatic food web, and promote native biodiversity.

Tidal Mudflat Community Restoration

Tidal mudflats are expected to become established as a component of tidal marshes restored in the Cache Slough, Cosumnes/Mokelumne, East, South, West Delta, and Suisun Marsh ROAs. Methods and considerations for selecting restoration sites and restoring tidal marshes are described in conservation measure HRCM16 in Section 3.4.2.

Tidal Mudflat Community Enhancement and Management

Existing tidal mudflats that are currently present in sites acquired to restore tidal marsh will be incorporated into the design and management of restored tidal marshes. The BDCP restored tidal mudflat component of restored tidal marshes will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain their intended habitat functions over the term of the BDCP (e.g., control of non-native invasive vegetation). Enhancement and management of existing and restored tidal mudflat habitats will be fully integrated with enhancement of contiguous conserved shallow subtidal, tidal marsh plain, grassland, and valley/foothill riparian communities to ensure that environmental gradients, desired habitat functions and mosaics, and native biodiversity are maintained.

Species Benefits

Tidal mudflat habitats in the Delta and Suisun Marsh provide habitat for many native wildlife species (e.g., waterfowl, gulls and terns, wading birds, shorebirds), including habitat for colonization and establishment of delta tule pea, Mason's lilaeopsis, and delta mudwort. Restoring tidal mudflat habitat will increase the spatial extent and distribution of habitat available to associated covered and other native wildlife species and will increase the diversity and complexity of the mosaic of habitats supported in the Delta and Suisun Marsh.

Effects of BDCP Implementation

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Restoration of tidal marsh are expected to remove narrow linear patches of existing tidal mudflat that are present along the outboard margins of existing levees and dikes that are

removed to reintroduce tidal exchange. Changes in local patterns of scour and deposition associated with changes in local hydrodynamics resulting from restoration of tidal marshes could also alter the extent and distribution of tidal mudflats. To restore tidal mudflats and contribute to its conservation, the BDCP will restore or create 3,675-4,825 acres of tidal brackish marsh and 13,295-21,645 acres of tidal freshwater marsh that are expected to support tidal mudflats that are proportionately similar in extent and patchiness as existing tidal marshes in the Evaluation Area. Tidal mudflats are expected to become established at the interface between restored tidal marsh plain and shallow subtidal habitat at tidal elevational zones observed elsewhere in the Bay-Delta.

The extent of tidal mudflat that would be restored is driven by many factors (e.g., sediment loads, local hydrodynamic conditions, site-specific bathymetry) that are not well understood at this time. Consequently, the extent of tidal mudflat that will develop over the term of the BDCP cannot be predicted. The extent of tidal mudflat that does establish at each tidal marsh restoration site is also expected to change over time as restored tidal marshes evolve (e.g., sedimentation, channel development, local hydrodynamic conditions, establishment of marsh vegetation, effects of sea level rise).

Biological Goals and Objectives

Goal MFNC1: Restore tidal mudflats to provide foraging habitat for shorebirds and wading birds and to provide substrates suitable for the natural establishment of covered tidal plant species.

Problem Statement: The extent of tidal mudflats within the Delta and Suisun Marsh have been substantially reduced with construction of levees and resultant channelization of Delta waterways, and conversion of historically tidal marshes to agricultural and other uses. This reduction in tidal mudflats has reduced the availability of foraging habitats that support shorebird migrations in the Pacific Flyway and has reduced the extent of silty substrates at the interface of openwater and vegetated tidal marsh that support habitat for delta tule pea, Mason's lilaepsis, and delta mudwort. Restoration of tidal brackish and freshwater marsh is expected to increase the extent of tidal mudflat that will provide habitat for migrant and breeding shorebirds and intertidal covered plant species.

Covered Species Benefiting: Delta tule pea, Mason's lilaepsis, and delta mudwort.

Objective MFNC1.1: Restore tidal mudflats as a component of BDCP restored tidal brackish and freshwater marshes. Tidal marsh (brackish and fresh) would be restored in accordance with the habitat BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective MFNC1.2: Control the establishment of non-native vegetation on BDCP restored mudflats over the term of the BDCP to support habitat and food production for associated covered and other native species.

Tidal Brackish Emergent Wetland Community

Conservation Approach

The overall biological goals for the tidal marsh brackish emergent wetland natural community are designed to restore functional tidal brackish marsh in conjunction with restored shallow subtidal aquatic and transitional upland habitats such that the historical gradient of habitats extending from the tidal pelagic zone to uplands is reestablished. This approach will increase habitat area for associated covered and other native species, provide space for future upslope establishment of tidal brackish marsh to accommodate sea level rise, provide upland refugia for marsh wildlife during flood events, provide for the production of nutrients and food in support of the aquatic food web, and promote native biodiversity.

Tidal Brackish Emergent wetland community Restoration

Tidal brackish marsh will be restored in the Suisun Marsh ROA, which is positioned in the area of the Bay-Delta estuary that provides the range of salinities that support tidal brackish marsh vegetation. Patches of existing tidal brackish marsh that may currently be present in sites acquired to restore tidal brackish marsh will be incorporated into the design and management of restored marshes. Restored tidal freshwater marsh to be restored in the West Delta ROA could convert to tidal brackish marsh in the future with sufficient sea level rise resulting from movement of the estuary's current low salinity zone eastward. Methods and considerations for selecting restoration sites and restoring tidal brackish emergent wetland communities are described in conservation measure HRCM16 in Section 3.4.2.

Tidal Brackish Emergent wetland community Enhancement and Management

Patches of existing tidal brackish emergent communities that are currently present in sites acquired to restore tidal brackish marsh will be incorporated into the design and management of restored marshes. BDCP restored tidal brackish marshes will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain and enhance their intended habitat functions over the term of the BDCP (e.g., control of non-native vegetation and predators). Enhancement and management of restored tidal brackish marshes will be fully integrated with enhancement of contiguous conserved tidal perennial aquatic, tidal mudflat, grassland, and valley/foothill riparian communities to ensure that environmental gradients, desired habitat functions and mosaics, and native biodiversity are maintained.

Species Benefits

Tidal brackish emergent wetland communities in Suisun Marsh provide habitat for many native wildlife species (e.g., waterfowl, shorebirds, wading birds, small mammals), including habitat for the salt marsh harvest mouse, Suisun shrew, Suisun song sparrow, California black rail, California clapper rail, white-tailed kite (foraging), and western pond turtle that are covered under the BDCP. Restoring tidal brackish marsh will

increase the spatial extent and distribution of habitat available to associated covered and other native wildlife and will increase the diversity and complexity of the mosaic of habitats supported in Suisun Marsh.

Effects of BDCP Implementation

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Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of some patches of existing tidal brackish marshes primarily as a result of restoring tidal brackish marsh habitat. Results of hydrodynamic modeling of hypothetical marsh restoration scenarios indicate that the tidal range would dampen as tidal marsh restoration projects are implemented. Dampening of the tidal range may result in either desiccating or inundating patches of existing tidal brackish marsh. BDCP implementation could remove approximately 2,000 acres of tidal brackish marsh. BDCP proposes to restore 65,000 acres of tidal marsh, comprised of a mosaic of tidal marsh plain, shallow subtidal aquatic, and transitional upland habitats. BDCP proposes to restore at least 7,000 acres of brackish tidal marsh in the Suisun Marsh ROA that will contribute to the conservation of the tidal brackish emergent wetland community and associated covered species.

Biological Goals and Objectives

Goal BMNC1: Restore or create tidal brackish emergent wetlands that support habitats for covered and other native species and to support aquatic food web processes.

Problem Statement: Substantial reduction in the extent, distribution, and condition of historical tidal brackish marshes that surrounded the periphery of Suisun Bay has reduced the extent and diversity of tidal brackish habitats for associated covered and other native plant and wildlife species. Restoring tidal brackish marsh habitats along a gradient extending from shallow subtidal aquatic to upland transitional habitats is expected, along with BDCP conservation of other natural communities, to increase the abundance and distribution of associated native wildlife and plant species, improve connectivity among habitat areas within Suisun Marsh and Suisun Bay, and contribute to the long-term conservation of tidal brackish marsh-associated covered species.

Covered Species Benefiting: Salt marsh harvest mouse, Suisun shrew, Suisun song sparrow, California black rail, California clapper rail, white-tailed kite (foraging), and western pond turtle.

Objective BMNC1.1: Restore at least 7,000 acres of tidal brackish emergent wetlands in the Suisun Marsh ROA that support habitats for covered and other native species and to support aquatic food web processes within 40 years of BDCP implementation in accordance with the tidal marsh (brackish and freshwater) BDCP restoration implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective BMNC1.2: Maintain and improve the habitat and ecosystem functions of BDCP restored tidal brackish marshes over the term of the BDCP.

Tidal Freshwater Emergent Wetland Community

Conservation Approach

The overall biological goals for the tidal freshwater emergent wetland natural community are designed to restore functional freshwater tidal marsh in conjunction with restored shallow subtidal aquatic, tidal mudflat, and transitional upland habitats such that the historical gradient of habitats extending from the tidal pelagic zone to uplands is reestablished. Implementation of the approach outlined below will increase habitat area for associated covered and other native species, provide space for future upslope establishment of tidal freshwater marsh to accommodate sea level rise, provide upland refugia for marsh wildlife during flood events, provide for the production of nutrients and food in support of the aquatic food web, and promote native biodiversity.

Tidal freshwater Emergent wetland community Restoration

Tidal freshwater marsh will be restored in the Cache Slough, Cosumnes/Mokelumne, East, South, and West Delta ROAs, which are positioned in the area of the Bay-Delta estuary with low salinities that support tidal freshwater marsh vegetation. Patches of existing tidal freshwater marsh that may currently be present in sites acquired to restore tidal brackish marsh will be incorporated into the design and management of restored marshes. Restored tidal freshwater marsh to be restored in the West Delta ROA could convert to tidal brackish marsh in the future with sufficient sea level rise resulting from movement of the estuary's current low salinity zone eastward. Methods and considerations for selecting restoration sites and restoring tidal freshwater emergent wetland communities are described in conservation measure HRCM16 in Section 3.4.2.

Tidal Freshwater Emergent wetland community Enhancement and Management

Patches of existing tidal freshwater emergent communities that are currently present in sites that are acquired to restore tidal freshwater marsh will be incorporated into the design and management of restored marshes. BDCP restored tidal freshwater marshes

will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain and enhance their intended habitat functions over the term of the BDCP (e.g., control of non-native vegetation and predators). Enhancement and management of restored tidal freshwater marshes will be fully integrated with enhancement of contiguous conserved tidal perennial aquatic, tidal mudflat, grassland, and valley/foothill riparian communities to ensure that environmental gradients, desired habitat functions and mosaics, and native biodiversity are maintained.

Species Benefits

Tidal freshwater emergent wetland communities provide habitat for many native wildlife species (e.g., waterfowl, shorebirds, wading birds, small mammals), including habitat for the tricolored blackbird, California black rail, white-tailed kite (foraging), giant garter snake, and western pond turtle that are covered under the BDCP. Restoring tidal freshwater marsh will increase the spatial extent and distribution of habitat available to associated covered and other native wildlife and will increase the diversity and complexity of the mosaic of habitats supported in the Delta.

Effects of BDCP Implementation

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Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of some patches of existing tidal freshwater marshes primarily as a result of restoring tidal freshwater marsh habitat. Results of hydrodynamic modeling of hypothetical marsh restoration scenarios indicate that the tidal range would dampen as tidal marsh restoration projects are implemented. Dampening of the tidal range may result in either desiccating or inundating patches of existing tidal freshwater marsh. BDCP implementation could remove approximately 200 acres of tidal freshwater marsh. BDCP proposes to restore 65,000 acres of tidal marsh, comprised of a mosaic of tidal marsh plain, shallow subtidal aquatic, and transitional upland habitats. BDCP proposes to restore at least 15,000 acres of brackish tidal marsh in the Planning Area ROAs that will contribute to the conservation of the tidal freshwater emergent wetland community and associated covered species. Smaller quantities of freshwater marsh vegetation may also be restored along Delta channel margins as a component of channel margin restoration actions (see conservation measure HRCM##).

Biological Goals and Objectives

Goal FMNC1: Restore or create tidal freshwater emergent wetlands that support habitats for covered and other native species and to support aquatic food web processes.

Problem Statement: Substantial reduction in the extent, distribution, and condition of tidal freshwater marshes that historically covered most of the Delta has reduced the extent and diversity of tidal freshwater habitats for associated covered and other native plant and wildlife species. Restoring tidal freshwater marsh habitats along a gradient extending from shallow subtidal aquatic to upland transitional habitats is expected, along with BDCP conservation of other natural communities, to increase the abundance and distribution of associated native wildlife and plant species, improve connectivity among habitat areas within the Planning Area and Suisun Bay, and contribute to the long-term conservation of tidal freshwater marsh-associated covered species.

Covered Species Benefiting: Tricolored blackbird, California black rail, white-tailed kite (foraging), giant garter snake, and western pond turtle.

Objective FMNC1.1: Restore at least 15,000 acres of tidal freshwater emergent wetlands that support habitats for covered and other native species and to support aquatic food web processes in the Cache Slough, Cosumnes/Mokelumne, East, West, and South Delta ROAs within 40 years of BDCP implementation in accordance with the tidal marsh (brackish and freshwater) BDCP restoration implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective FMNC1.2: Maintain and improve the habitat and ecosystem functions of BDCP restored tidal freshwater marshes over the term of the BDCP.

Valley/Foothill Riparian Community

Conservation Approach

The overall biological goals for the valley/foothill riparian natural community are designed to protect, enhance, and restore functional riparian habitats that support associated covered and other native species and promote native biodiversity. Valley/foothill riparian habitats will be restored to improve connectivity among natural habitats within and adjacent to the Planning Area and Suisun Marsh and to provide additional habitat for riparian-dependent species. Most conservation and restoration of riparian habitats is anticipated to occur in conjunction with restoration of tidal marsh and seasonally inundated floodplain habitats. Conditions suitable for the establishment of valley/foothill riparian communities are expected to occur along the edge of restored tidal marsh above the extreme high water elevation; along natural levees of currently disconnected tidal channel banks that would be reconnected following restoration of tidal marshes; on restored seasonally inundated floodplains and channels within restored

seasonally inundated floodplain habitat areas; and in conjunction with restored channel margin habitats where soil and hydrologic conditions that support establishment of riparian vegetation exist. This approach is intended to mimic the historical landscape position of valley/foothill riparian communities and ecological gradients extending from aquatic to terrestrial communities in the Delta and Suisun Marsh.

Valley/Foothill Riparian Restoration

The spatial distribution of restored valley/foothill riparian habitats is broadly defined by locations within the Planning Area and Suisun Marsh that are suitable for achieving tidal marsh, seasonally inundated floodplain, and channel margin habitat restoration (see descriptions of conservation measures HRCM1/2, HRCM16, HRCM##, and HRCM11/14 in Section 3.4.2). Methods and considerations for restoring valley/foothill riparian habitats are described in conservation measure HRCM11/14 in Section 3.4.2.

Valley/Foothill Enhancement and Management

Patches of existing valley/foothill riparian habitat that are likely to be present on some BDCP lands acquired to conserve other natural communities (e.g., BDCP preserved grassland and agricultural lands may include existing patches of valley/foothill riparian habitat) will be protected and managed to enhance their habitat functions and values for covered and other native species. Presence of riparian habitat will be a criterion used by the Management Entity to evaluate parcels under consideration for acquisition to achieve conservation objectives for other natural communities.

The Management Entity will assess the habitat functions and values of existing patches of valley/foothill riparian within the BDCP preserve system to determine if they are degraded and in need of management actions to improve their habitat functions and values (e.g., low relative cover of native plant species, land uses that limit habitat extent, adjacent land uses that limit use by native wildlife species). The Management Entity will undertake management actions to enhance the function of degraded valley/foothill riparian habitats using appropriate site-specific methods. Enhancement methods, frequencies, and intensities of application will be informed by pre-acquisition assessments, assessments of existing habitat functions, and targeted studies. Site-specific implementation documents (e.g. preserve management plans) will be prepared during implementation after land is acquired and specific restoration and management needs are determined. Preserve management plans will be approved by wildlife agencies before implementation.

BDCP restored valley/foothill riparian habitats will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain their intended habitat functions over the term of the BDCP (e.g., control of non-native vegetation and predators).

Species Benefits

Valley/foothill riparian communities in the Planning Area and Suisun Marsh provide habitat for many native wildlife species (e.g., neotropical migrant birds, deer, skunks, raccoon, raptors), including habitat for the yellow-breasted chat and nesting habitat for Swainson's hawk and white-tailed kite that are covered under the BDCP. Restoring valley/foothill riparian habitats will increase the spatial extent and distribution of habitat available to associated covered and other native wildlife and will increase the diversity and complexity of the mosaic of habitats supported in the Planning Area.

Effects of BDCP Implementation

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Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of patches of existing valley/foothill riparian habitat. BDCP implementation could remove approximately 1,100 acres of valley/foothill riparian . BDCP proposes to restore at least 5,000 acres of riparian forest and scrub in the Planning Area and Suisun Marsh that will contribute to the conservation of the Valley/foothill riparian community and associated covered species.

Biological Goals and Objectives

Goal VRNC1: Restore or create riparian forest and scrub in locations with supporting hydrology to improve native biodiversity and provide habitat for covered and other native species.

Problem Statement: Substantial reduction in the extent, distribution, and condition of Valley/foothill riparian communities that historically occurred along the upper elevational margins of the Delta and along natural levees along Delta and Suisun Marsh channels has reduced the extent and diversity of valley/foothill riparian habitats for associated covered and other native plant and wildlife species. Restoring Valley/foothill riparian habitats to establish a more natural ecological gradient extending from shallow subtidal aquatic to upland transitional habitats is expected, along with BDCP conservation of other natural communities, to increase the abundance and distribution of associated native wildlife and plant species, improve connectivity among habitat areas within and adjacent to the Planning Area and Suisun Bay, improve genetic interchange among native riparian-associated species' populations, and contribute to the long-term conservation of riparian-associated covered species.

Covered Species Benefiting: Yellow-breasted chat, Swainson's hawk (nesting), white-tailed kite (nesting), and valley elderberry longhorn beetle.

Objective VRNC1.1: Restore or create at least [] acres of riparian forest and scrub in the Cache Slough ROA within 40 years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective VRNC1.2: Restore or create at least [] acres of riparian forest and scrub in the East Delta ROA and/or Cosumnes/Mokelumne ROA within 40 years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective VRNC1.3: Restore or create at least [] acres of riparian forest and scrub in Conservation Zone 6 within 40 years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective VRNC1.4: Restore or create at least [] acres of riparian forest and scrub in the Suisun Marsh ROA within 40 years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Goal VRNC2: Maintain and enhance the habitat functions of restored riparian forest and scrub and existing patches of riparian forest and scrub that are present on BDCP preserve lands to support native biodiversity and habitat conditions for covered and other native species.

Problem Statement: Isolated patches of Valley/foothill riparian habitats are expected to be protected as part of habitat acquisitions to protect other BDCP natural communities. Habitat functions and values supported by atches of protected Valley/foothill riparian habitats may be degraded and the expected habitat functions and values supported by restored riparian habitats may become degraded over time (e.g., establishment of non-native plant species). Under taking management actions to enhance existing patches of protected riparian habitat and maintaining the habitat functions and values of restored riparian habitat over time is expected to help ensure that biological objectives for the Valley/foothill riparian communities and associated covered species are achieved.

Covered Species Benefiting: Yellow-breasted chat, Swainson's hawk (nesting), white-tailed kite (nesting), and valley elderberry longhorn beetle.

Objective VRNC2.1: Enhance habitat functions and values of BDCP protected and restored riparian forest and scrub for covered species and other native wildlife species.

Grassland Community

Conservation Approach

The overall biological goals for grasslands are to protect, enhance, and restore functional grassland communities that benefit covered species and promote native biodiversity. Protection and enhancement will be focused on patches of existing grassland that support high habitat functions and values for covered and other native species.² It is anticipated that protection and enhancement of high value grasslands can be accommodated in conjunction with achieving BDCP goals and objectives for conserving alkali seasonal wetland complex and vernal pool complex natural communities. Grasslands will be restored to improve connectivity while providing additional habitat for native grassland-dependent species. Some conservation and restoration of grasslands will occur in conjunction with tidal marsh habitat restoration objectives, where conservation of transitional upland habitat can contribute to achieving BDCP tidal brackish and freshwater marsh restoration design objectives for reestablishing the natural gradient from aquatic to terrestrial communities. Grassland conservation will also meet some of the same covered species needs provided by agricultural lands, potentially reducing the need to focus conservation efforts on agricultural community type.

Grassland Community Protection

In determining the aerial extent and spatial configuration of grasslands to be protected, the following process was employed: assessment of habitat quality of the grasslands that currently exist within the planning area; spatial and functional needs of covered grassland species; estimation of impact on grasslands resulting from implementation of the BDCP; and review and consideration of the objectives of approved and planned HCP/NCCP that overlap or adjacent to the BDCP Planning Area.

To identify the extent and distribution of existing grasslands to be protected, the value of existing grassland communities as habitat for covered and other native species in the Planning Area were evaluated using the following criteria. To what degree under reasonable management would protection the patch of grassland:

- provide benefits for multiple covered species?
- protect uncommon site specific attributes (e.g., soil types) required by covered species with narrow range of habitat requirements?
- contribute to maintaining local and regional ecological processes?
- support connectivity between/among existing protected habitat areas?
- protect or allow for re-establishment of natural environmental gradients?
- contribute to establishment of large preserve areas?.
- be resilient to climate change?

² Inclusions of lower value patches of grassland are also expected to be protected incidental to protection of other natural communities; such patches of protected grassland however, do not contribute towards achieving the grassland protection objectives.

- complement the habitat functions and values of supported by adjoining natural communities for covered and other native species?
- support or contribute to supporting in conjunction with protection of other habitats a heterogeneous mix of natural communities and native species, including native grasses?
- be achieved in conjunction with other BDCP natural community conservation actions?, and
- be complementary with achieving biological objectives for approved and planned HCPs and NCCPs overlapping or adjacent to the Planning Area?

A substantial amount of high value grassland is currently in protected status within the BDCP planning area that is not expected to be adversely affected with implementation of the BDCP. Creation of tidal wetlands in the Cache Slough and Suisun Marsh ROAs will provide opportunities to protect existing high value grasslands by establishing across-community connectivity, conserving natural gradients, and accommodating ecological and physical process changes, especially those related to climate change.

Consideration for protection of grassland communities will be given to lands that meet the preserve design criteria and acquisitions will be further prioritized by the Management Entity based on the potential to contribute towards achieving the biological goals and objectives established for other natural communities. Higher priority will be placed on lands that are adjacent to existing or restored tidal marshes, grasslands that support vernal pools or alkali seasonal wetlands; and grasslands that include large patches of native grasses and forbs. Specific protection targets, however, are not established for patches of native grasses because they intergrade with dominant patches of nonnative grasses and are generally not well documented in the Planning Area and Suisun Marsh.

Grassland Enhancement and Management

The Management Entity will assess the habitat functions of protected grasslands to determine if they are degraded and in need of management actions to improve their habitat functions (e.g., low relative cover of native plant species). The Management Entity will undertake management actions to enhance the function of degraded grassland habitats using appropriate site-specific methods. Enhancement methods, frequencies, and intensities of application will be informed by pre-acquisition assessments, assessments of existing habitat functions, and targeted studies. Site-specific implementation documents (e.g. preserve management plans) will be prepared in coordination with DFG and USFWS during implementation after land is acquired and specific restoration and management needs are determined.

Grassland communities in the planning area are mosaics of many vegetation alliances. There is uncertainty about the proper management regime necessary to enhance each grassland type. The management regime necessary to maintain a desirable mosaic of grassland types across the preserve system will be determined through small-scale experimental treatments using a combination of methods. Methods that could be used to

enhance grassland include but are not limited to: livestock grazing, grazing exclusion, selective application of herbicides, mowing, mechanical removal, supplemental seeding of natives, and prescribed fire. Enhancing grasslands within the BDCP preserve system may require simultaneous application of a combination of treatments at multiple sites to achieve desired levels of habitat function.

Grassland Community Restoration

The Management Entity will restore grassland habitat as part of other conservation acquisitions. Priority for restoration will be given to sites that provide a range of environmental gradients and increase connectivity between preserve lands. For example, the BDCP objective for restoring 65,000 acres tidal marsh includes acquisition and management of transitional upland habitats. These transitional uplands could also contribute towards achieving objectives for the grassland community and would be considered high priority for grassland restoration.

Native Species Benefits

Grasslands in the Planning Area provide foraging habitat for predators by supporting populations of small animals which are a component of the prey base for many covered species such as Swainson's hawk, western burrowing owl, white-tailed kite, and San Joaquin kit fox. Managing grasslands to increase the cover and extent of native grasses will benefit foraging raptors by reducing overall vegetative cover and decreasing escape cover for prey. California ground squirrels and other fossorial mammals also play a key role in the grassland community by providing burrows that are used by many sensitive species (e.g. nesting and roosting sites for burrowing owls, dens for kit fox, aestivation sites for covered amphibians). Grasslands provide habitat functions similar to those supported by agricultural habitats (e.g., alfalfa) and conservation of grassland habitats would be expected provide habitat for many of the covered species dependent on agricultural habitats that would be removed within implementation of BDCP covered activities and conservation measures.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of existing grassland habitats. BDCP implementation could remove approximately 3,800 acres of grassland habitat. BDCP proposes to protect, enhance, and restore at least [] acres of grassland in and/or adjacent to the Planning Area and Suisun Marsh that will contribute to the conservation of the grassland community and associated covered species.

Biological Goals and Objectives

Goal GRNC1: Protect and enhance large patches of contiguous grasslands representative of natural environmental gradients that provide or could provide support high habitat functions and values for grassland-associated covered and other native species.

Problem Statement: Substantial reduction in the extent, distribution, and condition of historical grasslands that surrounded the periphery of the Delta has reduced the diversity of native grassland plant species and habitat for associated native covered and other wildlife species. Protecting and enhancing remaining grassland habitats that support or could support high habitat functions and values for covered and other native species is expected, along with BDCP conservation of other natural communities, to increase the abundance and distribution of native wildlife and plant species, improve connectivity among habitat areas within and adjacent to the Planning Area, improve genetic interchange among native species' populations, and contribute to the long-term conservation of grassland-associated covered species.

Covered Species Benefiting: San Joaquin kit fox, salt marsh harvest mouse, riparian brush rabbit, Townsend's western big-eared bat, tricolored blackbird, western burrowing owl, greater sandhill crane, white-tailed kite, Swainson's hawk, giant garter snake, western pond turtle, California red-legged frog, western spadefoot toad, California tiger salamander, San Joaquin spearscale, Carquinez goldenbush, and caper-fruited tropidocarpum.

Objective GRNC1.1: Protect at least [] acres of grassland with at least [] percent in Conservation Zone 1 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of the grassland may be protected outside of the Planning Area in Solano and Yolo Counties under an approved HCP/NCCP or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective GRNC1.2: Protect at least [] acres of grassland with at least [] percent in Conservation Zone 7 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of the grassland may be protected outside of the Planning Area in Contra Costa County under the East Contra Costa

County HCP/NCCP in locations that will achieve covered species habitat objectives.

Objective GRNC1.3: Enhance habitat values for covered species and other native plant and wildlife species in BDCP protected grassland habitats.

Goal GRNC2: Restore grassland communities in association with restoration of tidal marsh communities to provide additional habitat for grassland-dependent species and to recreate the historical gradient of communities that extended from shallow subtidal aquatic communities upslope to transitional grassland and riparian communities.

Problem Statement: The native grasslands that were distributed along the upper elevational margins of tidal marshes historically present in the Delta and Suisun Marsh have been substantially reduced as a result of agricultural and urban development. The BDCP will restore tidal marsh on agricultural lands and, as such, grassland will need to be restored to reestablish natural transitional upland habitats abutting the upslope edge restored marsh plains to provide high functioning habitat for covered and other native species and to preclude the establishment and spread of non-native invasive plant species.

Objective GRNC2.1: Restore between [] and [] acres of grassland within the transitional upland zone of BDCP restored tidal marshes within 40 years of BDCP implementation in accordance with the BDCP implementation schedule for restored tidal marshes presented in Chapter 6, *BDCP Implementation*.

Objective GRNC2.2: Restore between [] and [] acres of native grassland within grasslands protected in Conservation Zones 1 and/or 7 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Alkali Seasonal Wetland Complex Community

[Note to Reviewers: text will be modified to incorporate applicable information from the vernal pool recovery plan.]

Conservation Approach

The overall biological goals for the alkali seasonal wetland complex natural community are designed to protect, enhance, and improve functional alkali seasonal wetland complex in conjunction with the conservation of grassland and vernal pool complex natural communities within which it frequently occurs. This approach will preserve the watersheds of the alkali seasonal wetland complex that are critical for its hydrological function, preserve habitat area and movement corridors for associated covered and other native species especially those that have both aquatic and terrestrial life stages, provide

movement corridors between different communities for wildlife species, and promote native biodiversity.

Alkali Seasonal Wetland Complex Community Protection

Alkali seasonal wetland complex will be protected in Conservation Zones 1, 5, 9, and 10 (see Figure X). In determining the aerial extent and spatial configuration of alkali seasonal wetland complex to be protected the following process was employed: consideration of the distribution and extent of existing alkali seasonal wetland complex; the spatial and temporal needs of covered species that use alkali seasonal wetland complex as habitat; the extent of alkali seasonal wetland complex that would be removed as a result of implementing BDCP covered activities and conservation measures, and; a review and consideration of the objectives of approved and planned HCP/NCCP that overlap or adjacent to the BDCP Planning Area.

To identify the extent and distribution of existing alkali seasonal wetland complex to be protected, the value of existing alkali seasonal wetland complex communities as habitat for covered and other native species in the Planning Area were evaluated using the following criteria. To what degree under reasonable management would protection of the alkali seasonal wetland complex:

- provide benefits for multiple covered species?
- contribute to maintaining local and regional ecological processes?
- support connectivity between/among existing protected habitat areas?
- complement the habitat functions and values of supported by adjoining natural communities for covered and other native species?
- protect or allow for re-establishment of natural environmental gradients?
- support or contribute to supporting in conjunction with protection of other habitats a heterogeneous mix of natural communities and native species, including native alkali seasonal wetland complex plants?
- be achieved in conjunction with other BDCP natural community conservation actions?, and
- be complementary with achieving biological objectives for approved and planned HCPs and NCCPs overlapping or adjacent to the Planning Area.

Alkali Seasonal Wetland Complex Community Enhancement and Management

Patches of protected alkali seasonal wetland complex community that are currently present within sites acquired to protect or restore grassland, vernal pool complex, tidal brackish emergent wetland, and tidal freshwater emergent communities will be incorporated into the design and management of those natural communities. The Management Entity will assess the habitat functions of existing patches of alkali seasonal wetland complex within the BDCP preserve system to determine if they are degraded and

in need of management actions to improve their habitat (e.g., invasion of Italian ryegrass in Conservation Zone 10) and ecosystem (e.g., preexisting alterations of surface hydrology) functions. The Management Entity will undertake management actions to enhance the function of degraded alkali seasonal wetland complex habitat using appropriate site-specific methods. Enhancement methods, frequencies, and intensities of application will be evaluated using existing assessments and research findings specific to each of the conservation areas, pre-acquisition site assessments, assessments of existing site habitat functions, and studies designed specifically to develop data that will contribute the protection, enhancement, and improvement of alkali seasonal wetland complex in each of the four regions. Site-specific implementation documents (e.g. preserve management plans) will be prepared in coordination with DFG and USFWS during implementation after land is acquired and specific restoration and management needs are determined. BDCP enhanced alkali seasonal wetland complex will be monitored to evaluate its development and identify any subsequent management actions that may need to be undertaken to maintain its intended habitat functions over the term of the BDCP (e.g., control of Italian ryegrass, effects on covered and other native species, and effects on hydrological regimes). Enhancement and management of alkali seasonal wetland complex will be fully integrated with the enhancement of contiguous conserved communities to ensure that environmental gradients, desired habitat functions and mosaics of habitat functions, movement corridors, and native biodiversity are maintained.

Native Species Benefits

Alkali seasonal wetland complex community provides habitat for many native wildlife species (e.g., waterfowl, shorebirds, wading birds, small mammals), including habitat for a number of wildlife and plant species that are covered under the BDCP. Protecting and enhancing alkali seasonal wetland complex will improve habitat functions and values in support of maintaining and increasing associated covered and other native wildlife and plant populations, and will increase the diversity and complexity of the mosaic of habitats supported in the BDCP Planning Area.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of patches of existing alkali seasonal wetland complex primarily as a result of the construction of conveyance facilities and restoring tidal marsh habitat. BDCP implementation could remove approximately 150 acres of alkali seasonal wetland complex. BDCP proposes to protect and enhance █ acres of alkali seasonal wetland complex that will contribute to the conservation of the alkali seasonal wetland complex community and associated covered species. Additionally, contiguous protected grassland and vernal pool complex communities will be protected and managed to maintain or enhance their habitat and ecosystem functions and to contribute to the habitat value and ecosystem function of protected alkali seasonal wetland complex.

Biological Goals and Objectives

Goal AWNC1: Protect and enhance alkali seasonal wetland complexes that support covered species habitat representative of the range of alkali seasonal wetland complex conditions present in the Planning Area.

Problem Statement: Historically, alkali seasonal wetland complex communities distributed within grasslands on patches of alkali soil that occurred along the margins of the Delta and Suisun Marsh. Conversion of land for agricultural and urban uses has removed or substantially degraded the habitat functions and values of remaining alkali seasonal wetland complexes (e.g., removal of watershed topography with land leveling, establishment of non-native plants). The reduction in the extent, distribution, and condition of historical alkali seasonal wetlands has reduced the diversity of native grassland plant species and habitat for associated native covered and other wildlife species. Protecting and enhancing remaining alkali seasonal wetland complexes in conjunction of adjoining grassland habitats is expected, along with BDCP conservation of other natural communities, to maintain or increase the abundance of native wildlife and plant species, improve connectivity among habitat areas within and adjacent to the Planning Area, and contribute to the long-term conservation of alkali seasonal wetland- and grassland-associated covered species.

Covered Species Benefiting: San Joaquin kit fox, Townsend's big-eared bat, tricolored blackbird, Suisun song sparrow, western burrowing owl, greater sandhill crane, Swainson's hawk, white-tailed kite, giant garter snake, western pond turtle, California red-legged frog, California tiger salamander; western spadefoot toad; vernal pool tadpole shrimp; Conservancy fairy shrimp; longhorn fairy shrimp; vernal pool fairy shrimp; mid Valley fairy shrimp; alkali milk-vetch; heartscale; brittlescale; San Joaquin spearscale; lesser saltscale; delta button celery, and; Carquinez goldenbush.

Objective AWNC1.1: Protect at least █ acres of alkali seasonal wetland complex with at least █ percent in Conservation Zones 1 and 10 the Yolo within █ years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to █ percent of alkali seasonal wetland complex may be protected outside of the Planning Area in

Solano and Yolo Counties under an approved HCP/NCCP or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective AWNC1.2: Protect at least [] acres of alkali seasonal wetland complex with at least [] percent in Conservation Zones 5 and 6 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of alkali seasonal wetland complex may be protected outside of the Planning Area in Contra Costa County under the East Contra Costa County HCP/NCCP in locations that will achieve covered species habitat objectives.

Objective AWNC1.3: Protect at least [] acres of alkali seasonal wetland complex with at least [] percent in Conservation Zone 9 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of alkali seasonal wetland complex may be protected outside of the Planning Area in Solano County under an approved HCP or under agreement with Solano County in locations that will achieve covered species habitat objectives.

Objective AWNC2.1: Enhance habitat functions and values of BDCP protected alkali seasonal wetland complexes in support of covered and other native plant and wildlife species.

Vernal Pool Complex Community

[*Note to Reviewers:* text will be modified to incorporate applicable information from the vernal pool recovery plan.]

Conservation Approach

The overall biological goals for the vernal pool complex natural community are designed to protect, enhance, and improve functional vernal pool complex in conjunction with the conservation of grassland and alkali seasonal wetland complex natural communities within which it frequently occurs. This approach will preserve the watersheds of the vernal pool complex that are critical for their hydrological function, preserve habitat area and movement corridors for associated covered and other native species especially those that have both aquatic and terrestrial live stages, provide seasonal habitat for waterfowl and shorebirds, provide movement corridors between different communities for wildlife species, provide for the production of nutrients and food in the uplands which sustains the aquatic food web of vernal pool, and promote native biodiversity. Conservation will be focused on each of the four vernal pool regions (see Section 2.3.4.9) present in the Planning Area and Suisun Marsh.

Vernal Pool Complex Community Protection

Vernal pool complex will be protected in each of the four vernal pool regions located in Conservation Zones 1, 3, 5, 6, and 9 (see Figure X): annual grassland vernal pool complexes in the Stone Lakes area; clay alluvium vernal pools and playa pools occurring from Putah Creek south to Cache Slough; Montezuma Block vernal pools and playa pools in the Jepson Prairie/Montezuma Hills area; and alkaline sink/meadow vernal pools near the Byron/Clifton Court Forebay area. In determining the aerial extent and spatial configuration of vernal pool complex to be protected the following process was employed: consideration of the distribution and extent of existing vernal pool complex; the spatial and temporal needs of covered species that use vernal pool complex as habitat; the extent and region of vernal pool complex that would be removed as a result of implementing BDCP covered activities and conservation measures, and; a review and consideration of the objectives of approved and planned HCP/NCCP that overlap or adjacent to the BDCP Planning Area.

To identify the extent and distribution of existing vernal pool complex to be protected, the value of existing vernal pool complex communities as habitat for covered and other native species in the Planning Area were evaluated using the following criteria. To what degree under reasonable management would protection of the vernal pool complex:

- provide benefits for multiple covered species?
- contribute to maintaining local and regional ecological processes?
- support connectivity between/among existing protected habitat areas?
- complement the habitat functions and values of supported by adjoining natural communities for covered and other native species?
- protect or allow for re-establishment of natural environmental gradients?
- support or contribute to supporting in conjunction with protection of other habitats a heterogeneous mix of natural communities and native species, including native vernal pool complex plants?
- be achieved in conjunction with other BDCP natural community conservation actions?, and
- be complementary with achieving biological objectives for approved and planned HCPs and NCCPs overlapping or adjacent to the Planning Area and ROAs.

Vernal Pool Complex Community Enhancement and Management

Patches of protected vernal pool complex community that are currently present within sites acquired to protect or restore grassland, alkali seasonal wetland complex, tidal brackish emergent wetland, and tidal freshwater emergent communities will be incorporated into the design and management of those natural communities. The Management Entity will assess the habitat functions of existing patches of vernal pool complex within the BDCP preserve system to determine if they are degraded and in need of management actions to improve their habitat (e.g., deep thatch buildup on pool margins) and ecosystem functions (e.g., preexisting alterations of surface hydrology).

The Management Entity will undertake management actions to enhance the function of degraded vernal pool complex habitats using appropriate site-specific methods. Enhancement methods, frequencies, and intensities of application will be evaluated using existing assessments and research findings specific to each of the four vernal pool regions, pre-acquisition site assessments, assessments of existing site habitat functions, and studies designed specifically to develop data that will contribute the protection, enhancement, and improvement of vernal pool complex in each of the four vernal pool regions. Site-specific implementation documents (e.g. preserve management plans) will be prepared in coordination with DFG and USFWS during implementation after land is acquired and specific restoration and management needs are determined.

BDCP enhanced vernal pool complex will be monitored to evaluate its development and identify any subsequent management actions that may need to be undertaken to maintain its intended habitat functions over the term of the BDCP (e.g., control of thatch, effects on covered and other native species, and effects on hydrological regimes). Enhancement and management of vernal pool complex will be fully integrated with the enhancement of contiguous conserved grassland and alkali seasonal wetland complex to ensure that environmental gradients, desired habitat functions and mosaics of habitat functions, movement corridors, and native biodiversity are maintained.

Native Species Benefits

Vernal pool complex community provides habitat for many native wildlife species (e.g., waterfowl and shorebirds), including habitat for vernal pool-associated covered species. Protecting and enhancing vernal pool complex will improve habitat functions and values in support of maintaining and increasing associated covered and other native wildlife and plant populations, and will increase the diversity and complexity of the mosaic of habitats supported in the Planning Area and Suisun Marsh.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of patches of existing vernal pool complex primarily as a result of the construction of conveyance facilities and restoring tidal marsh habitat. BDCP implementation could remove approximately 100 acres of vernal pool complex. BDCP

proposes to protect and enhance [] acres of vernal pool complex that will contribute to the conservation of the vernal pool complex community and associated covered species. Additionally, contiguous protected grassland and alkali seasonal wetland complex communities will be protected and managed to maintain or enhance their habitat and ecosystem functions and to contribute to the habitat value and ecosystem function of vernal pool complex.

Biological Goals and Objectives

Goal VPNC1: Protect and enhance vernal pool complexes within each of the four vernal pool regions that support covered species habitat.

Problem Statement: Historically, vernal pool complex communities distributed within grasslands on patches of impervious soils that occurred along the margins of the Delta and Suisun Marsh. Conversion of land for agricultural and urban uses has removed or substantially degraded the habitat functions and values of remaining vernal pool complexes (e.g., removal of watershed topography with land leveling, establishment of non-native plants). The reduction in the extent, distribution, and condition of historical vernal pools has reduced the diversity of native grassland plant species and habitat for associated native covered and other wildlife species. Protecting and enhancing remaining vernal pool complexes in conjunction of adjoining grassland habitats is expected, along with BDCP conservation of other natural communities, to maintain or increase the abundance of native wildlife and plant species, improve connectivity among habitat areas within and adjacent to the Planning Area, and contribute to the long-term conservation of vernal pool- and grassland-associated covered species.

Covered Species Benefiting: San Joaquin kit fox, Townsend's big-eared bat, tricolored blackbird, western burrowing owl, greater sandhill crane, Swainson's hawk, white-tailed kite, giant garter snake, western pond turtle, California red-legged frog, California tiger salamander; western spadefoot toad; vernal pool tadpole shrimp; Conservancy fairy shrimp; longhorn fairy shrimp; vernal pool fairy shrimp, and; mid Valley fairy shrimp; alkali milk-vetch; heartscale; brittle scale; San Joaquin spearscale; lesser salt scale; Boggs Lake hedge-hyssop; legenere, and; Heckard's peppergrass.

Objective VPNC1.1: Protect at least [] acres of intact Montezuma Block clay alluvium vernal pools and playa pools with at least [] percent in Conservation Zone 9 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of intact Montezuma Block clay alluvium vernal pools and playa pools may be protected outside of the Planning Area in Solano County under an approved HCP or under agreement with Solano County in locations that will achieve covered species habitat objectives.

Objective VPNC1.2: Protect at least [] acres of intact clay alluvium vernal pools and playa pools with at least [] percent located in Conservation Zone 1 and at least [] percent located in Conservation Zone 10 within [] years of BDCP

implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to █ percent of intact clay alluvium vernal pools and playa pools may be protected outside of the Planning Area in Solano and Yolo Counties under an approved HCP/NCCPs or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective VPNC1.3: Protect at least █ acres of intact alkaline sink/meadow vernal pools with at least █ percent located in Conservation Zones 5 and 6 within █ years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to █ percent of intact alkaline sink/meadow vernal pools may be protected outside of the Planning Area in Contra Costa County under the East Contra Costa County HCP/NCCP in locations that will achieve covered species habitat objectives.

Objective VPNC1.4: Enhance habitat functions and values of BDCP protected vernal pool complexes in support of covered and other native plant and wildlife species over the term of the BDCP.

Other Natural Seasonal Wetland Community

Conservation Approach

The overall biological goals for the other natural seasonal wetland natural community are different than those of the other natural communities because other natural seasonal wetlands were identified as the remaining seasonal wetlands after vernal pool complex, alkali natural seasonal wetland complex, and managed wetlands were mapped. Additionally, other seasonal wetlands are almost exclusively small to moderate size inclusions in and among agricultural fields that have established as an unintended byproduct of agricultural operations, such as holding ponds. Because of their small patch size, their presence as incidental inclusions within the much larger agriculture community, and their diffuse distribution throughout the agriculture natural community, the biological goals and objectives for the other natural seasonal wetland natural community do not include their protection, except to the extent that they are present on parcels of BDCP agricultural lands. Other natural seasonal wetlands that are protected within agricultural preserves will be evaluated to assess their habitat functions and values for covered species and will be maintained and enhanced if the habitat functions and values provided for covered species are greater than the habitat functions that would be provided if they were allowed to convert to other habitat types.

Native Species Benefits

Other natural seasonal wetland community provides incidental habitat for many native wildlife species (e.g., waterfowl and amphibians) within the much larger agricultural landscape within which it occurs.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of existing patches of other natural seasonal wetland primarily as a result of the construction of conveyance facilities and restoring tidal marsh habitat. BDCP implementation is anticipated to remove less than 10 acres of other natural seasonal wetland complex .

Biological Goals and Objectives

Goal ONSW1: Manage other natural seasonal wetlands within agricultural preserves to increase habitat functions in support of covered species if appropriate.

Problem Statement: *[To come]*

Covered Species Benefiting: Incidental habitat for a number of covered wildlife species.

Objective ONSW1.1: Integrate management of other natural seasonal wetlands with management of BDCP conserved agricultural lands to increase habitat functions for covered species.

Non-Tidal Freshwater Permanent Emergent Wetland Community

Conservation Approach

The overall biological goals for the non-tidal freshwater permanent emergent natural community are designed to protect, enhance, and restore functional non-tidal emergent wetlands that support associated covered and other native species and promote native biodiversity. Most non-tidal emergent wetlands present in the Planning Area are associated with managed landscapes, including artificial wetlands managed as waterfowl habitat, Delta island scour ponds, and agricultural drains and canals. Non-tidal emergent wetland habitats will be conserved in association with preserved non-tidal perennial aquatic, grassland, and agricultural natural communities. Conservation will be primarily

directed towards protecting existing non-tidal emergent wetlands associated with ponds, small non-tidal marshes, and agricultural conveyance channels in the eastern and northern Delta that support habitat for the giant garter snake and other native species.

Non-Tidal Freshwater Permanent Emergent Wetland Community Protection

In determining the aerial extent and spatial configuration of non-tidal emergent wetland habitats to be protected, the following process was employed: map the distribution and extent of existing patches of non-tidal emergent wetland; determine the spatial and functional needs of covered non-tidal emergent wetland species; estimate the extent of non-tidal emergent wetlands that would be removed as a result of implementing BDCP covered activities and conservation measures; and review and consider the objectives of approved and planned HCP/NCCPs that overlap with or are adjacent to the BDCP Planning Area.

To identify the extent and distribution of existing non-tidal emergent wetland to be protected, the value of existing non-tidal emergent wetlands as habitat for covered and other native species in the Planning Area were evaluated using the following criteria. To what degree under reasonable management would protection of a non-tidal emergent wetland:

- provide benefits for the giant garter snake and other covered species?
- contribute to maintaining local and regional ecological processes?
- support connectivity between/among existing protected habitat areas?
- complement the habitat functions and values of supported by adjoining natural communities for covered and other native species?
- protect or allow for re-establishment of natural environmental gradients?
- support or contribute to supporting in conjunction with protection of other habitats a heterogeneous mix of natural communities and native species?
- be achieved in conjunction with other BDCP natural community conservation actions?;
- require ongoing water management and infrastructure maintenance?; and
- be complementary with achieving biological objectives for approved and planned HCPs and NCCPs overlapping or adjacent to the Planning Area.

Based on this assessment, non-tidal freshwater permanent emergent natural communities will protected in Conservation Zones 1-5 and 10 (see Figure X).

Non-tidal emergent wetland habitats associated with agricultural drains and canals will be protected and managed in association with conservation of agricultural habitats and those associated with open water will be protected in association with protection of non-tidal perennial aquatic natural communities.

Non-Tidal Freshwater Permanent Emergent Wetland Community Enhancement and Management

The Management Entity will assess the habitat functions of protected non-tidal emergent wetland habitats to determine if they are degraded and in need of management actions to improve their habitat functions (e.g., low relative cover of native species, maintenance practices that degrade habitat function or directly affect associated wildlife). The Management Entity will undertake management actions to enhance the function of degraded non-tidal emergent wetland habitats using appropriate site-specific methods. Enhancement methods, frequencies, and intensities of application will be informed by pre-acquisition assessments, assessments of existing habitat functions, and targeted studies. Site-specific implementation documents (e.g. preserve management plans) will be prepared in coordination with DFG and USFWS during implementation after land is acquired and specific restoration and management needs are determined.

BDCP restored non-tidal emergent wetland habitats will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain their intended habitat functions over the term of the BDCP (e.g., control of non-native vegetation and predators).

Non-Tidal Freshwater Permanent Emergent Wetland Community Restoration

The Implementing Entity will restore non-tidal emergent wetland habitat within patches of other BDCP protected natural communities where appropriate hydrology is present. Habitat restoration will be located within the range of giant garter snake in the east and north Delta and designed to function as giant garter snake habitat. Restored non-tidal emergent wetlands will be restored in conjunction with restoration of non-tidal open water habitats (non-tidal perennial aquatic community) to create mosaics of freshwater marsh that support habitat for the giant garter snake, California red-legged frog, California tiger salamander, western pond turtle, waterfowl (foraging and brooding habitat), wading birds, and other non-tidal marsh-associated wildlife.

Native Species Benefits

Non-tidal permanent freshwater emergent communities in the Planning Area provide habitat for many native wildlife species (e.g., amphibians, waterfowl, garter snakes), including habitat for the tricolored blackbird (nesting), giant garter snake, California red-legged frog, California tiger salamander, and western pond turtle that are covered under the BDCP. Enhancing existing and restoring additional non-tidal emergent wetland habitats will improve existing habitat functions and values and restoring additional wetlands is expected to maintain and increase populations of associated covered and other native species and increase the diversity and complexity of the mosaic of habitats supported in the Planning Area.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of patches of existing non-tidal emergent wetland habitat. BDCP implementation could remove approximately 50 acres of non-tidal emergent wetland. BDCP proposes to protect, enhance, and restore █ acres of non-tidal emergent wetland that will contribute to the conservation of the non-tidal permanent freshwater emergent wetland community and associated covered species.

Goal NWNC1: Protect, enhance, and restore non-tidal permanent freshwater emergent communities that support habitat for covered and other native species.

Problem Statement: Historically, non-tidal emergent wetlands were limited to the margins of the Planning Area in depressions that maintained sufficient water to allow for establishment of tules and other native vegetation. Non-tidal emergent wetlands present in the Planning Area today are largely an artifact of agricultural practices and management to maintain waterfowl habitats. Many of the native species that historically used the tidal marsh habitats that covered much of the Delta are now dependent on remaining patches of non-tidal emergent wetlands. Protecting and enhancing remaining non-tidal emergent wetlands and restoring additional wetlands along with BDCP conservation of other natural communities is expected to maintain or increase the abundance of native associated wildlife and plant species, improve connectivity among habitat areas within and adjacent to the Planning Area, and contribute to the long-term conservation of non-tidal emergent wetland-associated covered species.

Covered Species Benefiting: Tricolored blackbird, giant garter snake, California red-legged frog, California tiger salamander, and western pond turtle.

Objective NWNC1.1: Protect at least █ acres of non-tidal freshwater emergent wetland that supports habitat for giant garter snake and other native species with at least █ percent located in the Conservation Zones 1 and 10 within █ years of BDCP implementation in accordance with the habitat BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to █ percent of non-tidal freshwater emergent wetland that supports habitat for giant garter snake may be protected outside of the Planning Area in Solano County and/or Yolo County under an approved HCP/NCCP or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective NWNC1.2: Protect at least █ acres of non-tidal freshwater emergent wetland that supports habitat for giant garter snake and other native species with at least █ percent located in the Conservation Zones 3, 4, and 5 within █ years of BDCP implementation in accordance with the habitat BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to █ percent of non-tidal freshwater emergent wetland that supports habitat for giant garter snake may be protected outside of the Planning Area in Sacramento County and/or San Joaquin County under an approved HCP or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective NWNC1.3: Restore or create at least █ acres of non-tidal freshwater emergent wetlands that function as habitat for giant garter snake or other covered species, resident and wintering and breeding waterfowl, and other native species in Conservation Zones 1, 3, and/or 10 within █ years of BDCP implementation in accordance with the habitat BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Objective NWNC1.4: Maintain and improve the habitat functions of BDCP protected and restored non-tidal emergent wetlands for covered and other native species over the term of the BDCP.

Non-Tidal Perennial Aquatic Community

Conservation Approach

The overall biological goals for the non-tidal perennial aquatic natural community are designed to protect, enhance, and restore functional non-tidal open water habitats that support associated covered and other native species and promote native biodiversity. Most non-tidal open water habitats present in the Planning Area and Suisun Marsh are associated with managed landscapes, including farm ponds, scour ponds on subsided islands, borrow site ponds, large agricultural drains and canals, and wastewater treatment ponds. Conservation of non-tidal open water habitats is anticipated to occur in conjunction with management of preserved non-tidal freshwater permanent wetland, grassland, and agricultural natural communities. Conservation will be focused on protecting existing and restoring additional non-tidal open water wetlands associated with ponds and agricultural conveyance channels in the eastern and northern Delta that support habitat for the giant garter snake, California tiger salamander, and other native species and in the southwest Delta that support habitat for the California tiger salamander and California red-legged frog.

Non-Tidal Perennial Aquatic Community Protection

In determining the aerial extent and spatial configuration of non-tidal open water habitats to be protected, the following process was employed: distribution and extent of existing non-tidal open water habitat; spatial and functional needs of covered non-tidal open water

species; the estimated extent of non-tidal open water habitat that would be removed as a result of implementing BDCP covered activities and conservation measures; and review and consideration of the objectives of approved and planned HCP/NCCP that overlap or adjacent to the BDCP Planning Area.

To identify the extent and distribution of existing non-tidal open water habitats to be protected, the value of existing non-tidal open water habitats as habitat for covered and other native species in the Planning Area were evaluated using the following criteria. To what degree under reasonable management would protection of a non-tidal emergent wetland:

- provide benefits for the giant garter snake and other covered species?
- complement the habitat functions and values of supported by adjoining natural communities for covered and other native species?
- protect or allow for re-establishment of natural environmental gradients?
- support or contribute to supporting in conjunction with protection of other habitats a heterogeneous mix of natural communities and native species?
- be achieved in conjunction with other BDCP natural community conservation actions?;
- require ongoing water management and infrastructure maintenance?; and
- be complementary with achieving biological objectives for approved and planned HCPs and NCCPs overlapping or adjacent to the Planning Area.

Based on this assessment, non-tidal perennial aquatic natural communities will protected in Conservation Zones , , and (see Figure X).

Non-Tidal Perennial Aquatic Community Enhancement and Management

The Management Entity will assess the habitat functions of protected non-tidal open water habitats to determine if they could provide additional value through management actions to improve their habitat functions (e.g., establishment of emergent vegetation along pond margins, control of non-native aquatic predators, restored supporting hydrology). The Management Entity will undertake management actions to enhance the function of non-tidal open water habitats using appropriate site-specific methods. Enhancement methods, frequencies, and intensities of application will be informed by pre-acquisition assessments, assessments of exiting habitat functions, and targeted studies. Site-specific implementation documents (e.g. preserve management plans) will be prepared in coordination with DFG and USFWS during implementation after land is acquired and specific restoration and management needs are determined.

BDCP enhanced non-tidal open water habitats will be monitored to evaluate their development and identify any subsequent management actions that may need to be undertaken to maintain their intended habitat functions over the term of the BDCP (e.g., control of non-native vegetation and predators).

Non-Tidal Perennial Aquatic Community Restoration

The Implementing Entity will restore non-tidal open water habitat within patches of protected or created grassland, agricultural, and managed wetland communities where appropriate hydrology is present. Habitat restoration will be located within the range of giant garter snake in the east and north Delta and designed to function as giant garter snake habitat. Restored non-tidal open water habitat will be restored in conjunction with restoration of non-tidal emergent wetland habitats to create mosaics of freshwater marsh that support habitat for the giant garter snake, western pond turtle, waterfowl (foraging and brooding habitat), wading birds, and other non-tidal marsh-associated wildlife.

Native Species Benefits

Non-tidal perennial aquatic communities in the Planning Area provide habitat for many native wildlife species (e.g., amphibians, waterfowl, shorebirds, wading birds, garter snakes), including habitat for the giant garter snake, western pond turtle, California red-legged frog, and California tiger salamander that are covered under the BDCP. Enhancing existing and restoring additional non-tidal open water habitats will improve existing habitat functions and values and restoring additional non-tidal open water habitat is expected to maintain and increase populations of associated covered and other native species and a increase the diversity and complexity of the mosaic of habitats supported in the Planning Area.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Fremont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove or degrade the functions of existing non-tidal open water habitat. BDCP implementation could remove approximately 400 acres of non-tidal open water habitat. BDCP proposes to protect, enhance, and restore █ acres of non-tidal open water habitat that will contribute to the conservation of the non-tidal perennial aquatic community and associated covered species.

Biological Goals and Objectives

Goal NWNC1: Protect, enhance, and restore non-tidal perennial aquatic communities that support habitat for covered and other native species.

Problem Statement: Historically, non-tidal open water habitats were limited to the margins of the Planning Area in depressions that maintained sufficient water to allow for permanent ponding of water. Non-tidal open water habitats present in the Planning Area today are largely an artifact of agricultural practices, levee failures, infrastructure, and management to maintain waterfowl habitats. Protecting and enhancing existing non-tidal open water habitats and restoring additional open water along with BDCP conservation of other natural communities is expected to maintain or increase the abundance of native associated wildlife and plant species, improve connectivity among habitat areas within and adjacent to the Planning Area, and contribute to the long-term conservation of non-tidal emergent wetland-associated covered species.

Covered Species Benefiting: Giant garter snake, western pond turtle, California red-legged frog, and California tiger salamander.

Objective NWNC1.1: Protect at least [] acres of ponds that support non-tidal open water habitat in the Planning Area within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. The protected non-tidal open water habitat will be distributed such that: 1) at least [] ponds will be located in Conservation Zone 3 that support habitat for the giant garter snake, 2) at least [] ponds will be located within Conservation Zones 1, 9, and/or 10 that support aquatic breeding habitat for the California tiger salamander, and 3) at least [] water bodies will be located in Conservation Zone 7 that supports habitat for the California red-legged frog and California tiger salamander. Up to [] ponds that meet these habitat objectives may be protected outside of the Planning Area in Solano County, Yolo County, Sacramento County, and/or East Contra Costa County under an approved HCP/NCCP or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective NWNC1.2: Restore or create at least [] acres of non-tidal open water habitat that functions as habitat for giant garter snake, resident and wintering and breeding waterfowl, and other native species in Conservation Zones 1, 3, and/or 10 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of the habitat area may be restored outside of the Planning Area in Solano County, Yolo County, and/or Sacramento County under an approved HCP/NCCP or under agreement with the Counties in locations that will achieve covered species habitat objectives.

Objective NWNC1.3: Maintain and improve the habitat functions of BDCP protected and restored non-tidal open water habitats for covered and other native species over the term of the BDCP.

Inland Dunes Conservation Strategy

[To be determined.]

Managed Wetlands Conservation Strategy

Conservation Approach

The overall biological goals and objectives for the managed wetlands natural community are designed to increase the habitat functions and values supported by existing managed wetlands for wintering and breeding waterfowl and migrant and breeding shorebirds in the Planning Area and Suisun Marsh. Increasing habitat functions and values for wintering and breeding waterfowl and migrant and breeding shorebirds are also expected to increase habitat functions and values for other native wildlife species that use managed wetlands habitats. Increasing habitat functions and values supported by managed wetlands will be accomplished through enhancement and restoration of BDCP conserved natural communities that support wintering and breeding waterfowl and migrant shorebird habitats.

Implementation of BDCP covered activities and conservation measures will remove existing managed wetlands. Managed wetlands are largely managed to provide food resources for wintering and breeding waterfowl and migrant and breeding shorebirds. Wintering and breeding waterfowl and migrant and breeding shorebirds also use tidal habitats (comprised of shallow subtidal aquatic, tidal mudflat, marsh plain, and transitional upland components) and agricultural habitats (e.g., corn fields, rice, pasture) that will be protected, enhanced, and restored with BDCP implementation, though the habitat functions and values supporting a particular species of waterfowl or shorebird may be lesser or greater on a per acre basis than that provided by managed wetlands. Consequently, the goals and objectives for increasing the habitat functions and values currently supported by managed wetlands are tied to the wintering and breeding waterfowl and migrant shorebird habitat functions and values supported by BDCP tidal marsh restoration and enhancement of conserved agricultural lands. For example, designing tidal marshes to support areas of very shallow water and tidal mudflats will provide foraging and roosting habitat for migrant and breeding shorebirds. Ensuring a high degree of tidal circulation and good water quality in restored tidal marshes will enhance invertebrate productivity for shorebirds. Foraging areas for a variety of waterfowl, particularly diving ducks, can be provided by including a diversity of water depths within the mosaic of tidal marsh and subtidal habitats. Waterfowl nesting and brood habitat can be provided by providing a natural transition from tidal wetland to upland.

To ensure that objectives to provide an overall increase in habitat functions and values for native species that are supported by existing managed wetlands in the Planning Area and Suisun Marsh are achieved, an assessment of the relative value provided by each habitat type supported by existing managed wetlands and BDCP restored and enhanced natural communities for wintering and breeding waterfowl and migrant and breeding shorebirds

will be performed (hereafter referred to as the Assessment). This Assessment will be conducted in spring 2010 as part of BDCP's effects and conservation assessment. If Assessment results indicate that BDCP implementation would not achieve its objectives for increasing habitat functions and values from current conditions, proposed BDCP conservation measures will be modified such that the objective will be achieved. Increasing habitat functions and values will be achieved with implementation of one or more of the following types of conservation actions: 1) managing BDCP conserved agricultural lands to increase habitat functions and values for wintering and breeding waterfowl and migrant and breeding shorebirds supported by managed wetlands, 2) improving management of existing managed wetlands to increase habitat functions and values, and/or 3) creation and management of additional managed wetlands within or outside of the Planning Area.

As BDCP is implemented, BDCP protected, enhanced, and restored habitats will be monitored to ensure that the expected habitat functions and values for wintering and breeding waterfowl and migrant and breeding shorebirds are realized. If the expected habitat functions and values are not provided, the BDCP Management Entity will adjust implementation to achieve habitat function and value objectives through the BDCP adaptive management decision making process described in Section 3.6, *Adaptive Management*.

Agricultural Land Enhancement

If indicated by Assessment results, BDCP may manage BDCP conserved agricultural lands to increase habitat functions and values for wintering and breeding waterfowl and migrant and breeding shorebirds (see agricultural land natural community conservation strategy), while maintaining the intended habitat functions and values supported by the conserved agricultural lands for covered and other native wildlife species. Enhancement methods could include planting crop types that provide high value foods, shallow flooding of fields during migration and wintering periods to increase availability of food, timing discing of fields such that food availability is maximized, flooding and drawing down fields during shorebird migration periods to create foraging habitat, and adjusting planting and harvest periods of forage crops to ensure food availability over waterfowl migration and wintering periods.

Managed Wetlands Enhancement and Management

If indicated by Assessment results, BDCP may enhance and manage seasonal wetlands through conservation easements with owners of existing managed wetlands to support enhanced management activities designed to increase habitat functions and values in support of wintering and breeding waterfowl and migrant and breeding shorebirds. Enhancing the management of managed wetlands can maximize the habitat functions and values supported by existing managed wetlands. Food production for migrating waterfowl and shorebirds are important goals for managed wetlands. Enhancement and maintenance of infrastructure to optimize well-established management methods can

improve the food production and availability to these groups of birds. Common management practices include methods to increase food production by vegetative manipulation (e.g. discing or mowing), duration of flooding, timing of water drawdowns, and methods to improve habitat by controlling water depth and topography. An essential management component is assuring adequate water supplies for comprehensive management and flooding. Managed wetlands will be enhanced using methods described in site-specific management plans that would be developed for each conserved managed wetlands unit.

Managed Wetlands Creation

If indicated by Assessment results, BDCP may create and manage new managed wetlands. Created managed wetlands will be designed and managed specifically to provide high functions and values for wintering and breeding waterfowl and migrant and breeding shorebirds, which would also support habitat for seasonal wetland-associated covered species and other native wildlife.

Native Species Benefits

Although managed wetlands are largely managed to supply habitat functions and values in support of wintering and breeding waterfowl and migrant and breeding shorebirds, they also provide habitat for other native species (e.g., wading birds, raptors, sandhill cranes, marsh-associated passerine birds). Increasing the habitat functions and values supported by Planning Area and Suisun Marsh habitats for wintering and breeding waterfowl and migrant and breeding shorebirds relative to current conditions are also expected to benefit covered species (e.g., tricolored blackbird, California clapper rail, greater sandhill crane, Swainson's hawk, giant garter snake) and other native wildlife species (e.g., wading birds, gulls and terns, water birds).

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

Implementation of the BDCP covered activities and conservation measures will remove managed wetlands as a result of construction of conveyance facilities and restoring tidal marsh habitat. BDCP implementation could remove approximately 13,000 acres of about 65,900 acres of managed wetlands present in the Planning Area and Suisun Marsh. To

increase the habitat functions and values provided by managed wetlands relative to current conditions, BDCP proposes to restore 65,000 acres of tidal brackish and freshwater marsh comprised of shallow subtidal aquatic, tidal mudflat, tidal marsh plain, and transitional upland components. If results of the Assessment of expected change in habitat functions and values currently provided by managed wetlands indicates that the habitat function and value objectives are not achieved with restoration of tidal marsh, BDCP will enhance management of conserved agricultural lands, enhance management of existing managed wetlands, and/or create and manage new seasonal wetlands in sufficient quantities such that the objective is achieved.

Biological Goals and Objectives

Goal MWNC1: Increase habitat functions and values provided by existing managed wetlands in the Planning Area and Suisun Marsh through enhancement and restoration of BDCP conserved natural communities such that those functions and values are increased relative to current conditions to support achieving Central Valley Joint Venture Implementation Plan waterfowl and shorebird conservation targets for the Delta and Yolo Basin.

Problem Statement: Wintering and breeding waterfowl and migrant shorebird habitat within the Central Valley and Bay-Delta Estuary has declined substantially from pre-settlement conditions. The Central Valley Habitat Joint Venture has developed wetland acreage goals for nine basins within the Central Valley. The acreage goals for the Suisun basin have been surpassed while the restoration goal for wetlands in the Delta basin is 19,000 acres. Increasing the habitat functions and values for wintering and breeding waterfowl and migrant and breeding shorebirds supported by Planning Area and Suisun Marsh habitats will increase these habitat functions and values regionally while helping to reach goals established by the CVHJV Implementation Plan for the Delta Yolo Basins.

MWNC1.1: Increase the wintering and breeding waterfowl habitat functions and values supported by Planning Area and Suisun Marsh habitats by █ percent from current conditions within 40 years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*

MWNC1.2: Increase the migrant shorebird habitat functions and values supported by Planning Area and Suisun Marsh habitats by █ percent from current conditions within 40 years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*.

Agricultural Lands Natural Community

Conservation Approach

The overall biological goal for the agricultural land community is to ensure preservation and enhancement of the habitat functions and values provided by agricultural lands

within the Planning Area that support habitat for covered and other native wildlife species. Preservation objectives for habitat functions and values supported by agricultural lands may also be achieved through protection and enhancement of other natural communities that support those same habitat functions. Natural habitat areas present on BDCP preserved agricultural lands would also be managed and enhanced to maintain and improve habitat functions for covered and other native wildlife species. Agricultural lands and associated natural habitats would be acquired and managed through conservation easements or in fee-title.

Conservation of the agricultural land community will focus on preserving a mix of alfalfa, irrigated pasture, grain, rice, and row crops of sufficient extent and distribution to conserve associated covered species and contribute to maintaining wintering and breeding waterfowl and migrant shorebird populations. Orchards and vineyards would not be preserved because they typically provide minimal functions as habitat for covered species and most other native species of wildlife.

Preservation of Agricultural Lands

In determining the aerial extent and spatial configuration of preserved agricultural lands, the following process was employed: current distribution and extent of agricultural lands by crop type; spatial and functional needs of covered agricultural species; the estimated extent of agricultural crop types that would be removed as a result of implementing BDCP covered activities and conservation measures; and review and consideration of the objectives of approved and planned HCP/NCCP that overlap or adjacent to the BDCP Planning Area.

The mix and extent of agricultural crop types to be preserved is based on meeting the habitat needs of associated covered species and wintering and resident waterfowl. The crop types and amounts grown on preserve lands is expected to change among years to maintain appropriate crop rotations and to achieve a desired mix of agricultural habitats within the Planning Area based on annual cropping patterns on non-preserved agricultural lands. To identify the extent and distribution of agricultural lands to be conserved and managed as habitat for covered and other native species, the habitat functions and values supported by existing agricultural lands in the Planning Area were evaluated using the following criteria. To what degree under reasonable management would conservation and management of agricultural lands:

- Provide essential habitat for greater sandhill crane (roosting and foraging), Swainson's hawk, tricolored blackbird breeding habitat, and giant garter snake aquatic habitat within or adjacent to known occupied areas?;
- Maintain or enhance connectivity with existing preserved habitat areas?;
- Contribute to creation of large preserve areas?; and
- Be complementary with achieving the biological objectives established for approved and planned HCPs and NCCPs overlapping or adjacent to the Planning Area.

Additionally, a major consideration for selecting specific parcels to be conserved will include the presence of natural habitats (e.g., riparian forest, wetlands, ponds, or grassland habitat that provide benefit for multiple covered species), the conservation of which would contribute to achieving objectives for other natural communities.

Based on application of these criteria, agricultural land natural communities will be preserved in Conservation Zones 1-7 and/or 10 (see Figure X).

Agricultural Lands Enhancement and Management

Enhancement of preserved agricultural lands can occur through 1) cultivation of specific crop types and cropping patterns that may be adjusted over time based on Planning Area-wide cropping patterns at any point in time relative to the needs of covered species; 2) adjusting agricultural practices to increase habitat functions for specific species (e.g., adjusting discing practices to increase the availability of waste grain to increase food for greater sandhill cranes and wintering and breeding waterfowl); and 3) through enhancement of other natural communities present on conserved lands (e.g., riparian woodland, roadside trees rows, hedge rows, agricultural drains and ditches). Site-specific implementation documents (e.g. preserve management plans) will be prepared in coordination with DFG and USFWS during implementation after land is acquired and specific restoration and management needs are determined.

Native Species Benefits

Agricultural lands provide essential foraging, roosting, and movement habitat for several covered species including Swainson's hawk, white-tailed kite, tricolored blackbird, greater sandhill crane, and giant garter snake. Maintaining suitable agricultural cover types distributed appropriately throughout the Planning Area and enhancing associated natural communities (e.g., riparian, wetlands, grasslands) will preserve the extent and distribution of these species in the Planning Area. Agricultural lands also provide benefit to other species and species groups, such as shorebirds, other water birds, and wintering and breeding waterfowl.

Effects of BDCP Implementation

[Note to Reviewers: This section describes partial effects of BDCP actions on this natural community as currently proposed for use in supporting development of natural community conservation strategies. The estimated extent of the natural community that could be removed will change as BDCP planning progresses and new information is developed. The estimated extent of natural community removal cited below does not include all currently proposed BDCP actions (e.g., proposed modifications to Freemont Weir, restoration of seasonally inundated floodplain, facility powerline corridors) and assumes construction of the proposed eastern conveyance surface facility alignment. Construction of a tunneled conveyance facility would be expected to reduce the extent of natural community effects.]

BDCP implementation could remove approximately 44,000 acres of agricultural lands farmed for alfalfa, irrigated pasture, rice, and truck crops. BDCP proposes to protect and manage at least [] acres of agricultural lands that will contribute to the conservation of covered and other native species that are dependent on agricultural habitats.

Biological Goals and Objectives

Goal ALNC1: Maintain and increase habitat functions and values for covered and other native species that are supported by agricultural land cover types and management practices.

Problem Statement: The agricultural landscape within the Planning Area is a dynamic matrix of a variety of land cover types, including perennial, semi-perennial, and seasonally or annually rotational crops. Due primarily to the large extent of the rotational landscape, the cover type matrix is subject to change annually based primarily on agricultural economic conditions. This in turn changes habitat values across the landscape for agriculture-associated Covered Species and other dependent wildlife. Managing this dynamic landscape to benefit wildlife, particularly within an HCP/NCCP plan area, requires a cooperative effort on the part of private landowners, state and federal resource agencies, and local jurisdictions. Direct management of acquired preserve lands is usually insufficient to ensure maintenance of landscape-level habitat values over time. Thus, agricultural preserve lands are generally used to supplement a more comprehensive approach that may include establishing an incentive-based program to promote the long-term retention of wildlife habitat values and targeting specific geographic areas and cover types to sustain key wildlife species or species groups.

Covered Species Benefiting: Greater sandhill crane, Swainson's hawk, white-tailed kite, burrowing owl, tricolored blackbird, and giant garter snake.

Objective ALNC1.1: Preserve and annually maintain the current extent and spatial distribution of rice production in Conservation Area 10 within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of current levels of rice production in Conservation Area 10 may be preserved outside of the Planning Area in Yolo County under an approved HCP/NCCP or under agreement with the County in locations that will achieve covered species habitat objectives. This objective may also be partially or fully achieved by maintaining an equivalent extent of natural or managed wetlands that support habitat functions similar to rice lands for associated covered and other native wildlife species.

Objective ALNC1.2: Preserve and maintain [] acres of land in alfalfa production with at least [] to [] percent distributed within Conservation Zone 3, [] to [] percent distributed within Conservation Zones 4-5, [] to [] percent distributed within Conservation Zone 6, and [] to [] percent distributed within Conservation Zones 1 and 10 to provide habitat for associated covered and other native wildlife species within [] years of BDCP implementation in accordance

with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of the preserved alfalfa may be located adjacent to the Planning Area in Yolo, Sacramento, or San Joaquin Counties under approved HCP/NCCPs for those Counties or under agreements with the Counties in locations that will achieve covered species habitat objectives. This objective may be partially or fully achieved by maintaining equivalent habitat values through preservation of other land cover types that support habitat functions similar to alfalfa fields for associated covered and other native species.

Objective ALNC1.3: Preserve and maintain [] acres as irrigated pasture land with at least [] to [] percent distributed within Conservation Zone 3, [] to [] percent distributed within Conservation Zones 4-5, [] to [] percent distributed within Conservation Zone 6, and [] to [] percent distributed within Conservation Zones 1 and 10 to provide habitat for associated covered and other native wildlife species within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of the preserved irrigated pasture land may be located adjacent to the Planning Area in Yolo, Solano, Sacramento, East Contra Costa or San Joaquin Counties under approved HCP/NCCPs for those Counties or under agreements with the Counties in locations that will achieve covered species habitat objectives. This objective may be partially or fully achieved by maintaining equivalent habitat values through preservation of other agricultural or other land cover types that support habitat functions similar to irrigated pasture for associated covered and other native species.

Objective ALNC1.4: Preserve and maintain [] acres in production of annually cultivated irrigated crops with at least [] to [] percent distributed within Conservation Zone 3, [] to [] percent distributed within Conservation Zones 4-5, [] to [] percent distributed within Conservation Zone 6, and [] to [] percent distributed within Conservation Zones 1 and 10 to provide habitat for associated covered and other native wildlife species within [] years of BDCP implementation in accordance with the BDCP implementation schedule presented in Chapter 6, *BDCP Implementation*. Up to [] percent of the preserved annually cultivated irrigated crops may be located adjacent to the Planning Area in Yolo, Sacramento, East Contra Costa, or San Joaquin Counties under approved HCP/NCCPs for those Counties or under agreements with the Counties in locations that will achieve covered species habitat objectives. This objective may be partially or fully achieved by maintaining equivalent habitat values through preservation of other agricultural or other land cover types that support habitat functions similar to annually cultivated irrigated cropland for associated covered and other native species.

Objective ALNC1.5: Maintain and improve the habitat functions of BDCP protected agricultural lands for covered and other native species over the term of the BDCP.

Objective ALNC1.6: Maintain and protect associated vegetation communities and wildlife habitats that occur within BDCP protected agricultural lands, including isolated valley oak trees, trees and shrubs along field borders and roadsides, remnant groves, riparian corridors, water conveyance channels, grasslands, and wetlands.

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Table 2. Extent of Existing Natural Communities within BDCP Conservation Zones

Natural Community	Conservation Zone (see Figure 1 for locations)										Total in Evaluation Area
	1	2	3	4	5	6	7	8	9	10	
Tidal perennial aquatic	1,011	4,967	1,200	8,991	16,721	2,353	3,531	1,443	5,456	6,703	52,377
Tidal mudflat ¹	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tidal brackish emergent wetland	0	0	0	0	0	0	0	0	7,310	0	7,310
Tidal freshwater emergent wetland	521	179	648	838	1,805	148	143	179	154	1,710	6,326
Valley foothill riparian	357	2,080	2,575	2,430	3,702	2,671	256	185	86	2,427	16,770
Grassland	9,190	5,524	5,879	5,767	13,603	5,951	4,540	3,810	3,582	7,191	65,036
Alkali seasonal wetland complex	355	0	17	1	35	12	545	24	297	4,281	5,567
Vernal pool complex	1,692	0	1,057	0	0	0	6	40	4	440	3,238
Other natural seasonal wetland	196	0	193	1	0	18	0	3	1	54	465
Non-tidal permanent freshwater emergent wetland	3	1	11	35	237	4		4	9	49	353
Non-tidal perennial aquatic	1,011	4,967	1,200	8,991	16,721	2,353	3,531	1,443	5,456	6,703	52,377
Managed wetlands	714	122	1,092	1,015	4,531	71	57	73	49,554	6,936	64,165
Agricultural lands											

Natural Community	Conservation Zone (see Figure 1 for locations)										Total in Evaluation Area
	1	2	3	4	5	6	7	8	9	10	
Alfalfa	5,909	14,556	4,896	6,872	10,426	28,235	7,862	1,823	0	1,703	82,283
Irrigate Pasture	18,107	2,033	2,688	7,311	3,324	3,466	1,311	726	550	10,178	49,693
Vineyard	0	10,233	8,330	5,065	496	2,679	698	946	0	0	28,447
Orchard	64	5,143	1,072	3,065	402	5,776	61	2,339	0	73	17,996
Rice	0	0	0	1,738	1,097	0	0	0	0	9,802	12,637
Other Cultivated Crops	9,741	28,583	12,466	54,243	42,738	46,755	11,816	10,678	1	12,714	229,735
<i>Subtotal: Cropland only</i>	<i>33,821</i>	<i>60,550</i>	<i>29,451</i>	<i>78,294</i>	<i>58,483</i>	<i>86,911</i>	<i>21,748</i>	<i>16,511</i>	<i>551</i>	<i>34,470</i>	<i>420,791</i>
Other Agricultural lands	7,604	9,131	7,119	9,557	10,137	17,873	4,864	8,056	2,733	4,364	81,439
<i>Subtotal: All agricultural land</i>	<i>41,426</i>	<i>69,681</i>	<i>36,571</i>	<i>87,851</i>	<i>68,620</i>	<i>104,785</i>	<i>26,612</i>	<i>24,567</i>	<i>3,283</i>	<i>38,835</i>	<i>502,230</i>
Total	56,476	87,521	50,443	115,920	125,974	118,367	39,220	31,772	75,194	75,329	776,215
<p>Notes:</p> <p>N/A = Not applicable. Tidal mudflats present in the Evaluation Area have not been delineated. Tidal mudflat is a component of delineated tidal brackish and freshwater emergent wetland and tidal perennial aquatic communities and the extent of existing tidal mudflats is included in the extent indicated for those communities.</p> <p>¹Other agricultural lands include patches of native vegetation and water conveyance infrastructure along field margins, roads bisecting fields, farmyards, agricultural-related structures, etc. that are designated as agricultural land cover types within the BDCP land cover data base.</p>											