CHAPTER 3

Habitat Conservation Plan Components and Effects on Covered Species

3.1 Approach to and Framework for the Conservation Strategy

The habitat conservation plan (HCP) employs both habitat-based and species-specific approaches. The habitat-based component of the conservation strategy of the HCP focuses on mitigating the potential loss of habitat values (quality and quantity) of each habitat type within the HCP area. This is accomplished primarily by creating or acquiring replacement habitat. The overall conservation strategy for the Imperial Irrigation District (IID) HCP is to maintain or increase the value (amount and/or quality) of each habitat in the HCP area in addition to implementing measures to minimize direct effects to covered species from operation and maintenance (O&M) and construction activities. The habitat-based conservation approach of the HCP is augmented by a species-specific treatment of individual species (i.e., burrowing owls, desert pupfish, and razorback sucker) that are not easily accommodated by a habitat approach. Consistent with the guidance provided by the U.S. Fish and Wildlife Service (USFWS), all HCP effects are evaluated on a species-by-species basis. In addition to the habitat-based and species-specific strategies, the HCP contains general commitments that guide and facilitate the implementation of the plan.

The area for which IID seeks coverage supports six general habitats as follows:

- Salton Sea
- Tamarisk scrub
- Drain vegetation
- Desert
- Aquatic
- Agricultural fields

Covered species are assigned to one or more habitat groups based on the habitats that they use in the HCP area. The overall conservation strategy for the IID HCP is to maintain or increase the value (amount and/or quality) of each habitat in the HCP area. Species for which the ecology is best understood are used to develop the appropriate level of mitigation for each of the habitats occurring in the HCP area. By ensuring the habitat representation and quality in the HCP area, the persistence of covered species using these habitats can be reasonably assumed.

Although the HCP predominantly follows a habitat-based approach, the effect of the covered activities and implementation of the HCP measures on each covered species are evaluated as required under the USFWS's 5-Point Policy. Life history, habitat requirements, occurrence and distribution in the HCP area, and overall population status of each species are used to predict the potential effects of implementing the HCP. By considering each

species individually within the habitat-based framework, the adequacy of the HCP measures in meeting the issuance criteria for each covered species is demonstrated.

The occurrence and distribution of burrowing owls in the HCP area is determined more by the availability of unique features (e.g., burrows) than the occurrence and distribution of a particular habitat type. A species-specific conservation strategy was developed for burrowing owls to ensure adequate coverage by the HCP measures. Further, the Aquatic Habitat group contains desert pupfish and razorback suckers. However, these species occupy two different aquatic habitats, the IID drainage system, and the IID conveyance system, respectively, and the effects of covered activities on these species are distinctly different. Therefore, desert pupfish and razorback suckers are also addressed individually.

IID's HCP consists of five habitat conservation strategies and three species-specific strategies. The habitat conservation strategies are as follows:

- Salton Sea habitat
- Tamarisk scrub habitat
- Drain habitat
- Desert habitat
- Agricultural field habitat

The four species-specific strategies are as follows:

- Burrowing owl
- Desert pupfish
- Razorback sucker
- Other covered species

Each of these conservation strategies, described in the following sections, were developed based on the potential for and magnitude of the effects the covered activities could have on covered species using each habitat. The following description of the specific strategies and habitat conservation measures is presented to help facilitate an understanding of the details of the commitments made by IID. The italicized language presented within text boxes represents the specifics of the measure; the text that follows each measure provides a justification for the measure and additional clarification. This format is intended to improve the readers' ability to understand and distinguish the key elements and commitments of the plan. However, the document as a whole, not just the language contained in the text boxes, forms the basis of IID's HCP and its commitments.

The elements of this HCP that address the effects related to changes at the Salton Sea were not developed in anticipation that a project to restore the Salton Sea would be implemented nor are they dependent upon implementation of a future restoration project. However, because a future project could influence the appropriateness or need for certain mitigation measures, several of the measures contain alternative direction in the event that a restoration project is implemented.

3.2 General HCP Commitments

To ensure proper implementation of the HCP measures presented in the following sections and the Monitoring and Adaptive Management Program (Chapter 4), IID will hire a full-time biologist to oversee implementation of the HCP measures and convene an HCP Implementation Team (HCP IT) to guide implementation of and adjustments to the HCP. These commitments are described in more detail below.

General–1. *Within 1 year of issuance of the incidental take permit (ITP), IID will appoint a full-time equivalent biologist/project manager (HCP Implementation Biologist) to manage the proper implementation of the HCP. Responsibilities will include ensuring adequate staffing and resources. Prior to securing a full-time equivalent biologist/project manager, IID's existing environmental compliance staff will ensure compliance with the HCP requirements.*

The HCP contains a suite of measures covering a variety of habitats and species and requires a comprehensive monitoring program. To ensure that the terms of the HCP are carried out, IID will hire a full-time biologist. The HCP Implementation Biologist will be responsible for ensuring that IID is complying with the HCP conditions.

General–2. *Within 3 months of issuance of the ITP, IID will convene an HCP Implementation Team consisting of representatives from IID, USFWS, and California Department of Fish and Game (CDFG).*

IID will convene an HCP Implementation Team consisting of representatives from IID, USFWS, and CDFG to guide execution of the HCP over the term of the HCP. The purpose of the HCP IT is to collaboratively guide and coordinate execution of the HCP over the term of the permit. The HCP IT will be responsible for the following:

- Guiding implementation of the HCP measures (e.g., identifying the location and characteristics for managed marsh habitat to be created under the Drain Habitat Conservation Strategy)
- Developing specific methodologies for survey programs and studies
- Adjusting the HCP measures under the Adaptive Management Program

Specific responsibilities of the HCP IT are identified in the HCP measures presented in the following sections, in Chapter 4: Monitoring and Adaptive Management and Chapter 5: Plan Implementation.

3.3 Salton Sea Habitat Conservation Strategy

3.3.1 Amount and Quality of Salton Sea Habitat

For the species covered by the HCP, use of the Salton Sea is a function of the abundant food resources, availability of a large, open body of water, and the presence of unique habitat features. The attractiveness of the Salton Sea to piscivorous birds stems from the very high abundance of fish at the Salton Sea. The availability of protected nesting and roosting locations adds to the attractiveness of the Salton Sea to these birds and other colonial-nesting birds. For nonpiscivorous bird species, abundant aquatic invertebrates are an important food resource. Aquatic invertebrates include brine shrimp, brine fly larvae, adult

pileworm, and barnacle nauplia and cypris. In addition to the food resources and nesting/roosting areas for birds, the Salton Sea provides habitat for desert pupfish and could play a role in supporting shoreline strand and adjacent wetland vegetation. Potential impacts of the covered activities to covered species using these resources relate to changes in salinity and the water surface elevation of the Salton Sea.

3.3.1.1 Fish Abundance

The tilapia, *Oreochromis mossambicus,* is the primary prey for covered species of piscivorous birds at the Salton Sea. Changes in the abundance of tilapia could alter the level of use of the Salton Sea by covered species of piscivorous birds. Thus, it is important to consider the ecology of tilapia at the Salton Sea in assessing the potential effects of the water conservation and transfer programs on covered piscivorous birds.

The Salton Sea supports the highest density of tilapia reported. Costa-Pierce and Riedel (2000a) estimated the standing crop of tilapia as 3,200 pounds per acre (lb/acre), 3.6 to 14.4 times greater than some tropical lakes in Southeast Asia. Within the Salton Sea, the highest densities of tilapia occur at the New and Alamo River deltas and in nearshore areas (Costa-Pierce and Riedel 2000a; Costa-Pierce pers. comm. 2000). The nearshore area of high tilapia density extends about 1,970 feet from the shoreline and at the deltas areas about 0.39 square miles (mi^2) in size around each river mouth support high tilapia density. The catches per unit effort of tilapia in the deltas and nearshore areas were more than 10 to 30 times greater than in pelagic areas of the sea and in the rivers (Table 3.3-1).

TABLE 3.3-1
Catch Per Unit Effort for Tilapia in the Salton Sea

Area	Catch Per Unit Effort (kg/hr)
Pelagic	0.22
Nearshore	2.37
River deltas	3.29
River channels	0.1

Source: Costa-Pierce and Riedel (2000a)

A food habit study of tilapia in the Salton Sea showed that in pelagic areas tilapia feed on zooplankton, particularly copepods and rotifers, whereas in the nearshore and deltaic areas, the diet was much more diverse and included a substantial amount of sediment and detrital matter (Costa-Pierce and Riedel 2000b). The high concentration of tilapia in the river deltas and nearshore areas may be related to the high levels of organic matter in the river and drain discharges to the sea at these locations. The nearshore and delta areas also support breeding by tilapia. In addition to nearshore and delta areas, tilapia spawn in drains.

Tilapia have a high salinity tolerance and they are able to adapt to very high salinity levels, particularly if the increase in salinity is gradual (Phillipart and Ruwet 1982 cited in Costa-Pierce and Riedel 2000a). Tilapia have been collected at a salinity of 120 parts per thousand (ppt),[1] but reproduction has not been reported at this salinity level (Whitfield and Blaber 1979). Costa-Pierce and Riedel (2000a) provide a review of reported salinity tolerances of

[1] Many of the studies regarding salinity tolerance of various species report the results in parts-per-thousand (ppt). Modeling conducted for this HCP utilized concentrations in mg/L (converted to g/L) which differs slightly from ppt as salinity increases due to the difference in the specific gravity of saltwater versus freshwater. Model results are reported in ppt for simplicity and to allow direct comparison with reported tolerances.

tilapia. Highest growth rates were reported at 14 ppt, but growth was still good and tilapia reproduced at 30 ppt. At 69 ppt, tilapia grew poorly, but reproduced well. In the Salton Sea at about 44 ppt, tilapia also grew poorly, but reproduced well. Based on these studies, Costa-Pierce and Riedel (2000a) suggested that tilapia in the Salton Sea could successfully acclimate to and continue to reproduce at a salinity level of 60 ppt. Above a salinity level of 60 to 70 ppt, growth, survival, and reproduction would decline (Costa-Pierce, pers. comm. January 12, 2001). While evidence suggests that reproduction of tilapia will begin to decline at a salinity level above 60 ppt, the actual salinity thresholds for reproduction and survival in the Salton Sea could be higher.

3.3.1.2 Nesting and Roosting Sites

Nesting and roosting sites used by covered species (i.e., black skimmers, gull-billed terns, white pelicans, brown pelicans, and double-crested cormorants) are presently available at several locations around the Salton Sea. Most sites are small, generally less than 0.25 acres, and with low relief, sometimes only a few inches above the level of wind-driven wave inundation. Water depth between islands and the mainland is only a few feet. Mullet Island is the largest island and used heavily as a nesting and roosting site. Other smaller islands consisting of old earthen levees are also available. Fewer islands are present in the northern portion of the sea; remnants of earthen levees near the mouth of the Whitewater River provide some nesting and roosting sites.

3.3.1.3 Desert Pupfish

Desert pupfish inhabit pools formed by barnacle bars located in near-shore and shoreline areas of the Salton Sea and at Salt and San Felipe creeks. Barnacle bars are deposits of barnacle shells on beaches, near the shore, and at the mouths of drains that discharge to the Salton Sea. Pools form behind the barnacle bars. These pools provide habitat for pupfish and also are believed to be important for allowing pupfish movement among drains, shoreline pools and smaller tributaries such as Salt and San Felipe creeks.

3.3.1.4 Shoreline Strand and Adjacent Wetland Habitat

The Salton Sea database identifies 293 acres of shoreline strand habitat along the Salton Sea. Shoreline strand habitat consists of tamarisk and iodine bush. In addition to the shoreline strand, the Salton Sea database identifies 2,349 acres of adjacent wetlands dominated by tamarisk. The source of the water that supports the shoreline strand community is uncertain but could consist of a combination of shallow groundwater and seepage from the Salton Sea. These areas potentially provide habitat for covered species associated with tamarisk scrub habitat.

3.3.2 Effects of the Covered Activities

The primary potential effects of the covered activities on covered species using the Salton Sea relate to changes in the rate of salinization of the sea and changes in the water surface elevation. The salinity level influences the abundance and persistence of fish that support foraging by piscivorous birds and also could influence the ability for pupfish to use the sea to move among drains and to move from Salton Sea to San Felipe Creek and mouth of Salt Creek. Reductions in the water surface elevation could influence the availability and suitability of nesting and roosting areas for colonial nesting birds and also the extent of tamarisk along the sea's margins. The projected changes in salinity and water surface

elevation with and without implementation of the water conservation and transfer programs and the potential responses of covered species to these changes are described below.

3.3.2.1 Increased Salinity

Since its formation, the salinity of the Salton Sea has been increasing because of high evaporative water loss and continued input of salts from irrigation drainage water. Increasing salinity of Colorado River water delivered at Imperial Dam, which is the sole source for irrigation water in Imperial Valley, also is a factor. The Salton Sea is currently hypersaline, with salinity greater than the ocean.

The Mozambique tilapia is the most abundant fish species in the Salton Sea (Costa-Pierce and Riedel 2000a; Black 1988) and is the primary forage species for piscivorous birds at the Salton Sea (Molina 1996; S. Johnson, pers. comm. 2000). Because of the importance of tilapia in the diet of piscivorous birds at the Salton Sea, the potential change in the tilapia population of the Salton Sea is the focus of assessing the impact of the covered activities on covered piscivorous bird species.

Modeling by Reclamation (January 2002) indicates that the salinity of the Salton Sea would continue to gradually increase over the next 75 years in the absence of the water conservation and transfer programs. The mean of the salinity projections show the salinity of the Salton Sea surpassing 60 ppt in 2023 (Table 3.3-2; Figure 3.3-1). Costa-Pierce and Riedel (2000a) stated that survival, growth and reproduction would decline at a salinity above 60 ppt. Thus, once the salinity of the Salton Sea surpassed 60 ppt, tilapia abundance would be expected to decline as the increasing salinity impaired reproduction. However, relatively freshwater inflow from the New and Alamo Rivers creates an estuarine environment in the river deltas where salinity levels are lower than in the main body of the Salton Sea. Under current conditions, Costa-Pierce and Riedel (2000c) reported salinity levels ranging from 10 to 30 ppt in the river deltas. Tilapia could persist at the Salton Sea if the deltas continued to provide lower salinity environments.

TABLE 3.3-2
Mean and Upper and Lower Bounds of the 95 Percent Confidence Interval Around the Year that Salinity of the Salton Sea is Projected to Exceed 60 ppt Under the Baseline Condition and Various Water Conservation and Transfer Scenarios

Scenario	Upper Bound	Mean	Lower Bound
Baseline	2030	2023	2018
300 KAFY to SDCWA by Fallowing	2021	2017	2014
130 KAFY to SDCWA	2015	2013	2011
230 KAFY to SDCWA	2014	2012	2011
300 KAFY to SDCWA	2014	2012	2011

Source: Reclamation (January 2002)
KAFY = thousand acre-feet per year

Water conserved through IID's water conservation programs would result in a reduction in inflows to the Salton Sea. This inflow reduction would increase the rate of salinization of the sea. IID could achieve water conservation through a combination of on-farm and system-based measures, and fallowing. The degree to which water conservation would

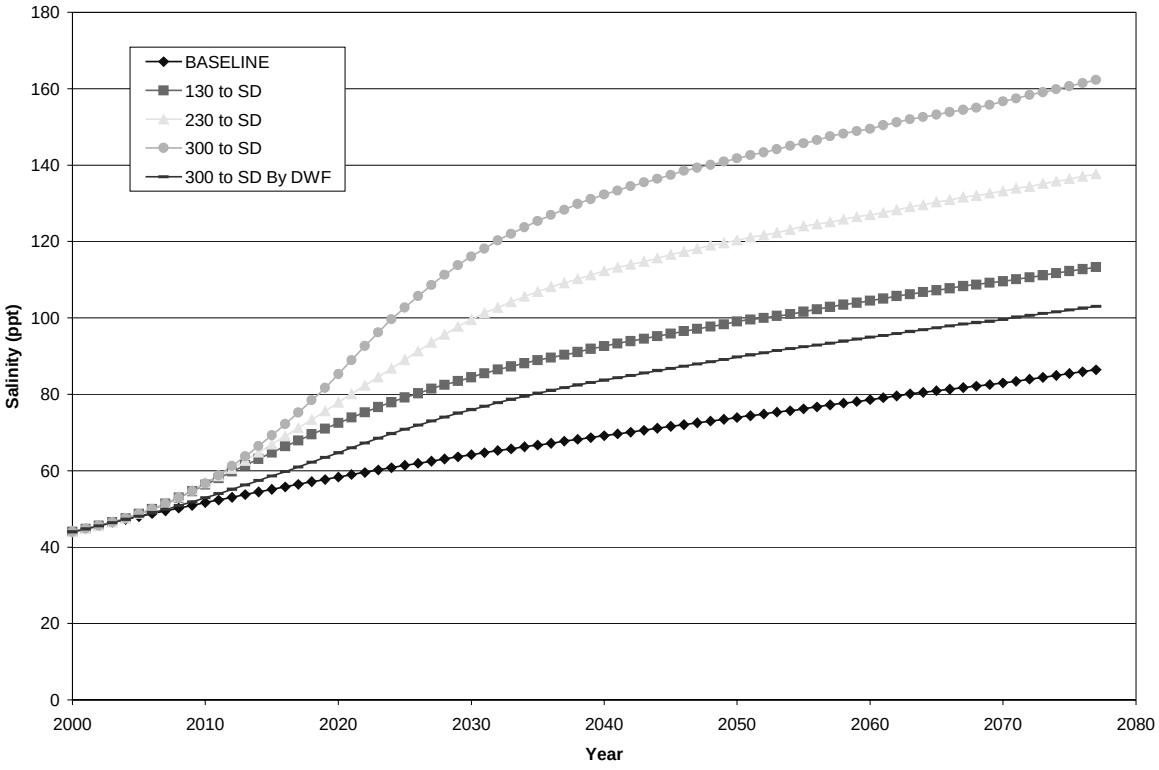

FIGURE 3.3-1
Projected Salinity Levels With and Without Implementation of the Water Conservation and Transfer Programs

accelerate salinization would depend on the method of water conservation, the amount of water conserved, and the amount of water transferred out of the Salton Sea basin.

The potential effects of the water conservation and transfer programs on the rate of salinization are bounded by projections of (1) using all on-farm and system-based measures to achieve 300 thousand acre-feet per year (KAFY) of conservation and (2) using all fallowing to achieve 300 KAFY of conservation (Figure 3.3-1). With conservation and transfer of 300 KAF using on-farm and system-based measures the mean salinity of the Salton Sea is predicted to surpass 60 ppt in 2012 (Figure 3.3-2), 11 years earlier than under the baseline projections. Using all fallowing to achieve the same level of conservation, the mean salinity of the Salton Sea is predicted to exceed 60 ppt in 2017, six years earlier than under the baseline condition.

The preceding discussion could be interpreted as suggesting that the rate and magnitude of future changes in salinity and the response of tilapia are certain and determinant. The modeling conducted by Reclamation constitutes the best available information on the rate and magnitude of salinity increases at the Salton Sea. However, models are necessarily simplified representations of complex systems that can and do react unpredictably. Myriad factors will influence the actual salinity trajectory of the sea. Factors potentially influencing the salinity trajectory include but are not limited to future weather conditions; unknown chemical dynamics; variations in inflows from Mexico; implementation of a Salton Sea

Return to Contents

Restoration Project; variations in IID diversion levels because of legal or political changes, drought in the upper basins states, or others factors.

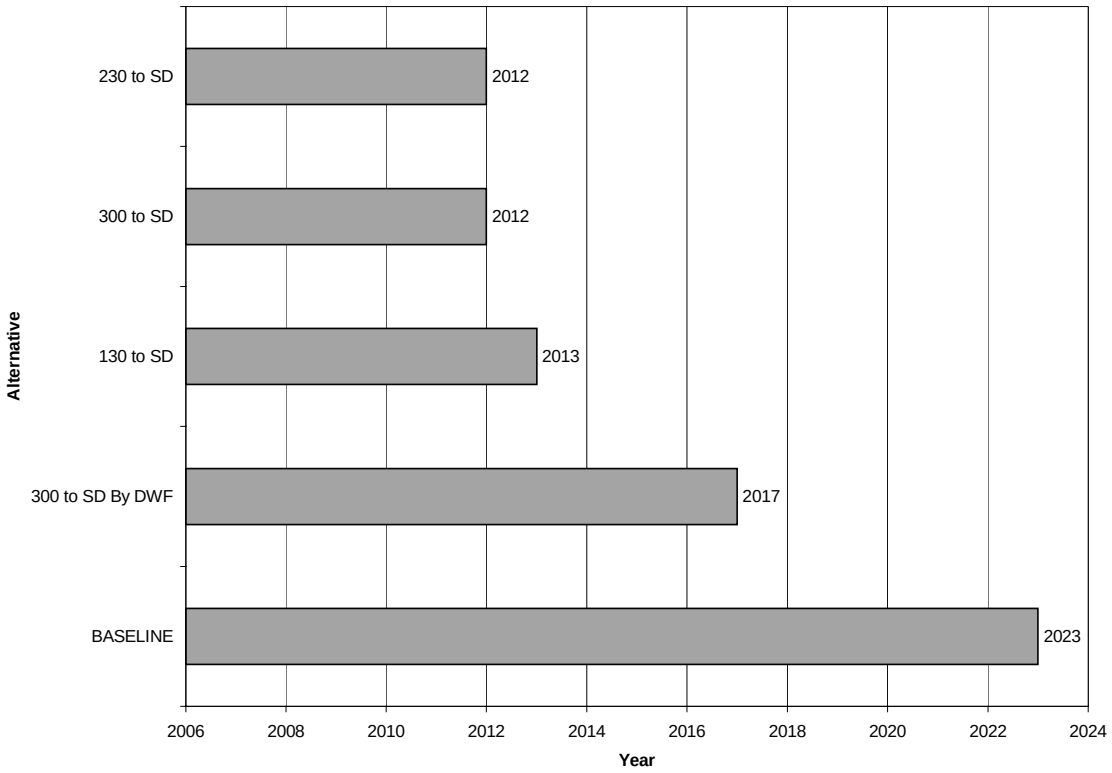

FIGURE 3.3-2
Year that Mean Salinity of the Salton Sea is Projected to Exceed 60 ppt Under the Baseline Condition and the Potential Range of Water Conservation Amounts and Transfer Locations

These unknowns could accelerate or decelerate the salinization of the Sea relative to the current projections. However, these factors would be expected to equally affect the projections with and without implementation of the water conservation and transfer programs. As such, the differences between the salinity projections with implementation of the water conservation and transfer programs and the baseline would not be expected to change substantially.

In the preceding discussion, tilapia were assumed to no longer be able to reproduce once the salinity of the sea reached 60 ppt and at that point their abundance at the sea would decline. The actual response of tilapia to increased salinity at the Salton Sea likely will be much less definitive for several reasons. First, relatively freshwater will continue to flow into the Salton Sea at the New, Alamo and Whitewater rivers and from the drains. Some tilapia could persist at the Salton Sea if low salinity areas persisted around the deltas and potentially near drain outlets. Second, given tilapia's ability to tolerate very high salinity levels as juveniles and adults, the deltas and drains could serve as a breeding population from which individuals could disperse to populate other areas of the sea until the salinity of the main body became intolerable to adults and juveniles. Third, tilapia at the Salton Sea could adapt or evolve to tolerate higher salinities. These three factors could act to extend the persistence and abundance of tilapia at the Salton Sea. Alternatively, increased stress

associated with higher salinity could increase the susceptibility of tilapia to disease and lead to an increased incidence of massive die-offs. Although the exact response of tilapia to increased salinity cannot be predicted with certainty, it is reasonable to expect that the total tilapia population supported in the Salton Sea would be reduced relative to existing conditions. This reduction would occur with or without implementation of the water conservation and transfer programs. The potential effects of a reduction in tilapia at the Salton Sea on the four major piscivorous birds covered by the HCP are described below.

American White Pelican

White pelicans use the Salton Sea as a migratory stopover and wintering area. As a migratory stopover, individual pelicans appear to use the Salton Sea for a few weeks to a few months before continuing on their migration to Mexico (Shuford et al. 1999). Some birds probably remain at the Salton Sea throughout the winter rather than continuing on to Mexico.

The number of pelicans using the Salton Sea at any time varies substantially. According to counts reported by USFWS and aerial surveys conducted by Point Reyes Bird Observatory (Shuford et al. 2000), the Salton Sea at times supports one of the largest concentrations of white pelicans in the Pacific Flyway. McKay reported maximum counts of white pelicans at the Salton Sea during 1984 to 1990. The maximum counts ranged from 2,000 to 17,000 and usually occurred in February. The average of maximum counts for these years was 6,500 white pelicans. Based on a sharp decline in counts between 1985 and 1990, the population of pelicans using the Salton Sea was believed to be declining. However, the aerial surveys conducted in 1999 found 16,697 pelicans using the Salton Sea in January and February, a similar number as reported by McKay in 1985 (17,000; Shuford et al. 2000). The following November, Shuford et al. (2000) reported 19,197 pelicans at the Salton Sea. Christmas Bird count data show white pelicans at the Salton Sea in every year since 1979 (Figure 3.3-3). The number of birds observed in Christmas Bird Counts at the Salton Sea from 1979 to 2000 averages about 2,195. The USFWS recorded numbers of white pelicans at the Salton Sea for a 21-month period between December 1999 and August 2001. White pelican numbers were highest (24,110) in February 2000 and lowest (770) in June 2001 (Table 3.3-3).

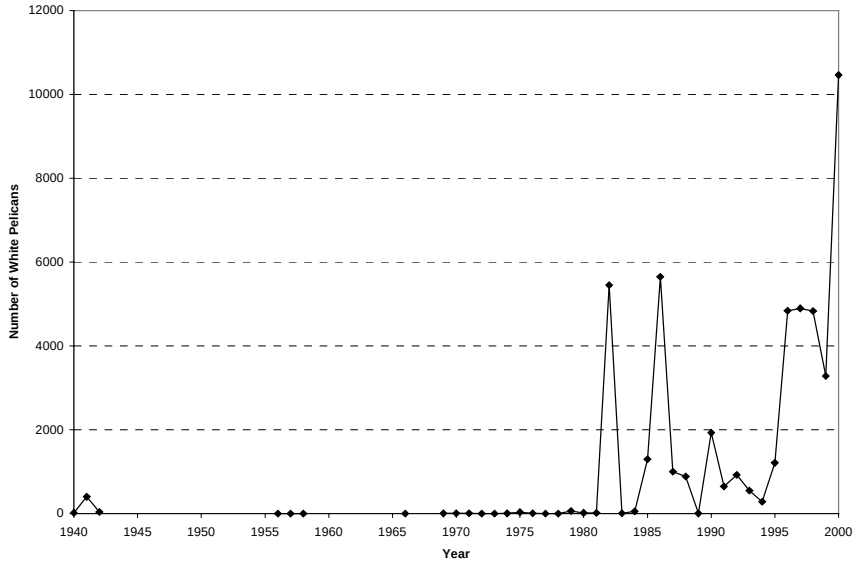

FIGURE 3.3-3
Number of White Pelicans Reported in Christmas Bird Counts at the Salton Sea from 1940 to 2000

Return to Contents

TABLE 3.3-3
American White Pelicans Reported at the Salton Sea, California

Date	Number Counted
December 1999	5,000
January 2000	8,875
February 2000	24,110
March 2000	15,408
April 2000	7,255
May 2000	3,510
June 2000	3,459
July 2000	1,147
August 2000	994
September 2000	13,997
October 2000	5,075
November 2000	3,000
December 2000	7,380
January 2001	8,736
February 2001	18,705
March 2001	15,036
April 2001	3,200
May 2001	1,245
June 2001	770
July 2001	1,320
August 2001	7,430
Average	**7,412**

Source: Salton Sea Authority, Wildlife Disease Program

These data indicate that winter and migratory use of the Salton Sea is highly variable within and among years. While large numbers of white pelicans stop at the Salton Sea for brief periods of time on migration or exploit food resources at the sea sporadically during the winter, the average wintering population is much lower. Pelicans that overwinter at the Salton Sea usually are present in greatest numbers at the Salton Sea from November to April (Shuford et al. 2000). In addition to the Salton Sea, pelicans using the Pacific Flyway also overwinter along the California coast south of San Francisco, the San Joaquin Valley, throughout Baja California, and in the Gulf of California (Johnsgard 1993).

Pelicans are highly opportunistic and mobile in selecting foraging sites, and have been reported to travel long distances to forage even during breeding, an energetically stressful time (Knopf and Kennedy 1980). At Pyramid Lake, Nevada, pelicans have been reported foraging at seven different lakes during the breeding season. With the exception of Pyramid Lake where the breeding colony is located, all of the foraging sites were more than 37 miles from Pyramid Lake, with the farthest foraging site (Stillwater National Wildlife Refuge [NWR]), nearly 62 miles away (Knopf and Kennedy 1980). Knopf and Kennedy (1980) found that pelicans nesting at Pyramid Lake switched foraging locations frequently during the nesting season. Changes in foraging location appeared to be linked to the availability of fish. For example, pelicans used Pyramid Lake, the closest foraging location to the breeding colony, at relatively low levels except for June when tui chub became available in shoreline areas. Knopf and Kennedy (1980) characterized pelicans as "opportunistic in selecting foraging sites where fish are most readily available." Johnsgard (1993) also notes the great distances that pelicans will travel to forage. Summarizing data from other studies, Johnsgard (1993) reports one-way foraging flights of up to 100 miles (Great Salt Lake), round trips of 60 to 380 miles (Chase Lake, ND), and one-way distances of 90 miles (Harvey and Warner basins).

The reported foraging behavior of white pelicans indicates that they seek the most favorable foraging area within a wide area. The availability of an abundant source of fish, tilapia in particular, makes the Salton Sea attractive to pelicans. With increased salinity of the Salton Sea, the abundance of tilapia would likely decline as described above. However, tilapia could persist at the Salton Sea, particularly in the New and Alamo River deltas. Pelicans currently concentrate foraging in the deltas (Shuford et al. 2000). With the continued persistence of tilapia at the Salton Sea, pelicans would likely continue to use the Salton Sea as a migratory stopover and wintering area. However, if salinity increases result in a substantial decline in the abundance of tilapia, it is reasonable to expect that the level of use of the Salton Sea by white pelicans would decline. A decline in the level of use of the Salton Sea by pelicans could be manifested as a shorter stopover time for birds that continue to wintering grounds farther south, lower numbers of birds, or shorter residence periods of overwintering birds. Given their opportunistic foraging strategy and ability to travel long distances, it is likely that pelicans would switch to other wintering areas if fish at the Salton Sea became less abundant and if the energetic costs of foraging there became greater than at other locations in California and Mexico. Other locations where white pelicans have been reported during migration and overwintering include the Lower Colorado River (LCR) (USFWS unpublished data), Mystic Lake and Lake Elsinore in southern California (G. Black, pers. comm. 2001), coastal bays along the southern California and Mexican coasts (Small 1994; Johnsgard 1993). As such, the actual level of take resulting from changes in fish abundance at the Salton Sea is uncertain. However, it is reasonably likely that the level of use of the Salton Sea by white pelicans would decline as tilapia abundance declined. This effect would occur with and without implementation of the water conservation programs. The effect of the water conservation programs would be to accelerate the rate at which this effect would be manifested.

Adult pelicans are capable of moving long distances to find food. As such, with a decline in the abundance of fish at the Salton Sea, at least some of the adult pelicans, albeit possibly not all, should be able to find alternate food resources. The segment of the population most at risk to adverse effects of reduced fish abundance at the Salton Sea likely would be first year birds. First year birds are not as experienced as older birds at locating food and exploiting food resources. For brown pelicans, Johnsgard (1993) suggested that the high mortality rate of first year birds and substantially lower mortality rate of birds older than 1 year reflected an improved foraging efficiency of older birds. Similarly, first year white pelicans could be the least adept segment of the population at finding and exploiting alternate foraging habitat with a decline in the abundance of fish at the Salton Sea. A portion of the birds using the Salton Sea, possibly disproportionately first year birds, could be injured or killed if they could not find alternate foraging habitat or forage efficiently.

California Brown Pelican

Brown pelicans probably had little historical use of the Salton Sea (Anderson, pers. comm. 1993). Some postbreeding pelicans were documented at the sea in the late 1970s. Use of the Salton Sea by brown pelicans subsequently increased, with the maximum summer usage estimated at 5,000 birds. Nearly 2,000 were recorded in 1999, but a maximum of only 1,000 were recorded in 2000 (Shuford et al. 2000). The USFWS recorded numbers of brown pelicans at the Salton Sea for a 21-month period between December 1999 and August 2001. Brown pelican numbers were highest (3,990) in July 2001 and lowest (5) March 2000 (Table 3.3-4).

TABLE 3.3-4
California Brown Pelicans Reported at the Salton Sea, California.

Date	Number Counted
December 1999	100
January 2000	50
February 2000	40
March 2000	5
April 2000	10
May 2000	82
June 2000	2,563
July 2000	1,948
August 2000	1,354
September 2000	918
October 2000	300
November 2000	319
December 2000	96
January 2001	38
February 2001	65
March 2001	6
April 2001	16
May 2001	530
June 2001	2,650
July 2001	3,990
August 2001	3,280
Average	**874**

Source: Salton Sea Authority, Wildlife Disease Program

The post-breeding visitors are mostly young birds that disperse northward from breeding areas in the Gulf of California (Hazard, pers. comm.). Most use of the Salton Sea is by post-breeding visitors, with more limited use for wintering. Shuford et al. (2000) reported that brown pelicans occur at the Salton Sea primarily from mid-June to early October. They observed the highest numbers in August. The primary wintering area in the United States is along the California coast (Johnsgard 1993).

Brown pelicans only recently, in 1996, started nesting at the Salton Sea (Shuford et al. 1999). The number of breeding birds has been low with 6 pairs nesting in 1996 and several pairs attempting to nest in most years since then (Shuford et al. 1999). Brown pelicans did not nest at the Salton Sea in 1999 (Shuford et al. 2000). Nesting birds have used tamarisk at the Alamo River delta and also attempted to nest at Obsidian Butte (S. Johnson, pers. comm. 2000). Compared to the nearest breeding colonies of brown pelicans located in the Gulf of California on San Luis Island (4,000 to 12,000 pairs), Puerto Refugio (1,000 to 4,000 breeding pairs) and Salsipuedes / Animas / San Lorenzo area (3,000 to 18,000 pairs), the population nesting at the Salton Sea makes a small contribution to the overall population. Other breeding populations occur off the southern California Coast and the western coast of Baja California (Johnsgard 1993).

Dispersing juveniles wander considerably from nesting locations and can travel long distances (Johnsgard 1993). Young eastern brown pelicans can move more than 310 miles from breeding areas (Johnsgard 1993). Similarly in California, most banded birds were recovered within 310 miles of the breeding site but one was found in Mexico, 1,375 miles away from the banding location (Johnsgard 1993). Adults also appear to become wanderers after breeding and have been reported to move 280 to 360 miles from nesting areas (Johnsgard 1993).

As previously described, the abundance of tilapia is expected to decline as the salinity of the sea increases. However, tilapia could persist at the Salton Sea, particularly in the New and

Alamo River deltas. Pelicans currently concentrate foraging in the deltas (Shuford et al. 2000). With the continued persistence of tilapia at the Salton Sea, brown pelicans would likely continue to visit the Salton Sea as post-breeders. Because post-breeding pelicans are known to wander over large areas, it is likely that the pelicans would remain at the Salton Sea for a shorter period of time and/or seek out more favorable foraging areas in the Gulf of California or along the Pacific Coast, if foraging becomes energetically unfavorable at the Salton Sea. These areas are within the distances that brown pelicans can travel. As such, the actual level of take of post-breeding visitors resulting from changes in fish abundance is uncertain. However, it is reasonably likely that the level of use of the Salton Sea by brown pelicans would decline as tilapia abundance declined. This effect would occur with and without implementation of the water conservation programs. The water conservation programs would only act to accelerate the rate at which this effect would be manifested.

Breeding only recently was initiated at the Salton Sea and only in small numbers of birds (6 pairs or fewer). Brown pelicans did not nest at the sea in 1999 (Shuford et al. 2000). Brown pelicans that have nested at the Salton Sea represent less than 1 percent of the California breeding population (Johnsgard 1993) and a far smaller percentage of the subspecies' entire population. Depending on the degree to which the tilapia population declines, brown pelicans might not nest at the Salton Sea again in the future Because of the small number of birds that have nested at the sea and the infrequency of nesting, the impact associated with the potential loss of future breeding opportunities for brown pelicans at the Salton Sea would be minor.

Black Skimmer

Black skimmers first appeared in California in 1962. Six years later five skimmers were sighted at the Salton Sea (Collins and Garrett 1996). The first nesting by black skimmers in California occurred in 1972 at the Salton Sea (Collins and Garrett 1996). Since black skimmers were first observed in California, their numbers have been steadily increasing. New breeding locations have been reported at several locations along the California coast from San Diego to San Francisco Bay and the number of birds using these various locations has generally been increasing (Table 3.3-5). In addition to the California nesting sites, black skimmers nest at Montague Island in the Gulf of California (Collins and Garret 1996).

At the Salton Sea, nesting colonies of black skimmers have ranged in size from 10 to several hundred pairs; most colonies consist of 50 to 200 pairs (Molina 1996). As many as 777 black skimmers have been reported in summer (Shuford et al. 2000). The Salton Sea is unique in being the only inland breeding site of this species and currently supports about 30 percent of the known breeding population in California. Skimmers nest on bare earthen slopes, terraces, and levees adjacent to the Sea. Specific nesting locations include Mullet Island, the Whitewater River delta, Morton Bay, Rock Hill, and Obsidian Butte.

After breeding, skimmers appear to be very mobile, moving among a number of wintering locations. Gazzaniga (1996) showed wide month-to-month fluctuations in the number of skimmers using five locations on the California coast. The reasons for the fluctuations were unclear, but she suggested that weather and food resources could play a role. Long distance movements by black skimmers also have been reported. Palacios and Alfaro (1992) captured birds banded at Bolsa Chica along the coast of Baja California and Gazzaniga (1996) observed a bird banded at Bolsa Chica at Princeton Harbor, 160 miles north of Bolsa Chica. Skimmers banded as chicks at Bolsa Chica have also been found breeding at Montague

Island in the Gulf of California (Collins and Garret 1996). In combination with the observed colonization of several locations on the California coast since the 1970s, these observations suggest that skimmers regularly travel long distances during the winter and will establish breeding colonies where suitable nesting conditions exist.

TABLE 3.3-5
Number of Pairs or Nest Initiations* by Black Skimmers at Various Locations in California, 1972-1995

Year	Salton Sea	San Diego Bay	Bolsa Chica	Upper Newport Bay	San Francisco Bay	Batiquitos Lagoon
1972	5					
1973	3					
1974	10					
1975	9					
1976	25	1				
1977	100	3				
1978	100	6				
1979	ND	14				
1980	0	30				
1981	0	25				
1982	0	35				
1983	0	50				
1984	0	++				
1985	47	150	10*			
1986	300	130	60*	2		
1987	500	++	106*	ND		
1988	100	200	150*	15		
1989	0	++	112*	45		
1990	100	++	338*	14		
1991	80	>157	398*	40		
1992	100	++	278*	++		
1993	300	326 (473*)	284*	++		
1994	450	310 (420*)	353*	++	2*	
1995	487	>200	201*	451*	2*	14*

Source: Collins and Garrett (1996)
ND: no data available
++ birds seen, possibly in large numbers, but no nest census data available.

Black skimmers could be adversely affected by the changes predicted at the Salton Sea in two ways. First, the water surface elevation of the Salton Sea is projected to decline and to create a land bridge to Mullet Island (see Section 3.3.2.2). The suitability of this nesting location for black skimmers could decline if predation or disturbance increased as a result of formation of the land bridge. In addition, other nesting and roosting locations could become less suitable for black skimmers as the sea elevation declines. Second, the increased salinity is expected to result in reduced abundance of tilapia. These effects would occur with or without implementation of the water conservation and transfer programs. However, the projected salinity change and decline in tilapia abundance could be accelerated by the water conservation programs.

Skimmers are believed to feed on young tilapia to a large extent at the Salton Sea (Molina 1996). While tilapia could persist at the Salton Sea, their abundance and reproductive rate is expected to decline. As a result, prey availability for skimmers could decline, and nesting might not be sustained or could occur at a lower level than currently is supported at the Salton Sea.

Double-Crested Cormorant

At the Salton Sea, cormorants nest on rocky ledges on Mullet Island or on dead vegetation at the deltas of the New and Alamo rivers. Snags in the Salton Sea are important for providing protected roost sites for double-crested cormorants. Cormorants regularly move between the Salton Sea and the lakes at the Finney-Ramer Unit of the Imperial Wildlife Area where they forage. Lakes at the Finney-Ramer Unit of Imperial WA also support double-crested cormorant nesting and roosting.

Double-crested cormorants are a common and abundant species at Salton Sea, with counts of up to 10,000 individuals (USFWS 1993; IID 1994). Small nesting colonies were documented at the north end of the sea in 1995 (USFWS 1996), but recently (1999) more than 7,000 double-crested cormorants and 4,500 nests were counted on Mullet Island. Mullet Island now represents the largest breeding colony of double-crested cormorants in California (Shuford et al. 1999). The year-round resident population is about 3,000 birds (Shuford et al. 2000).

With increased salinity of the Salton Sea, the abundance of cormorants at the Salton Sea could decline with reduced prey availability (i.e., tilapia). Increased salinity and reduced fish abundance at the Salton Sea would occur irrespective of the water conservation programs. However, the implementation of the water conservation programs could accelerate the occurrence of these changes. Changes in the suitability of nest and roost sites as the sea's elevation recedes also could occur. As described below, the sea's elevation is projected to decline under the baseline condition and with the water conservation and transfer programs. As a result, Mullet Island would become connected to the mainland potentially leading to increased disturbance or predation at the cormorant colony. Cormorants could abandon the colony on Mullet Island as a result of changes in the suitability of the site and / or changes in prey availability.

Even with changes in the suitability of foraging, roosting, and nesting habitat quality at the Salton Sea, cormorants would still inhabit the HCP area. They currently nest and roost on the Finney-Ramer Unit of the Imperial Wildlife Area (WA) and forage at lakes on this unit as well as in agricultural drains, reservoirs, and Fig Lagoon. The New, Alamo, and

Whitewater River deltas currently support nesting colonies of double-crested cormorants (Shuford et al. 2000) and would continue to provide nesting, roosting, and foraging opportunities. However, the large colony on Mullet Island would probably not persist.

Desert Pupfish

Desert pupfish have a high salinity tolerance. They have been collected and grown at salinities as high as 90 ppt (Kinne and Kinne 1962). Under baseline conditions, the projections show that the mean salinity of the Salton Sea would not exceed 90 ppt in 75 years. (Table 3.3-6). Thus, under baseline conditions, pupfish would be expected to be able to continue to use the sea to move among drains.

TABLE 3.3-6
Mean and Upper and Lower Bounds of the 95 Percent Confidence Interval Around the Year that Salinity of the Salton Sea is Projected to Exceed 90 ppt Under the Baseline Condition and Various Water Conservation and Transfer Scenarios

Scenario	Upper Bound	Mean	Lower Bound
Baseline	>2077 [a]	>2077[a]	2072
300 KAFY to SDCWA by Fallowing	2063	2051	2042
130 KAFY to SDCWA	2046	2037	2030
230 KAFY to SDCWA	2029	2026	2023
300 KAFY to SDCWA	2024	2022	2020

[a] The model projections stopped in 2077.
Source: Reclamation (January 2002)

With conservation using on-farm and system-based measures to conserve 300 KAFY, the mean projections show the salinity of the Salton Sea exceeding 90 ppt in 2022 (Table 3.3-6). At this salinity, the sea could become intolerable to pupfish and prevent them from moving among drains. If the sea becomes a barrier to pupfish, pupfish could be isolated in individual drains. Small, isolated populations are at risk of extinction because of environmental and genetic stochasticity. Ultimately, this condition also would occur under the baseline and with water conservation achieved with all fallowing, but at a later time.

3.3.2.2 Water Surface Elevation

The water surface elevation of the Salton Sea is projected to decline under both the baseline condition and with implementation of the water conservation and transfer programs. Under the baseline condition, the water surface elevation is projected to decline until a new equilibrium (evaporation equals inflows) is reached at about –235 ft mean sea level (msl) in the years 2070 to 2077 (Figure 3.3-4). The projected baseline is based on changes in current inflows as a result of the following:

- Continued and full implementation of the existing IID / MWD transfer
- Higher salinity in the Colorado River at Imperial Dam
- Reduced surplus flows available from the Colorado River
- Reduced contributions from the Coachella Aquifer

The IID / Metropolitan Water District of Southern California (MWD) transfer began producing water in about 1990, ramping up to full implementation in 1999. The projected baseline continues this transfer for the 75-year period at full implementation of 100 to 110 KAFY. The continued and full implementation of the IID / MWD transfer for the 75-year

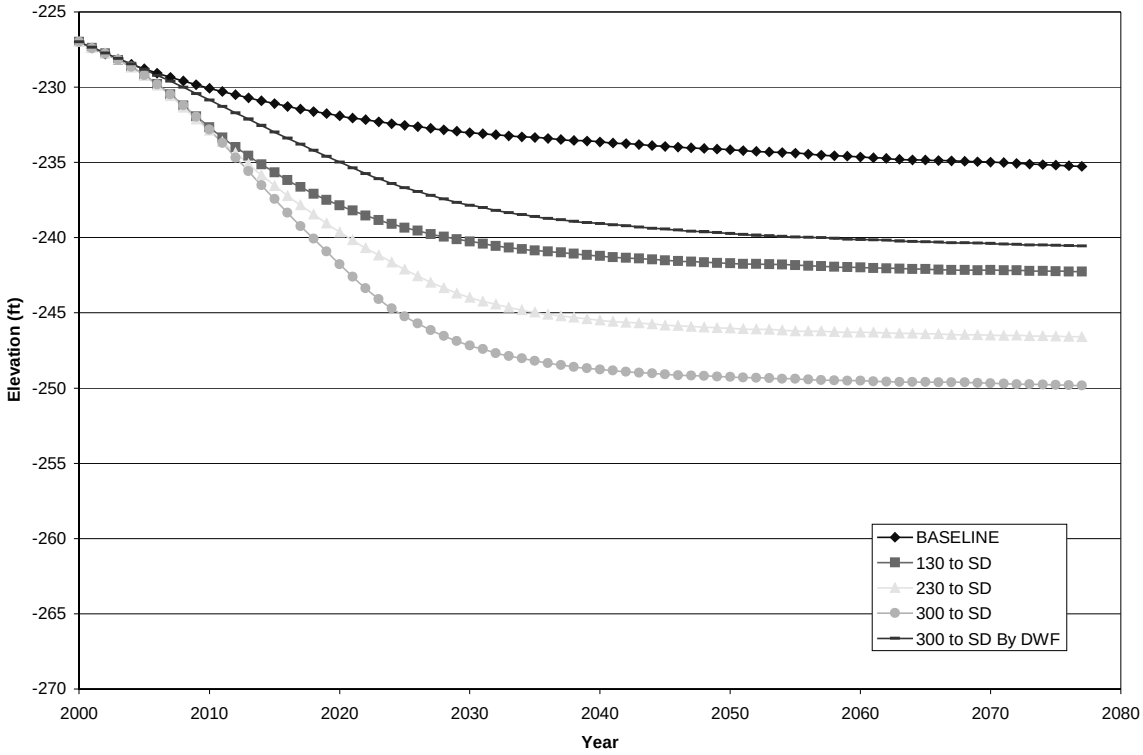

FIGURE 3.3-4
Projected Water Surface Elevation With and Without Implementation of the Water Conservation and Transfer Programs

period as projected in the IID / MWD Transfer EIR will on average reduce flows to the Salton Sea approximately 100 KAFY.

Higher salinity in the Colorado River will require that IID and Coachella Valley Water District (CVWD) divert more water from the Colorado River to leach salt from the agricultural fields for crop production. This however will be offset by California's Colorado River agriculture entitlement of 3.85 million acre-feet per year (MAFY) which will limit additional diversions from the Colorado River for this required additional salt leaching. As a result, crop yields and eventually crop production could decline resulting in less need for water and less return flows to the Salton Sea. In addition, some farmers may choose to idle some of their agriculture ground to allow for additional leaching of other more productive ground. The baseline modeling assumptions include this combination of a limit on agriculture diversions and the potential of idle ground for salt leaching. The net result to the baseline will be reduced flows to the Salton Sea over time.

Based on long-range forecasts of snowmelt runoff in the Colorado River Basin and the fact that all lower basin states are using their full entitlements leads to the conclusion of less surplus flows available from the Colorado River. As a result, the California agriculture water users will be limited to their entitlement of 3.85 MAFY. Currently CVWD requires surplus Colorado River water to meet its full demand. The projected baseline assumes that CVWD and IID would be limited to a maximum diversion of 3.43 MAFY (Palo Verde Irrigation District will continue to use 420 KAFY) in order to maintain the California

Return to Contents

agriculture entitlement of 3.85 MAFY. This is included in the baseline and, combined with the salt leaching projection, results in less diversion of Colorado River water by IID and CVWD, which reduces flows to the Salton Sea.

CVWD derives a portion of its water supply from groundwater. Based on population and agricultural growth within the CVWD and the limited water supply entitlement from the Colorado River, groundwater usage within the CVWD is required to continue into the future. Without additional recharge to this aquifer, the water table will continue to decline causing less inflows to the Salton Sea and CVWD projects that the Salton Sea water will eventually intrude into the CVWD aquifer. This assumption was included in the baseline projection and resulted in less flow to the Salton Sea over the modeling period.

Implementation of the water conservation and transfer programs would result in less inflow to the sea and would result in a more rapid decline in water surface elevation than under the baseline. With conservation of 300 KAFY through on-farm and system-based measures, the water surface elevation would decline rapidly for the first 35 years. After this period, the rate of elevation decline would lessen and the water surface elevation would stabilize at about –250 ft msl (Figure 3.3-5). With conservation of 300 KAFY through fallowing, the water surface elevation would decline at a faster rate than under the baseline condition (Figure 3.3-4), and stabilize at about –240 ft msl. Figure 3.3-5 shows the location of the shoreline at various surface elevations.

Nesting and Roosting Sites

Colonial nesting birds, including several covered species nest and roost on a number of small islands (islets) around the Salton Sea and a large island, Mullet Island. Bathymetry data of the Salton Sea indicates that the elevation of the land between the mainland and Mullet Island is less than –231 feet, or less than 4 feet below the existing surface water elevation (University of Redlands 1999). Thus, Mullet Island would be connected to the mainland with a decline in sea level of about 4 feet. Other islands used for nesting in addition to Mullet Island that could be connected to the mainland include a small barren islet at Johnson Street that supports gull-billed terns and black skimmers, and a single levee remnant at Elmore Ranch that has supported several species of ground-nesting birds. These sites are separated from the mainland by water that is about 2 to 3 feet deep.

The decline in water surface elevation projected for the baseline and the water conservation scenarios would result in these islands becoming connected to the mainland. Under the baseline condition, the water surface elevation would decline by about 8 feet. With conservation of 300 KAFY through on-farm and system-based measures, the water surface elevation is projected to decline about 27 feet. Although the islands would become connected to the mainland under all levels of conservation including the baseline condition, the timing would vary by a few years depending on the methods used to conserve water, the amount of conservation, and where the water is transferred (Table 3.3-7). With water conservation through on-farm and system-based measures, nesting islands could become connected to the mainland from 1 to 7 years earlier than under the baseline. Use of all fallowing to conserve water would decrease this difference to 0 to 4 years.

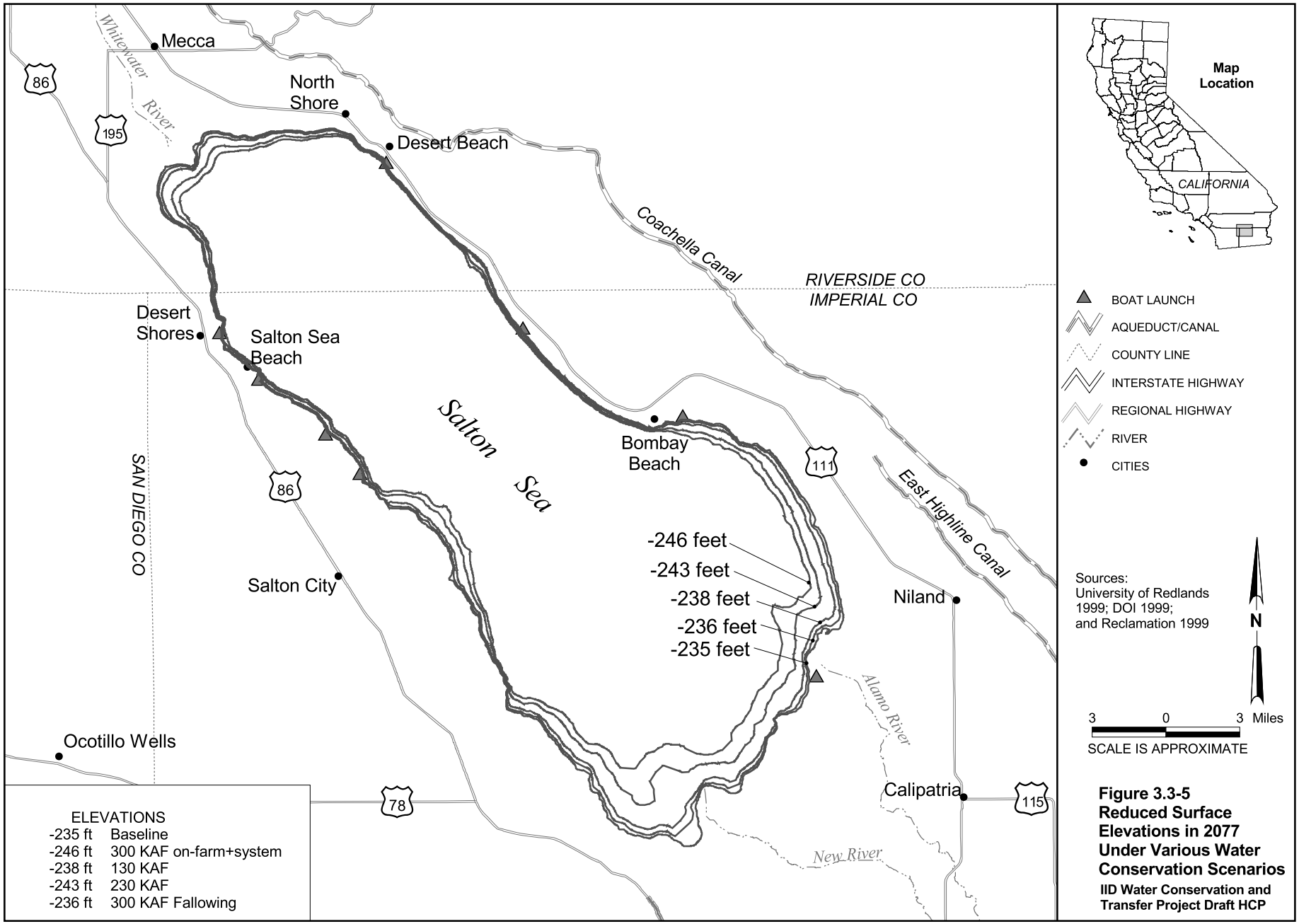

Figure 3.3-5
Reduced Surface Elevations in 2077 Under Various Water Conservation Scenarios
IID Water Conservation and Transfer Project Draft HCP

CH2M Hill RDD ArcView Project File \\rddgis\iid\recreation.apr 1:16 p.m. 12-14-2001

CH2MHILL

Return to Contents

TABLE 3.3-7
Year When the Water Surface Elevation of the Salton Sea is Projected to Decline 2, 3, and 4 Feet Under the Baseline Condition and Various Water Conservation and Transfer Scenarios.

	Elevation Decline		
	2 Feet	**3 Feet**	**4 Feet**
Baseline	2006	2010	2015
130 to SDCWA	2005	2007	2008
230 to	2005	2007	2008
300 to SDCWA	2005	2007	2008
300 to SDCWA by Fallowing	2006	2008	2011

Tamarisk Scrub Shoreline Strand

Depending on the relationship between the water surface elevation of the Salton Sea and maintenance of the shoreline strand and adjacent wetlands, the water conservation program could cause changes in the amount of tamarisk scrub habitat in shoreline strand and adjacent wetland areas. There is, however, considerable uncertainty about the extent of these possible changes. As the sea recedes, tamarisk could establish at lower elevations, replacing vegetation lost at high elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where drain water or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is currently not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas.

3.3.2.3 Other Covered Activities

Through their effect on the rate of salinization and surface elevation decline, water conservation and transfer activities are the primary covered activities anticipated to impact covered species associated with the Salton Sea. Table 3.3-8 summarizes the relationships of other covered activities to covered species associated with the Salton Sea.

TABLE 3.3-8
Potential Effects of Covered Activities on Covered Species Associated with the Salton Sea

Activity	Potential Effects (Positive and Negative)
Water Use and Conservation	
Combined effects of on-farm and system-based water conservation	Water conservation could reduce the amount of water flowing to the Salton Sea and accelerate declines in sea elevation and accelerate the rate of salinization.
Installation of on-farm water conservation features	On-farm water conservation practices would be constructed within agricultural fields or their margins, removed from portions of the Salton Sea used by covered species.

Return to Contents

TABLE 3.3-8
Potential Effects of Covered Activities on Covered Species Associated with the Salton Sea

Activity	Potential Effects (Positive and Negative)
Installation of system-based water conservation features	System-based water conservation practices would be constructed within the Imperial Valley in association with IID's conveyance system and in agricultural fields and their margins. System-based conservation activities would not be conducted at the Salton Sea.
Operation and Maintenance	
Conveyance system operation	Conveyance system operation is limited to moving water through the canals to meet customer needs and to address maintenance requirements. Other than the filling, draining and moving water through the canals, no physical effects are encompassed by conveyance system operation. No effects to covered species associated with the Salton Sea would be expected.
Drainage System Operation	
Rerouting or constructing new drains	IID reroutes or constructs about 2 miles of drains every 10 years. During the term of the permit IID could reroute drains near the Salton Sea to ensure adequate drainage and to provide connectivity among drains for pupfish. However, given the infrequent, transient and localized nature of the activities, no effects to covered species associated with the Salton Sea would not be expected.
Piping drains	IID does not anticipated piping drains at the Salton Sea.
Inspection activities	Potential effects of inspection activities would be limited to a minor potential for disturbance of covered species if they occur in the vicinity of structures at the time of inspection.
Canal lining maintenance	Canal lining maintenance consists of repairing the concrete lining of canals only. Lined canals do not occur in portions of the Salton Sea used by covered species.
Right-of-way maintenance Embankment maintenance Erosion maintenance	Along drains, right-of-way maintenance, embankment maintenance and erosion maintenance is conducted in association with vegetation control/sediment removal along drains. Given the infrequent, transient and localized nature of the activities, no effects to covered species associated with the Salton Sea would be expected.
Seepage maintenance	Seepage maintenance is conducted only along the canal system and consists of repairing leaks. Few canals occur near the Salton Sea in areas used by covered species associated with the Salton Sea. Given the infrequent, transient and localized nature of the activities, no effects to covered species associated with the Salton Sea would be expected.
Structure maintenance	Few structures requiring replacement occur at the Salton Sea in areas used by covered species. With the infrequent, transient and localized nature of the activities, no effects to covered species associated with the Salton Sea would be expected.
Pipeline maintenance	No piped drains occur at the Salton Sea.
Reservoir maintenance	No reservoirs occur at the Salton Sea.
Sediment removal Vegetation control	IID controls vegetation and removes sediment from drains that discharge directly to the sea. Because these activities are localized (within and immediately adjacent to the drain channels) and conducted relatively infrequently on drains discharging directly to the Sea (about once every 5 years), they have a minor potential to affect species associated with the Salton Sea. Effects to desert pupfish are addressed separately in Section 3.7.

Return to Contents

TABLE 3.3-8
Potential Effects of Covered Activities on Covered Species Associated with the Salton Sea

Activity	Potential Effects (Positive and Negative)
New and Alamo River maintenance	IID dredges the deltas of the New and Alamo rivers about once every four years. In conducting this dredging, IID retains the vegetation on the banks. Thus, habitat is not removed by these dredging operations, but the dredging could temporarily disturb covered species using the deltas. IID coordinates with USFWS at the refuge prior to conducting these activities.
Salton Sea dike maintenance	Salton Sea dike maintenance activities consist of replacing riprap, grooming embankments and repairing damaged sections of the dikes. With the infrequent, transient and localized nature of the activities, no effects to covered species associated with the Salton Sea would be expected.
Gravel and rock quarrying	IID quarries gravel and rock from two quarries adjacent to the Salton Sea (Red Hill and Pumice Island).The quarries are barren and do not support vegetation. Covered species associated with the Salton Sea are not known to occur at either of these quarries.
Fish hatchery operation and maintenance	The fish hatchery is located in the Imperial Valley, removed from the Salton Sea.
Recreational facilities	IID conducts dredging at Salton Sea Beach, Corvina Beach and Bombay Beach about every 60 days. IID also dredges at Red Hill Marina on request. This dredging presents a minor potential to displace birds that are foraging or resting on the water in the vicinity. The HCP does not cover take of covered species by recreationists.
HCP/EIS/EIR mitigation	IID would have the flexibility in locating specific HCP and EIR/EIS mitigation measures away from sensitive areas for covered species (e.g., nesting or roosting sites).

3.3.3 Approach and Biological Goals

The overall goal of the Salton Sea Conservation Strategy is to maintain the same duration and level of use of the Salton Sea by covered piscivorous birds, to maintain viable populations of desert pupfish occupying the drains that discharge directly to the Sea, and to provide habitat to support the species composition and seasonal occurrence of riparian-associated covered species that could use tamarisk scrub habitat in the HCP Area. This overall goal is to be accomplished through implementing measures to meet the following specific objectives.

- Avoid and minimize the effects of increased salinity on the fish that provide the forage base for covered piscivorous birds using the Salton Sea
- Maintain connectivity and genetic exchange among populations of desert pupfish inhabiting the drains
- Avoid and minimize take of covered species associated with loss of tamarisk scrub habitat
- Create or acquire and preserve native tree habitat to mitigate any take of covered species caused by removal of tamarisk

3.3.4 Salton Sea Mitigation Measures

The water conservation and transfer program could affect covered species at the Salton Sea in two ways: acceleration in the rate at which salinity increases in the Salton Sea and a reduction of the surface elevation. The primary effect of increased salinity is the earlier loss of fish in the Sea and the loss of the forage base for covered piscivorous birds. The primary effects of a reduction in Sea elevation are the potential loss of tamarisk scrub habitat adjacent to the Sea used by covered species and creation of land bridges to islands used by covered species for nesting and roosting. The measures developed to address these potential impacts are presented below.

Salton Sea–1. *IID will avoid and minimize the potential for take of covered piscivorous birds resulting from implementation of the water conservation and transfer project by acquiring and discharging additional water the Salton Sea. The amount of water discharged to the Sea will be sufficient to offset the reduction in inflow to the Salton Sea caused by the water conservation and transfer project and to maintain salinity in the Sea at or below 60 ppt until the year 2030. The annual amount of mitigation water discharged to the Sea will be equal to the actual discharge reduction caused by the water conservation and transfer program plus or minus any amount of water necessary to maintain the salinity trajectory of the 95 percent confidence bound under the baseline (Figure 3.3-6). IID will not be required to discharge water to the Sea for mitigation if the discharge of that water increases the surface elevation of the Salton Sea above the level established by the projected elevation change as shown for the Proposed Project in Figure 3.3-7. IID may discontinue to discharge water to the Salton Sea for mitigation prior to 2030 if a Salton Sea restoration project is implemented or if it can be demonstrated that tilapia can no longer reproduce successfully in the Sea.*

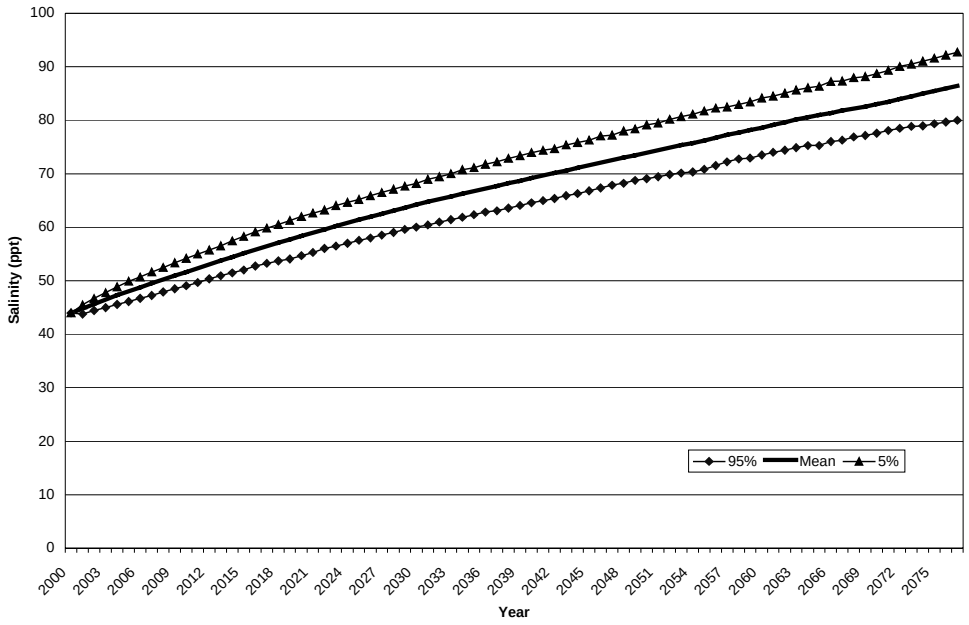

FIGURE 3.3-6
Salinity Projections in the Salton Sea Under the Baseline

Return to Contents

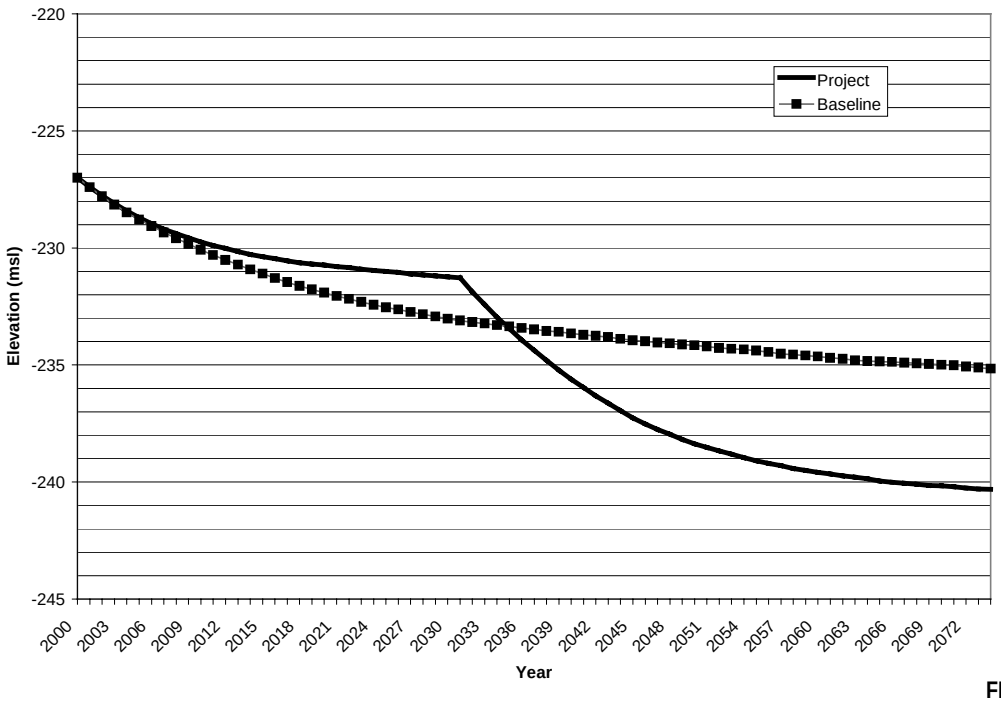

FIGURE 3.3-7
Projected Mean Water Surface Elevation of the Salton Sea Under the Proposed Project and the Baseline

Under this measure, IID would conserve and discharge water to the Salton Sea for the purpose of mitigating the impact of the water conservation and transfer program on salinity in the Sea and avoiding and minimizing the indirect effects on fish and covered piscivorous birds. The amount of water used to mitigate project effects on salinity and the number of years over which that water would be discharged to the Sea was based on the projection of when salinity in the Sea would reach a level at which tilapia could no longer reproduce. By maintaining suitable salinity conditions in the Sea, IID would ensure continued persistence of fish (and therefore piscivorous birds) for a period the same as that projected under the baseline. Under this strategy, the duration and level of use of the Salton Sea by piscivorous birds would be expected to be the same as under the Baseline.

Two elements of uncertainty were considered in defining the increment of impact associated with the water conservation and transfer component of the Proposed Project: (1) the uncertainty associated with the projection of when the salinity threshold (i.e., 60 ppt) for reduced fish reproduction would be reached and (2) the uncertainty associated with the accuracy of the threshold. The uncertainty associated with defining when the threshold would be reached was addressed through the modeling of the salinity in the Salton Sea. To account for the variability in the factors that influence salinity (e.g., hydrology), multiple runs of the Salton Sea model were made in which the variables were allowed to differ in each iteration. From these model runs, the probability (mean and 5/95 percent confidence bounds) of the projected salinity trajectory under the Salton Sea Baseline was determined (Figure 3.3-6). These projections indicate a 90 percent probability that the actual salinity trajectory will fall between the lines representing the 5 and 95 percent confidence bounds. The mean of the modeled projections indicated that salinity in the Salton Sea would reach 60 ppt under the Salton Sea Baseline in the year 2023. Thus, under the assumption that 60 ppt accurately represents the threshold above which fish production and bird use will

Return to Contents

decline at the Sea, IID could avoid and minimize the impact of any Project-related take of piscivorous birds by maintaining salinity at levels less than 60 ppt until 2023.

As described in the HCP, the best available information suggests that growth, survival, and reproduction of tilapia would begin to decline at a salinity of about 60 ppt (Costa-Pierce and Riedel 2000a). However, because of the complexity of the Salton Sea ecosystem and other factors that contribute to reproductive success of tilapia, the actual threshold could be lower or higher than 60 ppt. Available data are insufficient to gain better precision on the threshold or to calculate confidence bounds. Because of the uncertainty associated with the salinity threshold for tilipia in the Salton Sea could not be quantified, a salinity of 60 ppt was used. This salinity value represents the best professional judgment of scientists very familiar with this species in the Salton Sea and because no information could be found in the scientific literature to suggest a different threshold should be used. The uncertainty associated with the model predictions was quanitified in the form of 5- and 95-percent confidence intervals on the model projections. In order to allow the slowest reasonable increase in salinity under the Baseline guide mitigation requirements, the 95-percent confidence interval, which indicates that a salinity of 60 ppt would be exceeded in the year 2030, was used as the basis of the mitigation.

Under this revised strategy, IID would avoid the potential for take of covered piscivorous birds resulting from implementation of the water conservation and transfer component of the Project by discharging mitigation water to the Salton Sea. The amount of mitigation water would be sufficient to offset the reduction in inflow to the Salton Sea caused by the Proposed Project and to maintain salinity in the Sea at or below 60 ppt until the year 2030. The annual amount of mitigation water would be equal to the actual inflow reduction caused by the water conservation and transfer component of the Project plus or minus an amount of water necessary to maintain the target salinity trajectory. This trajectory would correspond to the salinity projection for the 95 percent confidence bound (see Figure 3.3-6) until 2030. However, because of the continued threat of potential flooding of lands adjacent to the Salton Sea, IID would not be required to discharge mitigation water to the Sea if the discharge of that water would increase the surface elevation of the Salton Sea above the levels established by the projected elevation change associated with the Proposed Project (Figure 3.3-7). That is, IID would not be required to discharge water to the Sea in years in which the elevation of the Sea was at or above the elevation projection for the Proposed Project described in Figure 3.3-7 due to unforeseen increases in elevation (e.g., increased inflow from a major storm event). In addition, IID could discontinue to discharge water to the Salton Sea for mitigation prior to 2030 if a Salton Sea restoration project were implemented or if it could be demonstrated that tilapia were no longer successfully reproducing in the Sea.

Mitigation water sources to offset Project-related inflow reductions could be acquired by IID by fallowing in the Imperial Valley or by using any other legally permissible water provided to IID for this purpose by other parties to the Quantification Settlement Agreement (QSA), by state or federal agencies, by any other third parties willing to contribute to the mitigation effort, or any combination of the foregoing. The use of water obtained by IID from sources outside the Imperial Valley could require appropriate subsequent environmental review. The amount of water discharged to the Sea would be calculated annually based on the proportion of efficiency conservation (e.g., system and on-farm) and fallowing used to generate the water for transfer. As previously described, the amount of water discharged

annually would match the anticipated Project-related reduction in inflow plus or minus any increment necessary to maintain the salinity trajectory, but not to exceed the elevation levels projected for the Project as described above.

By maintaining suitable salinity conditions in the Sea, IID would ensure continued persistence of fish (and therefore piscivorous birds covered by the HCP) for a period consistent with that projected under the Salton Sea Baseline. Under this approach, the level and duration of use of the Salton Sea by piscivorous birds would be expected to be the same as under the Salton Sea Baseline. In addition, maintaining the salinity trajectory associated with the 95 percent confidence bound until 2030 likely would result in a deceleration in the rate of salinization in the Sea. Any improvement over the Salton Sea Baseline likely would benefit piscivorous birds by extending the period of time that fish are supported in the Sea.

Avoiding salinity impacts also would result in the avoidance of biological impacts associated with changes in surface elevation. Because water surface elevation in the Sea under this strategy would be held at or above the Salton Sea Baseline projections, conservation-related changes in the use of nesting islands by covered species would not occur as a result of the Project. Likewise, potential impacts on the tamarisk scrub community adjacent to the Sea (e.g., shoreline strand) would not be affected by the Project prior to 2030 and might be avoided altogether. Implementation of this strategy also provides the ancillary benefit of allowing time for a Salton Sea restoration project to be developed.

Salton Sea–2. *IID will ensure that an appropriate level of connectivity between pupfish populations within individual drains (at the north and south ends of the sea) that are connected to the Salton Sea either directly or indirectly and that are below the first check will be maintained in the event that conditions in the Salton Sea become unsuitable for pupfish during the term of the HCP. When the salinity of the Salton Sea reaches 90 ppt (or lower as determined by the HCP IT), IID will work with the HCP IT to prepare and implement a detailed plan for ensuring genetic interchange among the pupfish populations in the drains. IID will continue to maintain created pupfish habitats for the duration of the term of the permits. IID also will construct and maintain one pupfish refugium pond consistent with the "Desert Pupfish Recovery Plan." This pond will be maintained for the purpose of assisting in the recovery efforts for that species. IID will work with the HCP IT to determine the location, timing, and technique in implementing this measure.*

As previously described, desert pupfish occupy many of IID's drains that discharge directly to the sea. Similarly, many of CVWD's drains that discharge directly to the sea also support pupfish. Individual pupfish are believed to use shoreline pools and the Salton Sea to move among the various drains. As the sea becomes more saline and nears the limit of pupfish tolerance, movement among the drains could cease and isolate populations. Small, isolated populations are more susceptible to problems associated with reduced genetic variability and the effects of random environmental events. To avoid the potential for isolating pupfish populations in the drains, IID will work with the HCP IT to restore a connection between populations or otherwise ensure continued genetic exchange among populations. IID will ensure connectivity among drains at the north end of the sea and among drains at the south end of the sea but not between drains at the north and south ends of the sea. This would be accomplished by constructing new drain channels or rerouting channels to encourage confluence.

Pupfish have a high salinity tolerance, and have been recorded at a salinity of 90 ppt. Model results suggest that with implementation of Salton Sea–1, the 90 ppt level would not be reached

for at least 50 years. Given the time period between project initiation and when mitigation would be required, IID will defer the specifics of the mechanism by which connectivity will be achieved in order to take advantage of additional information that might be available at the time mitigation is necessary. When the salinity of the Salton Sea reaches 90 ppt (or lower as determined by the HCP IT), IID will work with the HCP IT to prepare a detailed plan for ensuring genetic interchange among the pupfish populations in the drains. The plan will be submitted to USFWS and CDFG for approval before implementation. The plan will include construction details, the schedule for completion, and a monitoring program to demonstrate effectiveness (including adaptive management elements if appropriate). The budget allocated for ensuring genetic interchange among populations in the drains will be based on the assumption that physical connections (channels) will be constructed and maintained. However, this should not preclude IID or the HCP IT from developing more suitable alternatives, which would need to be approved by the USFWS and CDFG.

In addition to ensuring connectivity among pupfish populations, IID will take a positive step to contribute to the recovery of desert pupfish by constructing and managing a refugium pond to support a population of pupfish consistent with the goals of the *Desert Pupfish Recovery Plan* (Marsh and Sada 1993). The pond will be designed and located in consultation with the HCP IT, USFWS, and CDFG. IID will develop a detailed plan in coordination with the HCP IT, and the USFWS and CDFG will have approval of the plan. The USFWS and CDFG will be responsible for identifying the source population. A person qualified to capture and handle pupfish and that meets the approval of CDFG and USFWS will make the introductions. Management of the pond will be carried out by IID, although IID may choose to transfer management to another entity (e.g., USFWS or CDFG). Any transfer of management responsibility would be accompanied by a management endowment to ensure continued management until the end of the term of the HCP.

Salton Sea–3. *IID will conduct the following to address potential changes in tamarisk scrub habitat adjacent to the Salton Sea. Upon completion of the implementation of Salton Sea–1(i.e., 2030 or sooner), IID will conduct a survey of the areas designated as (1) "shoreline strand," (2) "adjacent wetland" with tamarisk as the primary vegetation as shown in the Salton Sea Digital Atlas (University of Redlands 1999), and (3) currently inundated areas that become exposed in the future by a reduction in water surface elevation of the Salton Sea. The general approach to the survey is described in Chapter 4. In consultation with the HCP IT, IID will develop the specific survey protocol necessary to establish the acreage in 2030 and to verify and quantify net changes in the total amount of tamarisk in shoreline strand and adjacent wetland areas in the future. The study plan will be submitted to USFWS and CDFG for approval.*

If the survey conducted in 2030 (or sooner based on cessation of Salton Sea–1) shows no change or a net gain in the acreage of tamarisk relative to the 2,642 acres currently available, no mitigation will be required at that time. IID will repeat the survey every 5 years for the remainder of the permit term, but may choose to conduct the surveys more frequently. If the acreage of tamarisk scrub in shoreline strand, adjacent wetland, and currently inundated areas exposed in the future is found to be less than 2,642 acres at any time during the remainder of the permit, and the reduction can be reasonably attributable to the water conservation and transfer project, IID will mitigate the net loss (i.e., the difference between the acreage found in survey and 2,642 acres except as qualified below) by acquiring or creating native tree habitat as described below. IID will not be responsible for losses of tamarisk clearly caused by unrelated activities such as fire, or chemical or mechanical removal by a landowner other than IID. Under no circumstances will IID be required to mitigate losses of tamarisk scrub greater than 2,642 acres.

If necessary, IID will create or acquire native tree habitat consisting of mesquite bosque or cottonwood-willow habitat in amounts calculated based on the following ratios.

- *If IID creates habitat prior to the surveys showing a net loss in the amount of tamarisk, the mitigation ratio for the acreage of created habitat to net lost acreage of tamarisk will be 0.25:1 as long as the created habitat meets the success criteria.*
- *If IID creates habitat after the surveys show a net loss or IID acquires existing habitat, the mitigation ratio for the acreage of the created or acquired habitat to lost acreage of tamarisk will be 0.75:1. The habitat will be created or acquired within 1 year of documenting a net reduction in tamarisk scrub unless otherwise agreed to by IID, USFWS, and CDFG.*
- *If IID elects to acquire habitat, IID will work with the HCP IT to identify a property for acquisition. Habitat to be acquired must support mesquite bosque or cottonwood-willow habitat and occur within the Salton Sea Basin. If the only available properties that meet these requirements are larger than required to compensate for the lost acreage, IID will acquire the least expensive property. IID can use the additional acreage of the acquired habitat to fulfill future mitigation obligations of Tree Habitat–1 or Tree Habitat–2. IID will place a conservation easement on acquired lands and provide for the property to be managed for covered species for the term of the permit. Within 1 year of recording the conservation easement, IID will prepare and submit to USFWS and CDFG for approval a management plan for the property that describes how the property will be managed. The management plan will describe the actions that IID will take to maintain the ecological functions of the acquired habitat. While the specific management needs will vary depending on the property acquired, considerations for the management plan include:*
  - *Measures to control human access (e.g., fencing, signage)*
  - *Frequency at which land will be visited to assess maintenance/management needs*
  - *Types of maintenance action (e.g., removing garbage, repairing fences)*
  - *Vegetation management practices (e.g., prescribed burning, removal of exotic plants)*

With the approval of USFWS and CDFG, which approval shall not be unreasonably withheld, IID may transfer the land to a third party who agrees to and is authorized to manage the land for habitat conservation purposes. If IID transfers the land to a third party, IID will establish an endowment fund adequate to provide for the management of the lands for the term of the permit.

If IID elects to create habitat, IID will develop a habitat creation and management plan. The habitat creation and management plan will include the following information:

- *Location*
- *Planting plan (including species composition and layout)*
- *Grading and other construction activities*
- *Long-term management practices*
- *Vegetation and species use monitoring*
- *Success criteria for the plantings and the actions that IID will take if the success criteria are not met*

If a Salton Sea restoration project is implemented that affects the water surface elevation of the Sea prior to 2030, IID will not be required to conduct the surveys or mitigate any changes in the amount of tamarisk scrub adjacent to the Sea. If a Salton Sea restoration project is implemented following completion of Salton Sea – 1, IID will discontinue monitoring the shoreline strand and adjacent wetlands and will not be responsible for mitigating any additional reductions in the amount of tamarisk in these areas over the term of the permit. Further, in the event that mitigation water is allowed to flow to the Sea beyond 2030 (e.g., mitigation of air quality impacts), IID will not be required to conduct surveys or mitigate changes in the amount of tamarisk scrub adjacent to the Sea.

The Salton Sea database identifies 293 acres of shoreline strand habitat along the Salton Sea. Shoreline strand habitat consists of tamarisk and iodine bush. In addition to the shoreline strand, the Salton Sea database identifies 2,349 acres of adjacent wetlands dominated by tamarisk. The source of the water that supports the shoreline strand community is uncertain but could consist of a combination of shallow groundwater and seepage from the Salton Sea. The extent to which the water surface elevation of the Salton Sea contributes to supporting this community is uncertain.

Depending on the relationship between the water surface elevation of the Salton Sea and maintenance of the shoreline strand and adjacent wetlands, the water conservation program could cause changes in the amount of tamarisk scrub habitat in shoreline strand and adjacent wetland areas once mitigation water is no longer supplied to the Sea (i.e., 2030). There is, however, considerable uncertainty about the extent of these possible changes. As the Sea recedes, tamarisk could establish at lower elevations, replacing habitat lost at high elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where drain water or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is currently not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas.

Because of the uncertainty about the potential changes in the amount of tamarisk scrub adjacent to the Salton Sea, IID would monitor changes in this community and mitigate measured net losses in the amount of tamarisk reasonably attributable to the conservation and transfer of water. Within three years following the discontinued supply of mitigation water to the Sea (i.e., 2030), IID will conduct a field survey to determine areas typed as shoreline strand or adjacent wetland with tamarisk as the primary vegetation as shown in the Salton Sea Digital Atlas (University of Redlands 1999). The habitat boundaries will be determined, and the percent coverage by live tamarisk and dead tamarisk will be estimated. This information will establish the baseline and provide the basis for determining the extent of future changes in tamarisk scrub.

Potential impacts to the tamarisk scrub adjacent to the Salton Sea as a result of the covered activities would be associated with water conservation and transfer after 2030 and the resulting projected decline in the water surface elevation of the Salton Sea. Hydrologic modeling of the Proposed Project indicates that the water surface elevation would decrease at a slower rate than the Baseline prior to 2030, but decrease more rapidly than the Baseline after 2030 (see Figure 3.3-7).

IID will monitor the tamarisk scrub every 5 years after 2030 to identify reductions in tamarisk that occur as the plants adjust to the new sea elevation. It is important to note that the water surface elevation is projected to decline in the absence of the proposed water conservation and transfer programs as well. However, it will not be possible to differentiate changes in the adjacent wetland / shoreline strand community attributable to the conservation and transfer relative to the changes that would have occurred in the absence of the transfer. Nevertheless, IID has agreed to mitigate measured changes in the amount of tamarisk scrub that occur following 2030 in the delineated shoreline strand and adjacent wetland areas.

IID will continue to survey the adjacent wetland and shoreline strand areas every five years after completion of the baseline survey for the remainder of the HCP term. These data will be compared with the previous survey data to determine if there was a decline in the amount of tamarisk scrub habitat. In addition to evaluating changes in the shoreline strand and adjacent wetlands demarcated in the Salton Sea Digital Atlas (University of Redlands 1999), IID will review aerial photographs and conduct ground-truthing to determine if tamarisk scrub has colonized new areas in response to changes in sea elevation. The acreage of any new areas of tamarisk scrub will be determined. If the baseline acreage of tamarisk scrub established in 2030 is greater than the 2,642 acres currently available, IID would have no mitigation obligation. If the 2030 baseline acreage is less than 2,642, IID would be obligated to create or acquire and preserve native tree habitat to mitigate any take of covered species resulting from net loss of tamarisk scrub relative to the 2030 baseline levels. Net changes in the amount of tamarisk scrub would be identified in the surveys conducted subsequent to 2030. IID's mitigation responsibility would extend only to net losses reasonably attributable to reductions in Sea elevation and not to losses clearly caused by unrelated activities such as fire, or chemical or mechanical removal by a landowner other than IID. Under no circumstances would IID be required to mitigate a loss of more than 2,642 acres.

IID may mitigate net losses of tamarisk scrub in two ways: (1) acquire native tree habitat or (2) create native tree habitat. IID may elect to create native tree habitat prior to a reduction in tamarisk occurring. In this case, IID would be able establish functioning native tree habitat prior to any loss in tamarisk scrub. Native tree habitat has a higher value than tamarisk scrub. Based on the relative habitat values developed by Anderson and Ohmart (1984), the habitat value of native tree habitat is about four times greater than tamarisk. Thus, IID would replace tamarisk at a 0.25:1 ratio (native tree to tamarisk), if it creates native tree habitat prior to measuring a reduction in tamarisk in the shoreline strand or adjacent wetlands.

If IID acquires native tree habitat or creates native tree habitat after measuring a net loss, a higher mitigation ratio (0.75:1) will be used to determine the acreage of native tree habitat to acquire or create. In the case of acquiring habitat, a higher mitigation ratio is used because there would be a net loss of vegetation. A higher mitigation ratio also is used if habitat is created after the reduction has been measured to account for the delay between when the habitat is created and when it starts functioning as habitat.

IID will maintain or provide funding for the maintenance of created / acquired native tree habitat until the end of permit term. At the end of the permit, IID would either stop water conservation or continue with the water conservation and transfer program covered by this HCP. If IID continues with the water conservation and transfer program, then the impacts attributable to the water conservation and transfer program would continue. Compliance with FESA would need to be extended and likely would include continued maintenance of created / acquired native tree habitat to mitigate the impact associated with continuing the water conservation and transfer program. Alternatively, if IID terminated the water conservation and transfer project after 75 years, inflow from the IID Water Service Area to the Salton Sea would return to pre-project levels and therefore, the elevation of the Salton Sea would increase toward pre-project levels. To the extent that a decline in the sea elevation from the water conservation and transfer project caused a reduction in tamarisk scrub in adjacent

wetland areas, tamarisk would be expected to reestablish in these areas as the sea elevation increased. With the reestablishment of tamarisk after cessation of the water conservation and transfer project, continued maintenance of native tree habitat created or acquired under this measure would not be necessary to maintain habitat values for covered species. Therefore, it is not necessary to maintain native tree habitat that is created or acquired under this measure in perpetuity.

3.3.5 Effects on Covered Species

Covered species potentially using the Salton Sea in the HCP area include resident breeding species, migratory breeding species, short-term residents during winter or migration, and transient species that occur in the HCP area irregularly during migration or other wanderings. Under the Salton Sea Conservation Strategy, IID would conserve additional water and allow that water to flow to the Sea to address potential changes in fish resources. In addition, IID would implement specified measures to address potential effects to desert pupfish from increases in salinity and potential effects to species associated with tamarisk scrub from changes in tamarisk scrub habitat adjacent to the Salton Sea. The effects of implementing the HCP on covered species are evaluated below.

As part of the Monitoring and Adaptive Management Program (Chapter 4), IID could implement a survey or study program requiring capture of covered species. Capture of covered species constitutes take under both the federal and state ESAs. Take that occurs in association with surveys or studies conducted for this HCP is a covered activity and will be authorized under the state and federal ITPs. Any of the covered species could be taken through surveys or studies.

Studies and surveys conducted during the course of this HCP will be developed by IID in coordination with the HCP IT and will be subject to the approval of CDFG and USFWS prior to implementation. In approving the studies/surveys, the CDFG and USFWS will require capture methods that minimize the potential for death and injury of covered species. In addition, these agencies will specify the number of individuals of covered species that may be captured. Thus, the level of take authorized to occur through this mechanism will be specified on a case-by-case basis through the approval of the CDFG and USFWS.

3.3.5.1 White Pelican

The primary mechanism through which the covered activities could result in take of white pelicans is a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of tilapia is expected to decrease as the salinity of the sea increases. With implementation of the Salton Sea Conservation Strategy, IID would avoid changes in salinity of the Salton Sea as a result of the water conservation and transfer programs. This approach is predicted to avoid impacts to white pelicans resulting from the acceleration of salinity increases and reduced fish abundance attributable to the water conservation and transfer programs. Under this strategy, fish would be expected to persist until about 2030 when the salinity of the sea is projected to exceed 60 ppt. The potential response of white pelicans to reduced fish availability at the Salton Sea after this salinity is exceeded is described in Section 3.3.2.1.

3.3.5.2 California Brown Pelican

The primary mechanism through which the covered activities could result in take of brown pelicans is a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of

tilapia is expected to decrease as the salinity of the sea increases. Under the Salton Sea Conservation Strategy, IID would maintain the prey resource for brown pelicans until that resource would be lost without implementation of the water conservation and transfer program. Maintenance of the salinity below 60 ppt is predicted to avoid impacts to brown pelicans attributable to the water conservation and transfer programs. The potential response of brown pelicans to reduced fish availability at the Salton Sea after this point was described in Section 3.3.2.1.

3.3.5.3 Black Skimmer

The primary mechanism through which the covered activities could result in take of black skimmers is a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of fish is expected to decrease as the salinity of the sea increases. Water conservation also could accelerate and increase the magnitude of the decline in the water surface elevation. With the accelerated drop in surface elevation, islands where black skimmers nest would become connected to the mainland earlier than under the baseline. Predation on eggs and chicks could be increased relative to the baseline during this period. Black skimmers could abandon nesting areas once they become accessible to land-based predators. The potential effects to black skimmers of changes in fish abundance and water surface elevation are described in more detail in Sections 3.3.2.1 and 3.3.2.2.

With implementation of the Salton Sea Conservation Strategy, changes in the salinity of the Salton Sea as a result of the water conservation and transfer programs are expected to be avoided. This approach would avoid impacts to black skimmers resulting from the acceleration of salinity increases and reduced fish abundance attributable to the water conservation and transfer programs. Under this strategy, fish would be expected to persist until about 2030 when the salinity of the sea is projected to exceed 60 ppt. This approach also would avoid the acceleration of surface elevation declines attributable to the water conservation and transfer programs. As a result, nesting and roosting islands would become connected to the mainland at about the same time as under the baseline after which nesting might not continue. The potential response of black skimmers to reduced fish availability at the Salton Sea after this salinity is exceeded was described in Section 3.3.2.1.

3.3.5.4 Van Rossem's Gull-Billed Tern

Gull-billed terns typically are associated with salt marshes and coastal bays, but also frequent open habitats such as pastures and farmlands for foraging. They primarily feed on insects, such as grasshoppers and beetles, but also will prey on earthworms, fish, frogs, lizards, small mammals, eggs, and young of other birds (CDFG 1999). Foraging likely occurs at the mudflats along the Sea as well as in adjacent agricultural fields and marshes. Potentially, a few gull-billed terns could be taken as a result of the accelerated decline in fish abundance. However, given their broad food habits and the availability of alternate foraging habitat, the potential reduction in tilapia abundance at the Salton Sea probably would not adversely affect the gull-billed tern population using the Salton Sea.

The Salton Sea is one of only two breeding locations for gull-billed terns in the United States, the other being in San Diego. About 160 pairs nest at the Sea each year (USFWS 1997b; Shuford et al. 1999). Numbers of nesting birds at the Salton Sea have declined from earlier estimates of about 500 as the rising sea has flooded nests (CDFG 1999). They nest on

sandy flats amidst shells and debris (CDFG 1999) around the south end of the Sea (Shuford et al. 1999). The largest breeding colonies are at the southeast corner of the Sea and to the south of Salton City (CDFG 1999) on Mullet Island and a small barren islet at Johnson Street. The islets at Rock Hill also support nesting gull-billed terns. The islets are in an impoundment of the Salton Sea NWR.

As explained in Section 3.3.2.2, nesting/roosting islands would become connected to the mainland with the reduction in the water surface elevation with and without implementation of the water conservation and transfer programs. Water conservation would accelerate and increase the magnitude of the decline in the water surface elevation relative to the baseline. With the accelerated drop in surface elevation, islands where gull-billed terns nest would become connected to the mainland a few years earlier than under the baseline. Predation on eggs and chicks could increase relative to the baseline during this period. Gull-billed terns could abandon some or all of their current nesting areas once they become accessible to land-based predators. Under the Salton Sea Conservation Strategy, the nesting/roosting islands would become connected to the mainland at about the same time as under the baseline condition, thus potential impacts would be avoided.

3.3.5.5 Double-Crested Cormorant

At the Salton Sea, cormorants nest on rocky ledges on Mullet Island or on dead vegetation at the deltas of the New and Alamo rivers. Snags in the Salton Sea are important for providing protected roost sites for double-crested cormorants. Cormorants regularly move between the Salton Sea and the lakes at the Finney-Ramer Unit of the Imperial WA where they forage. The Finney-Ramer Unit of the Imperial WA also supports nesting and roosting double-crested cormorants at the lakes on this unit.

Double-crested cormorants are a common and abundant species at Salton Sea, with counts of up to 10,000 individuals (IID 1994). Small nesting colonies were documented at the north end of the Sea in 1995 (USFWS 1996), but recently (1999) over 7,000 double-crested cormorants and 4,500 nests were counted on Mullet Island. Mullet Island currently supports the largest breeding colony of double-crested cormorants in California (Shuford et al. 1999).

The covered activities could result in take of double-crested cormorants through two mechanisms. First, the covered activities could result in take of cormorants through a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of fish is expected to decrease as the salinity of the sea increases. Water conservation to implement the water conservation and transfer programs could increase the rate of salinization of the sea and concomitantly accelerate the decline in fish abundance. Survival of adults or chicks could be reduced as prey availability declines at the Salton Sea.

Water conservation also could accelerate and increase the magnitude of the decline in the water surface elevation. With the accelerated drop in surface elevation, snags and islands where double-crested cormorants nest would become connected to the mainland a few years earlier than under the baseline. Predation on eggs and chicks could be increased relative to the baseline during this period. Double-crested cormorants could abandon nesting areas once they become accessible to land-based predators.

The population of double-crested cormorants in the United States declined considerably during the 1960s and early 1970s. This decline was attributed to pesticide residues in the

marine food chain, principally DDT (Small 1994). The population began recovering in the late 1970s and 1980s, and is currently estimated to number 1 to 2 million birds in the United States and Canada with the U.S. population increasing at a rate of about 6 percent (*64 Federal Register* [*FR*] 60826). In some locations, cormorant populations have increased to levels that some consider them a significant competitor with recreational fishing. In response, the USFWS is developing a national double-crested cormorant management plan (*64 FR* 608266).

Double-crested cormorants are abundant throughout California and the United States. With the large and increasing population throughout the United States and Canada, even complete loss of cormorants breeding at the Salton Sea would not jeopardize or substantially reduce the United States population of cormorants, despite the Sea harboring the largest breeding colony in California. Thus, even if some individuals were lost as a result of the covered activities, the effects on the entire cormorant population would be minor.

Under the Salton Sea Conservation Strategy, impacts to fish-eating birds, including double-crested cormorants are predicted to be avoided by avoiding changes in the salinity of the Salton Sea attributable to the water conservation and transfer program. IID would supply sufficient water to the sea to offset the salinity increases attributable to water conservation and transfer. This is predicted to avoid accelerating salinization of the sea and the earlier occurrence of expected declines in fish abundance. Under the baseline condition, the salinity of the Salton Sea is projected to exceed 60 ppt, the threshold above which reproduction of tilapia is expected to decline, in 2030. The potential response of double-crested cormorants to reduced fish availability at the Salton Sea after the threshold is reached was described in Section 3.3.2.1.

Provision of mitigation water to the Salton Sea also would avoid impacts to nesting sites used by cormorants and potentially provide a beneficial effect. As shown in Figure 3.3-7, the surface elevation of the Sea would be higher than under the baseline from about 2009 until 2035. Mullet Island where the largest colony of double-crested cormorants occurs at the Salton Sea is separated from the mainland by about 4 feet of water. Under the baseline, the surface elevation of the Sea would fall 4 feet by 2015. With implementation of Salton Sea–1, this degree of elevation drop would not occur until 2026, thereby retaining the separation of Mullet Island from the mainland for 11 more years.

3.3.5.6 Western Snowy Plover

Western snowy plovers are year-round breeding residents and winter migrants at the Salton Sea. The Salton Sea supports the largest wintering population of snowy plovers in the interior western United States and one of only a few key breeding populations in interior California (Shuford et al. 1999). The summer breeding population typically consists of over 200 individuals (IID 1994).

Nesting habitat for the western snowy plover in the project area is limited to the shoreline of the Salton Sea where they are known to nest on undisturbed, flat, sandy or gravelly beaches (Reclamation and SSA 2000). For foraging, snowy plovers use the shoreline of the Salton Sea, primarily concentrated on sandy beaches or alkali flats along the western and southern shorelines. They also could forage in agricultural fields in the valley.

Use of the Salton Sea by western snowy plovers is not expected to change substantially as a result of the covered activities, including implementation of the water conservation and

transfer project. This species forages for insect prey on mudflats, and nests in similar habitats. Mudflat habitats would continue to exist with a decline in Sea elevation, thus, continuing to provide nesting and foraging opportunities for western snowy plover.

Under the Salton Sea Conservation Strategy, IID would conserve additional water and allow this water to flow to the Salton Sea until 2030 such that there would be no change in salinity of the Salton Sea from implementation of the water conservation and transfer programs. Fallowing could be used to generate this water which could reduce foraging opportunities for snowy plover by reducing the amount of agricultural land in production. Take of snowy plovers could result from reductions in agricultural fields; this potential effect is evaluated in Section 3.8.6.9.

3.3.5.7 Osprey

Ospreys occur at the Salton Sea in small numbers as a nonbreeding visitor throughout the year (IID 1994). They prey almost exclusively on fish. Large trees and snags near the water are used for roosting and nesting. In the HCP area, suitable habitat conditions exist for the osprey at the Salton Sea and other water bodies in the HCP area including Fig Lagoon, the New and Alamo rivers, and Finney and Ramer lakes.

The primary mechanism through which the covered activities could result in take of osprey is a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of tilapia is expected to decrease as the salinity of sea increases. Water conservation to implement the water conservation and transfer programs could increase the rate of salinization of the sea and accelerate the decline in fish abundance. Potentially a few individual ospreys could be taken as a result of reduced foraging opportunities in the HCP area.

Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea on which osprey could prey until that resource would be lost without implementation of the water conservation and transfer program. This measure would offset take of osprey that could result from the accelerate decline in fish in the Sea. In addition, foraging opportunities for osprey would continue to be available at other locations in the HCP area. Because only a small number of ospreys currently use the HCP area, these other foraging locations likely would be adequate to support the existing level of use of the HCP area by ospreys. With the small numbers of ospreys that use the HCP area and the minimal potential for take to occur, implementation of the HCP would not jeopardize the continued existence of the species.

3.3.5.8 Black Tern

Black terns are common at the Salton Sea during the spring, summer and fall; they rarely occur at the Sea during the winter (USFWS 1997b). The Salton Sea watershed is thought to be the most important staging area for black terns in the Pacific Flyway (Shuford et al. 1999). In addition to the Salton Sea, black terns are common summer residents and migrants in Imperial Valley with up to about 10,000 individuals foraging over agricultural fields at some times (Shuford et al. (1999). There is no evidence that nesting occurs in the HCP area (CDFG 1999) although nesting could be supported in future.

Black terns forage primarily on insects and fish, but tadpoles, frogs, spiders, earthworms, and crustaceans are also taken. While black terns foraging in agricultural fields are assumed

to be foraging on insects, those at the Salton Sea could forage on insect prey as well as fish. The relative importance of these different prey types to black terns at the Salton Sea has not been determined.

Water conservation to implement the water conservation and transfer programs could increase the rate of salinization of the sea and accelerate the decline in fish abundance at the Salton Sea. Potentially a few individual black terns could be taken as a result of reduced foraging opportunities in the HCP area. Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea until that resource would be lost without implementation of the water conservation and transfer program. This approach would avoid impacts to black tern resulting from accelerated declines in fish abundance. However, if fallowing is used to generate water for mitigation, the reduction of agricultural land in production could reduce foraging opportunities for black terns. The effect of the potential take of black terns resulting from reductions in agricultural fields is evaluated in Section 3.8.6.10.

Black terns eat a wide variety of prey and forage in a variety of habitats. As a result, foraging opportunities will continue to be available in the HCP area and the potential for take is low. The Salton Sea, Drain Habitat, and Agricultural Field Habitat conservation strategies will contribute to maintaining foraging opportunities for black tern in the HCP area. The Salton Sea Conservation Strategy will avoid changes in fish abundance attributable to the water conservation and transfer programs. Under the Drain Habitat Conservation Strategy, 190 to 652 acres of managed marsh will be created and the Agricultural Field Habitat Conservation Strategy will enhance the probability that agricultural will remain the predominant land use in the HCP area. In combination, these strategies would mitigate the minimal amount of take potentially occurring and would not jeopardize the continued existence of the species.

3.3.5.9 Laughing Gull

Laughing gulls are a common post-breeding visitor (up to 1,000 individuals) at the Salton Sea and nested in the area up until the 1950s (USFWS 1997b; IID 1994; Shuford et al. 1999). They previously nested on sandy islets along the southwestern shore of the Salton Sea. Nesting habitat on the islets was lost to erosion as the Sea elevation increase and could have caused laughing gulls to abandon nesting at the Salton Sea. Currently, most laughing gulls occur at the south end of the Sea and in adjacent marsh habitats on the state and federal refuges.

The primary mechanism through which the covered activities could result in take of laughing gulls is a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of tilapia is expected to decrease as the salinity of sea increases. Water conservation for the water conservation and transfer programs could increase the rate of salinization of the sea and concomitantly accelerate the decline in fish abundance. Potentially a few laughing gulls could be taken as a result of reduced foraging opportunities at the Salton Sea. Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea until that resource would be lost without implementation of the water conservation and transfer program. This would avoid or offset impacts to laughing gull resulting from accelerated declines in fish abundance.

3.3.5.10 Wood Stork

Wood storks have a limited distribution in the United States, breeding only in Florida. Wood storks do not breed at the Salton Sea but use the area as a post-breeding visitor. Storks using the Salton Sea probably come from breeding colonies in Mexico. They can arrive at the Salton Sea as early as May after the breeding season and remain as late as October (Small 1994). At the Salton Sea, as many as 1,500 wood storks were counted in the 1950s (Shuford et al. 1999), but more recently counts of only 275 have been reported (IID 1994).

Wood storks forage in shallow water for small fish, small vertebrates and aquatic invertebrates. At the Salton Sea, shallow shoreline areas and pools formed by barnacle bars provide appropriate foraging conditions for wood storks. They also forage in freshwater impoundments on the refuges adjacent to the sea. Most wood storks at the Salton Sea occur at the southern end (CDFG 1999).

The effects of the water conservation and transfer project on wood storks would be similar to that described for laughing gulls, black terns and gull-billed terns with respect to changes in food resources. As described for these species, a few wood storks could be taken as a result of reduced foraging opportunities in the HCP area. Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea until that resource would be lost without implementation of the water conservation and transfer program. Depending on its location and characteristics, managed marsh created under the Drain Habitat Conservation Strategy could increase foraging opportunities for wood storks by supporting a variety of vertebrate and invertebrate prey species. The Salton Sea and Drain Habitat conservation strategies would avoid impacts to wood stork from changes in foraging opportunities at the Salton Sea; therefore, implementation of the HCP would not jeopardize the continued existence of wood stork.

3.3.5.11 Long-Billed Curlew

The long-billed curlew is a common, year round resident in the HCP area, with a large wintering population (Shuford et al. 2000). The number of birds in the Imperial Valley and at the Salton Sea varies throughout the year. Shuford et al. (2000) reported a total of 5,593 individuals in December 1999 during a survey for mountain plover that covered about 60 percent of the Imperial Valley. The highest count of long-billed curlews in the HCP area was nearly 7,500 birds in August 1995 (Shuford et al. 1999). Long-billed curlews are not known to breed in the HCP area (Shuford et al. 1999).

Long-billed curlews forage on a variety of insect prey, including beetles, grasshoppers, and spiders. In coastal areas, it also feeds on crabs, crayfish, mollusks, and other large invertebrates. With these food habitats, long-billed curlews could forage along the shoreline of the Salton Sea but commonly forage in agricultural fields.

The covered activities, including implementation of the water conservation and transfer project are not expected to substantially affect use of the HCP area by long-billed curlew. Mudflats at the Salton Sea that long-billed curlews could use for foraging would continue to be available and abundant even at reduced Sea elevations. Take of long-billed curlew could result from reductions in agricultural fields even though agricultural fields that long-billed curlews frequent for foraging would remain abundant. The degree of reduction in

agricultural fields would depend in part on the extent to which fallowing is used to conserve water. Effects to long-billed curlew from changes in agricultural fields are evaluated in Section 3.8.6.15.

3.3.5.12 California Least Tern

The California least tern occurs at the Salton Sea only accidentally. Fewer than 10 records of this species exist at the Salton Sea NWR (USFWS 1997b). Nesting has not been reported. Given the very low level of use of the HCP area, it is very unlikely that the covered activities would result in take of any California least terns. However, an individual potentially could be taken as a result of reduced foraging opportunities at the Salton Sea because of the accelerated reduction in fish abundance. Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea as potential forage base for California least tern until that resource would be lost without implementation of the water conservation and transfer program. The predicted avoidance of changes in fish abundance attributable to the water conservation and transfer program with implementation of the Salton Sea Conservation Strategy would offset the minimal amount of take of California least tern that could occur. Therefore, implementation of the HCP would not jeopardize the continued existence of least tern.

3.3.5.13 Bald Eagle

Bald eagles are a rare and occasional winter visitor to the Salton Sea with one to three individuals typically observed during winter. When visiting the Salton Sea, bald eagles probably prey on the abundant fish but probably also pursue waterfowl at the Sea or managed marshes in the Imperial Valley.

The primary mechanism through which the covered activities could result in take of bald eagle at the Salton Sea is a reduction in fish abundance. As described in Section 3.3.2.1 the abundance of tilapia is expected to decrease as the salinity of sea increases. Water conservation to implement the water conservation and transfer programs is projected to increase the rate of salinization of the sea and accelerate the decline in fish abundance at the Salton Sea. A few bald eagles potentially could be taken as a result of reduced foraging opportunities.

Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea until that resource would be lost without implementation of the water conservation and transfer program. The Salton Sea Conservation Strategy would avoid impacts to bald eagles from changes in foraging opportunities at the Salton Sea; therefore, implementation of the HCP would not jeopardize the continued existence of bald eagles.

3.3.5.14 Bank Swallow

Bank swallows are casual visitors to the HCP area, potentially occurring in the HCP area as migrants during the spring and fall. For foraging, they are not strongly associated with any particular habitat type, although they often forage near water where insects are abundant. Insects would continue to be available at the Salton Sea and adjacent marsh habitats. To the extent that bank swallows currently forage along the Salton Sea, foraging opportunities would persist with no impacts to bank swallows anticipated as a result of changes at the sea.

Bank swallows could be taken by covered activities that affect tamarisk scrub habitat and agricultural habitat as discussed in Sections 3.5.6.7 and 3.8.6.4.

3.3.5.15 Elegant Tern

Elegant terns occur only accidentally at the Salton Sea during spring. In the HCP area, elegant terns would be expected to occur only at the Salton Sea where they would forage on fish. Given the very low level of use of the HCP area, it is very unlikely that the covered activities would result in take of any elegant terns. However, an individual could be taken as a result of reduced foraging opportunities in the HCP because of the accelerated reduction in fish abundance.

Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea until that resource would be lost without implementation of the water conservation and transfer program. By avoiding changes in fish abundance, implementation of the Salton Sea Conservation Strategy would avoid or minimize the impact of any take of elegant terns.

3.3.5.16 Reddish Egret

The reddish egret is a rare visitor to the HCP area in the summer and fall. They are mainly expected to occur at the Salton Sea where suitable foraging habitat exists along the margins of the Salton Sea. Marsh habitats adjacent to the Salton Sea also could provide suitable foraging conditions for this species.

The effects of the water conservation and transfer project on reddish egrets would be similar to that described for laughing gulls, black terns and gull-billed terns with respect to changes in food resources. As described for these species, a few reddish egrets could be taken as a result of reduced foraging opportunities in the HCP area. Under the Salton Sea Conservation Strategy, IID would implement measures to maintain fish at the Salton Sea until that resource would be lost without implementation of the water conservation and transfer program. By avoiding changes in fish abundance, implementation of the Salton Sea Conservation Strategy would avoid or minimize the impact of any take of reddish egret.

3.3.5.17 Merlin

Merlins are rare visitors to the HCP area in the fall and winter (USFWS, 1997b). They are not known to nest in the area; therefore, use of the HCP area is limited to foraging. Merlins forage for shorebirds and other small birds in open habitats. With the exception of desert habitat, all of the habitats in the HCP area could be used by foraging merlins to varying degrees. The covered activities are unlikely to adversely affect merlins because of their very rare occurrence in the HCP area and broad habitat use for foraging. However, a few individuals could be taken because of changes in foraging habitat availability or quality potentially resulting from permanent or temporary reductions in drain vegetation (See Section 3.5.2.2), permanent or temporary reductions in tamarisk scrub habitat (See Section 3.4.2), or changes in the composition and amount of agricultural field habitat (See Section 3.8.2). Although the ecology of the Salton Sea will change as the salinity of the sea increases, shorebirds would be expected to continue to use the sea and adjacent habitats and provide foraging opportunities for merlins.

The minimal amount of potential take would be mitigated by implementation of the Salton Sea, Tamarisk Scrub Habitat, Drain Habitat, and Agricultural Field Habitat conservation strategies. Loss of tamarisk scrub habitat at the Salton Sea and in the Imperial Valley would be offset through the creation / acquisition and long-term protection of native tree habitat (See Sections 3.3.4.2 and 3.4.5). By attracting a variety of songbirds, native tree habitat would provide higher quality foraging opportunities for merlins. The Drain Habitat Conservation Strategy also would contribute to mitigating the impact of any take of merlin that could occur by increasing foraging opportunities through creation of managed marsh habitat. Finally, the Agricultural Field Habitat Conservation Strategy (See Section 3.8.4) would enhance the likelihood that agriculture would remain the dominant land use in the Imperial Valley and thereby continue to provide foraging opportunities for merlins. In combination, these strategies would mitigate the minimal amount of take of merlin potentially occurring and would not jeopardize the continued existence of the species.

3.3.5.18 Black Swift

Black swifts occur accidentally in the HCP area during the spring. Only two records of this species exist for the Salton Sea NWR (USFWS, 1997b). Black swift forage for insects in open habitats. For foraging, they are not strongly associated with any particular habitat type, although they often forage near water where insects are abundant. The covered activities are unlikely to adversely affect black swift because of the swift's very rare occurrence in the HCP area and broad habitat use for foraging. However, a few individuals could be taken because of changes in foraging habitat availability or quality potentially resulting from permanent or temporary reductions in drain vegetation (See Section 3.5.2.2), permanent or temporary reductions in tamarisk scrub habitat (See Section 3.4.2), or changes in the composition and amount of agricultural field habitat (See Section 3.8.2). Although the ecology of the Salton Sea will change as the salinity of the sea increases, insects would be expected to continue to be available at the sea and adjacent habitats and provide foraging opportunities for black swift.

The minimal amount of potential take would be mitigated by implementation of the Salton Sea, Tamarisk Scrub Habitat, Drain Habitat, and Agricultural Field Habitat conservation strategies. Loss of tamarisk scrub habitat at the Salton Sea and in the Imperial Valley would be avoided or offset through the creation / acquisition and long-term protection of native tree habitat (See Sections 3.3.4.2 and 3.4.5). By supporting more abundance and diverse insect populations than tamarisk scrub, native tree habitat would provide higher quality foraging opportunities for black swift. The Drain Habitat Conservation Strategy also would contribute to mitigating the impact of any take of black swifts that could occur by increasing foraging opportunities through creation of managed marsh habitat. Finally, the Agricultural Field Habitat Conservation Strategy (See Section 3.8.4) would enhance the likelihood that agriculture will remain the dominant land use in the Imperial Valley and thereby continue to provide foraging opportunities for black swift. In combination, these strategies would mitigate the minimal amount of take potentially occurring and would not jeopardize the continued existence of the species.

3.3.5.19 Vaux's Swift

Vaux's swifts occur in the HCP area as a migrant during the spring and fall. It is relatively common at the Salton Sea during the spring but considered uncommon in the fall (USFWS

1997b). Thousands of migrating birds have been reported at the north end of the Salton Sea during the spring but are relatively uncommon elsewhere in the Salton Basin during spring migration (Garrett and Dunn, 1981). For foraging, they are not strongly associated with any particular habitat type, although they often forage near water where insects are abundant.

The covered activities are unlikely to adversely affect Vaux's swift because of the swift's brief occurrence in the HCP area and broad habitat use for foraging. However, a few individuals could be taken because of changes in foraging habitat availability or quality potentially resulting from permanent or temporary reductions in drain vegetation (See Section 3.5.2.2), permanent or temporary reductions in tamarisk scrub habitat (See Section 3.4.2), or changes in the composition and amount of agricultural field habitat (See Section 3.8.2). Although the ecology of the Salton Sea will change as the salinity of the sea increases, insects would remain available at the sea and in other habitats throughout the HCP area.

The minimal amount of potential take would be mitigated by implementation of the Salton Sea, Tamarisk Scrub Habitat, Drain Habitat, and Agricultural Field Habitat conservation strategies. Loss of tamarisk scrub habitat at the Salton Sea and in the Imperial Valley would be avoided or offset through the creation / acquisition and long-term protection of native tree habitat (See Sections 3.3.4.2 and 3.4.5). By supporting more abundant and diverse insect populations than tamarisk scrub, native tree habitat would provide higher quality foraging opportunities for Vaux's swift. The Drain Habitat Conservation Strategy also would contribute to mitigating the impact of any take of Vaux's swift that could occur by increasing foraging opportunities through creation of managed marsh habitat. Finally, the Agricultural Field Habitat Conservation Strategy (see section 3.8.4) would enhance the likelihood that agriculture will remain the dominant land use in the Imperial Valley and thereby continue to provide foraging opportunities for Vaux's swift. In combination, these strategies would mitigate the minimal amount of take potentially occurring and would not jeopardize the continued existence of the species.

3.3.5.20 Purple Martin

Purple martins are occasional visitors to the Salton Sea area as spring and fall migrants (USFWS, 1997b). No published records exist of purple martins nesting in the southeastern portion of California (Williams, 1996), and purple martins are not expected to nest in the HCP area. For foraging, they are not strongly associated with any particular habitat type, although they often forage near water where insects are abundant. However, a few individuals could be taken because of changes in foraging habitat availability or quality potentially resulting from permanent or temporary reductions in drain vegetation (See Section 3.5.2.2), permanent or temporary reductions in tamarisk scrub habitat (See Section 3.4.2), or changes in the composition and amount of agricultural field habitat (See Section 3.8.2). Although the ecology of the Salton Sea will change as the salinity of the sea increases, insects would be expected to continue to be available at the sea and adjacent habitats and provide foraging opportunities for purple martin.

The minimal amount of potential take would be mitigated by implementation of the Salton Sea, Tamarisk Scrub Habitat, Drain Habitat, and Agricultural Field Habitat conservation strategies. Loss of tamarisk scrub habitat at the Salton Sea and in the Imperial Valley would be avoided or offset through the creation / acquisition and long-term protection of native tree habitat (See Sections 3.3.4.2 and 3.4.5). By supporting more abundant and diverse insect

Return to Contents

populations than tamarisk scrub, native tree habitat would provide higher quality foraging opportunities for purple martin. The Drain Habitat Conservation Strategy also would contribute mitigating the impact of any take of purple martin that could occur by increasing foraging opportunities through creation of managed marsh habitat. Finally, the Agricultural Field Habitat Conservation Strategy (See Section 3.8.4) would enhance the likelihood that agriculture will remain the dominant land use in the Imperial Valley and thereby continue to provide foraging opportunities for purple martin. In combination, these strategies would mitigate the minimal amount of take potentially occurring and would not jeopardize the continued existence of the species.

3.4 Tamarisk Scrub Habitat Conservation Strategy

3.4.1 Amount and Quality of Habitat in the HCP Area

In the HCP area, tamarisk scrub is found along the New and Alamo rivers, sporadically along some drains, in seepage areas adjacent to the East Highline Canal and All American Canal (AAC), adjacent to the Salton Sea, and in other scattered and isolated patches throughout the HCP area wherever water is available. The covered species associated with tamarisk scrub habitat (Table 2.3-16) primarily are riparian species that find optimal habitat in riparian vegetation consisting of mesquite, cottonwoods, willows, and other native riparian plant species. Tamarisk has invaded most areas within the HCP area where water supplied from the Colorado River provides sufficient soil moisture. Native riparian or mesquite bosque habitat is largely absent from the HCP area. Tamarisk also has colonized non-riparian areas along drains or seepage areas. Tamarisk scrub habitat is not optimal habitat for the species that use this habitat in the HCP area. Rather, it constitutes the only available tree-dominated habitat in the HCP area. While covered species will use tamarisk scrub, it is poor quality habitat and is not preferred.

The New and Alamo rivers support about 2,568 acres and 962 acres of tamarisk scrub habitat respectively, for a total of 3,530 acres. About 31 acres occur in the deltas of these rivers. With its tolerance for high salt concentrations, tamarisk has colonized the margins of the Salton Sea. Tamarisk is a primary component of areas designated as shoreline strand community in the Salton Sea database. The shoreline strand community occurs immediately adjacent to the sea and consists of tamarisk and iodine bush and encompasses about 293 acres (University of Redlands 1999). The source of the water that supports the shoreline strand community is uncertain, but is likely the result of shallow groundwater and seepage rising to the surface at its interface with the Salton Sea. In addition to the shoreline strand community, tamarisk scrub occupies about 2,349 acres of adjacent wetland areas of the Salton Sea as designated in the Salton Sea database. Section 2.3.2 provides additional information on the location and characteristics of the shoreline strand and adjacent wetland areas. Tamarisk is a common species in the drains. Drains support an estimated 215 acres of tamarisk scrub habitat. About 412 acres and 755 acres of tamarisk scrub habitat also are supported in seepage areas adjacent to the East Highline Canal and AAC, respectively. Table 3.4-1 summarizes the location and acreage of tamarisk scrub in the HCP area.

TABLE 3.4-1
Location and Acreage of Tamarisk Scrub Habitat in the IID HCP Area

Location	Acreage
New River	2,568
Alamo River	962
Shoreline strand	293
Adjacent to Salton Sea	2,349
Drains	215
AAC Seepage area	755
East Highline Canal seepage areas	412
Other patches	Unquantified
Total Quantified	**7,554**

3.4.2 Effects of the Covered Activities

The mechanisms through which the covered activities could take a covered species associated with tamarisk scrub are changes in habitat (permanent or temporary changes), disturbance, or mortality/injury. The potential effects of each of the covered activities on tamarisk scrub vegetation and covered species using tamarisk scrub habitat is described in Table 3.4-2. Activities with the potential to affect habitat are described in more detail following the table. Activities that are not expected to affect habitat have a very limited potential to affect covered species, with potential effects limited to disturbance in the event that the activity was conducted in proximity to tamarisk scrub inhabited by covered species.

TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated With Tamarisk Scrub Habitat

Activity	Potential Effects (Positive and Negative)
Water Use and Conservation	
Combined effects of on-farm and system-based water conservation	Water conservation could reduce the amount of water flowing to the Salton Sea and contribute to a reduced sea elevation. The acreage of tamarisk scrub in areas adjacent to the Salton Sea could be reduced. This potential effect is addressed as part of the Salton Sea Habitat Conservation Strategy (See Salton Sea–3 in Section 3.3.4.2).
Installation of on-farm water conservation features	On-farm water conservation practices would be constructed within agricultural fields or their margins and therefore would not likely affect tamarisk scrub habitat or covered species using tamarisk scrub habitat. Tamarisk could colonize the margins of constructed tailwater return ponds and delivery ponds and thereby increase the availability of this habitat to covered species.
Installation of System-Based Water Conservation Features	
Canal lining and piping	Canal lining is proposed along 1.74 miles of canal to reduce seepage. Canals proposed for lining (see Section 1.7) are surrounded by agricultural fields. Tamarisk does not occur along the canals proposed for lining because IID tightly controls vegetation within the canal right-of-way and farming adjacent to the canals prevent the development of tamarisk outside of IID's right-of-way.
Construction of new canals	New canals would be constructed through agricultural fields and would tie into the existing canal system. Only if a new canal crossed a drain in an area supporting tamarisk scrub would there be the potential for impacts to species associated with tamarisk scrub. It is anticipated that construction of new canals would not affect tamarisk scrub habitat or covered species using this habitat to any meaningful level because little additional canal would be constructed over the term of the permit and

Return to Contents

TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated With Tamarisk Scrub Habitat

Activity	Potential Effects (Positive and Negative)
	effects to tamarisk scrub habitat would only occur if the new canal crossed a drain in an area supporting tamarisk.
Lateral interceptors	Lateral interceptors would be constructed in agricultural fields but would cross some drains where there could be tamarisk scrub. As described under Structure Maintenance below, IID anticipates constructing up to six drain crossings each year. Drain crossings for lateral interceptors are encompassed by those described under Structure Maintenance. A lateral interceptor system includes a small reservoir (see Section 1.7). Construction of the reservoirs could remove up to 15 acres of tamarisk scrub vegetation.
Reservoirs	IID could construct up to 100 reservoirs 1 to 10 acres in size, and encompassing up to 1,000 acres. These reservoirs would be on agricultural lands or barren lands and would not impact tamarisk scrub habitat. Farmers are expected to construct 1 to 2 acre reservoirs to better regulate irrigation water. These reservoirs would be installed in agricultural fields and would not impact tamarisk scrub habitat.
Seepage Recovery Systems	Seepage recovery systems are proposed along the East Highline Canal. About 43 acres of tamarisk scrub habitat could be permanently lost because of installation of subsurface seepage recovery systems. Effects of surface seepage recovery systems on vegetation are addressed under the Drain Habitat Conservation Strategy (Section 3.5.4).
Operation and Maintenance	
Conveyance system operation	Conveyance system operation is limited to moving water through the canals to meet customer needs and to address maintenance requirements. Other than the filling, draining and moving water through the canals, no physical effects are encompassed by conveyance system operation. No effects to tamarisk or covered species using tamarisk scrub habitat would be expected.
Drainage System Operation	
Rerouting or constructing new drains	IID reroutes or constructs about 2 miles of drains every 10 years. Newly constructed drains could increase habitat for covered species associated with tamarisk scrub habitat. If IID constructed 2 miles of drains every 10 years, 15 miles of new drains would be created over the 75-year permit term, which could increase habitat for species associated with tamarisk scrub habitat as tamarisk colonized the new drain. Rerouting drains could result in the temporary reduction in vegetation in the drains during the period between abandonment of the old drain and when vegetation develops in the rerouted drain. No net loss of vegetation would occur because the rerouted portion would replace the abandoned section.
Piping drains	Over the 75-year term IID anticipates that about 50 miles of open drains would be pipelined, with an annual average of 0.67 miles of drain pipelining. About 22 acres of vegetation in the drains could be lost over the term of the permit of which an estimated 7 acres could be tamarisk.
Inspection activities	Potential effects of inspection activities would be limited to a minor potential for disturbance of covered species if they occur in the vicinity of structures at the time of inspection.
Canal lining maintenance	Canal lining maintenance consists of repairing the concrete lining of canals only. Activities required for canal lining maintenance are limited to

Return to Contents

TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated With Tamarisk Scrub Habitat

Activity	Potential Effects (Positive and Negative)
	the canal prism and adjacent roadway. Tamarisk does not grow in these areas. Therefore, canal lining maintenance would not likely affect tamarisk scrub habitat or covered species using this habitat.
Right-of-way maintenance Embankment maintenance Erosion maintenance	Along drains, right-of-way maintenance, embankment maintenance and erosion maintenance is conducted in association with vegetation control/sediment removal along drains. Potential impacts to covered species from these activities are encompassed by those under vegetation control. Along canals, these activities consist of grading and grooming canal embankments and maintaining the right-of-way free of vegetation. Vegetation typically consists of *Atriplex* and arrowweed but can include tamarisk. All canals are treated annually. Because of this annual treatment, tamarisk cannot become established and develop enough to provide habitat for covered species. Occasionally, storm events will cause bank sloughing or wash outs along drains and require immediate repair. The bank sloughing or wash outs remove vegetation (e.g., tamarisk) such that IID's actions to correct the erosion problem require minimal additional vegetation removal, including removal of tamarisk.
Seepage maintenance	Seepage maintenance is conducted only along the canal system and consists of repairing leaks. Because seepage maintenance is done regularly and routinely, tamarisk does not become established. Therefore, seepage maintenance would not likely affect tamarisk habitat or covered species using this habitat.
Structure maintenance	IID estimates that about 300 structures will be replaced each year. About 100 of these structures would be drainage structures with the remaining 200 canal structures. Replacement of canal structures would not be expected to affect tamarisk scrub habitat. All construction activity would be conducted with the canal's right-of-way that is maintained free of vegetation. Along lateral drains, replacing each structure temporarily disturbs an area about 75 feet long. Thus, each year about 7,500 feet (1.4 miles) of the drains would be disturbed, potentially and temporarily removing 0.6 acres of vegetation, a portion of which could be tamarisk ([7500 ft X 14 ft / 43560]*26 percent vegetated). This potential loss of vegetation is addressed in the Drain Habitat Conservation Strategy (Section 3.5.4). Installation of new drain crossings could result in the permanent loss of drain vegetation. IID estimates that six 40-foot-wide crossings will be constructed each year. Based on this estimate, 18,000 feet (3.4 miles) of drain would be affected by drain crossings over the term of the permit, potentially resulting in the loss of 1.5 acres of drain vegetation, a portion of which could be tamarisk. ([18,000 ft X 14 ft / 43560]*26 percent vegetated). This potential loss of vegetation is addressed in the Drain Habitat Conservation Strategy (Section 3.5.4). New structures that would be constructed on the drainage system would consist of control structures. Control structures are installed in steep drains that are eroding. Because of the erosion, drains needing control structures support little vegetation. Thus, construction of new control structures has a limited potential to affect tamarisk scrub habitat or associated covered species

Return to Contents

TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated With Tamarisk Scrub Habitat

Activity	Potential Effects (Positive and Negative)
Pipeline maintenance	Drain pipelines primarily occur in farm fields while conveyance system pipelines occur through developed areas. Neither of these areas support tamarisk scrub habitat. As such, the potential for pipeline maintenance to affect covered species is very low.
Reservoir maintenance	Reservoirs are located on the conveyance system. Vegetation is tightly controlled around the reservoir such that tamarisk scrub habitat does not develop. As such, continued reservoir maintenance would not likely affect species associated with tamarisk scrub habitat.
Sediment removal Vegetation control	IID removes sediment from about 300 miles of drains annually. Mechanical and chemical control of vegetation is conducted in association with sediment removal as necessary. While IID strives to maintain vegetation on drain banks, vegetation within the channel bottom is removed with sediment, potentially including tamarisk. These activities can temporarily reduce the amount of vegetation in the drains. An estimated 130 acres of vegetated drain is affected by sediment removal and vegetation control each year of which about 43 acres are tamarisk. Vegetation impacts in the drains are addressed and mitigated by the Drain Habitat Conservation Strategy (Section 3.5.4). Vegetation control along canals focuses on removing moss and algae. Thus, no effects to tamarisk scrub habitat would occur.
New and Alamo River maintenance	IID dredges the deltas of the New and Alamo rivers about once every four years. In conducting this dredging, IID retains the vegetation on the banks. Thus, tamarisk scrub habitat is not removed by these dredging operations, but the dredging could temporarily disturb covered species using tamarisk along the river channels. IID coordinates with USFWS at the refuge prior to conducting these activities. Mechanical and chemical control is used to treat the banks around the 20 drop structures on the New and Alamo rivers. About 10 acres are treated annually. Because of this annual treatment, tamarisk cannot become established and develop enough to provide habitat for covered species.
Salton Sea dike maintenance	Salton Sea dike maintenance activities consist of replacing riprap, grooming embankments and repairing damaged sections of the dikes. Because tamarisk does not occur on or immediately adjacent to the dikes, no change in habitat would occur with these activities and no disturbance of covered species would be expected.
Gravel and rock quarrying	Tamarisk scrub habitat is not found at the gravel and rock quarries. Thus, quarrying is not likely to affect covered species associated with tamarisk scrub habitat.
Fish hatchery operation and maintenance	The fish hatchery is a developed facility and does not support habitat for covered species associated with tamarisk scrub habitat.
Recreational facilities	New recreational facilities could be constructed in association with IID's drain and canals. As described in Section 1.7, potential recreational facilities may include bikepaths, footpaths, picnic tables, and similar facilities. Because recreational facilities would not be constructed in the drain prism where tamarisk scrub habitat could occur, construction of recreational facilities would not be expected to affect habitat for species associated with this habitat. If recreational facilities were constructed adjacent to drains, there would be a minor potential for disturbance of covered species during construction. Vegetation along canals is tightly controlled such that it is unlikely that any tamarisk would be removed to develop recreational facilities along canals. Further, IID would not locate

Return to Contents

TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated With Tamarisk Scrub Habitat

Activity	Potential Effects (Positive and Negative)
	new recreational facilities in areas with extensive tamarisk due to the increased construction cost associated with removal of tamarisk. The HCP does not cover take of covered species by recreationists.
HCP/EIS/EIR mitigation	HCP measures consisting of habitat construction could eliminate some tamarisk scrub habitat depending on its specific location. However, IID would not locate habitat creation areas in areas with extensive tamarisk if possible due to the increased construction cost associated with removal of tamarisk.

3.4.2.1 Habitat Changes at the Salton Sea

Covered species using tamarisk scrub also could be adversely affected by the water conservation and transfer programs if reductions in the sea elevation resulted in the loss of tamarisk scrub in shoreline strand and adjacent wetland areas around the Salton Sea. Impacts to covered species potentially resulting from changes in tamarisk scrub adjacent to the Salton Sea as a result of a reduced sea elevation are addressed as part of the Salton Sea Habitat Conservation Strategy (See Salton Sea–3 in Section 3.3.4.2). The following provides a general description of the nature and extent of potential changes in tamarisk scrub habitat adjacent to the Salton Sea. Mitigation for impacts to covered species using tamarisk scrub adjacent to the Salton Sea is covered under the Salton Sea Habitat Conservation Strategy.

The Salton Sea database identifies 293 acres of shoreline strand habitat along the Salton Sea. Shoreline strand habitat consists of tamarisk and iodine bush. In addition to the shoreline strand, the Salton Sea database identifies 2,349 acres of adjacent wetlands dominated by tamarisk. The source of the water that supports the shoreline strand community is uncertain but likely is the result of shallow groundwater rising to the surface at its interface to the Salton Sea. Depending on the extent to which seepage from the Salton Sea contributes to supporting the shoreline strand community and adjacent wetlands dominated by tamarisk, the water conservation program could result in a reduction in the amount of tamarisk scrub habitat. There is, however, considerable uncertainty about the extent of these possible changes. As the sea recedes, tamarisk could establish at lower elevations, replacing habitat lost at higher elevations. Alternatively, it has been suggested that tamarisk will not establish in areas exposed by a receding sea level because of excessive soil salinity (Reclamation and SSA 2000). In areas where relatively good quality drain water or shallow groundwater is the predominant water source, no change in tamarisk-dominated adjacent wetlands is expected. It is currently not possible to predict the magnitude of changes in tamarisk in shoreline strand and adjacent wetland areas as a result of the water conservation and transfer programs.

3.4.2.2 Permanent Habitat Loss in the Imperial Valley

Covered activities potentially resulting in the permanent loss of tamarisk scrub habitat in the Imperial Valley are installation of lateral interceptors, installation of seepage recovery systems, piping drains, and structure maintenance. The potential effects of each of these activities on habitat are described below. In total, an estimated 65.5 acres of tamarisk scrub could be lost because of the covered activities over the term of the permit.

As part of the water conservation and transfer project, IID could install 16 lateral interceptor systems (see Section 1.7). These systems consist of a canal and a reservoir about 40 surface acres in size. Some of the reservoirs could be located close to the New or Alamo rivers and their construction could result in removal of some tamarisk scrub adjacent to these rivers. IID anticipates that up to 15 acres of tamarisk scrub could be removed to construct reservoirs associated with lateral interceptor systems.

Seepage recovery systems are proposed along the East Highline Canal. Subsurface recovery systems are proposed where there is not an existing drain. These systems consist of an underground, perforated pipeline that collects the water and directs it to a sump. Along the East Highline Canal, the pipelines would be installed in close proximity to the outside toe of the canal embankment. Vegetation supported by seepage generally occurs on the embankment where it intercepts seepage water. Because the recovery system would be at the base of the embankment, vegetation would not be lost as a consequence of removing seepage water. However, construction would likely require removal of some of the seepage-supported vegetation. Construction to install these systems disturbs an area about 70 feet wide along the pipeline installation route. About 13.2 miles of pipeline are anticipated to be installed for the seepage recovery systems resulting in the removal of about 43 acres of tamarisk scrub habitat. This amount constitutes about 10 percent of the estimated 412 acres of tamarisk scrub habitat supported in seepage areas adjacent to the East Highline Canal in the HCP area.

Over the 75-year term, IID anticipates that about 50 miles of open drains (an annual average of 0.67 mile) would be pipelined. The entire drainage system encompasses an estimated 2,471 acres of which an estimated 26 percent (652 acres) is vegetated. Tamarisk comprises about 33 percent of the vegetation in the drains. Assuming that 26 percent of the 50 miles of drains piped is vegetated, 22 acres of drain vegetation could be lost over the term of the permit from piping drains. On average, about 7 acres could be tamarisk. This potential loss of vegetation in the drains is addressed through the Drain Habitat Conservation Strategy.

Structure maintenance with the potential to eliminate drain vegetation consists of installation of new drain crossings. IID estimates that six 40-foot-wide crossings will be constructed each year. Based on this estimate, 18,000 feet (3.4 miles) of drain would be affected by drain crossings over the term of the permit. Assuming the impacted area is 26 percent vegetated, about 1.5 acres of drain vegetation could be lost of which an estimated 0.5 acre could be tamarisk. This potential loss of vegetation in the drains is addressed through the Drain Habitat Conservation Strategy.

Tamarisk scrub habitat also occurs in some locations along the AAC in association with washes, where there is seepage from the canal or in other locations where water is available (e.g., from adjacent agricultural fields or from the LCR). As described in more detail in the Desert Habitat Conservation Strategy (see Section 3.6.2), the covered activities include replacement of structures along the AAC. Construction activities required to replace structures along the AAC could result in the removal of desert habitat or tamarisk scrub habitat. Under Desert Habitat–2, IID has committed to permanently remove no more than 100 acres of native desert habitat and tamarisk scrub habitat combined adjacent to the AAC and on the desert sides of the other canals adjacent to desert habitat. Thus, a maximum of an additional 100 acres of tamarisk scrub habitat (assuming all of the habitat impacted by construction along the canals adjacent to desert habitat is tamarisk scrub habitat) could be removed by the covered species.

3.4.2.3 Temporary Habitat Disturbance in the Imperial Valley

Covered activities potentially resulting in the temporary loss of tamarisk scrub habitat are sediment removal/vegetation control and structure maintenance. The potential effects of these activities are described below. In total, an estimated 43.2 acres of tamarisk could be temporarily disturbed by the covered activities each year. However, all of this tamarisk is in the drains and is addressed through the Drain Habitat Conservation Strategy.

The amount of vegetation in the drains was conservatively estimated at 652 acres; about 215 acres are tamarisk IID anticipates that it will clear vegetation/sediment from approximately one-fifth (about 130 acres) of the vegetated acreage in the drains each year. Thus, about 43 acres of tamarisk scrub and species associated with tamarisk scrub could be exposed to drain cleaning each year. Drain cleaning could displace individuals, temporarily reduce habitat in the localized area of the cleaning, or destroy nests if covered species breed in the drains. These potential impacts are addressed through the Drain Habitat Conservation Strategy.

Structure replacement could temporarily remove drain vegetation, some of which could be tamarisk. IID estimates that about 100 structures on drains will need to be replaced each year. Along lateral drains, replacing each structure temporarily disturbs an area about 75 feet long. Thus, each year about 7,500 feet (1.4 miles) of the drains would be disturbed, potentially resulting in the temporary removal of 0.6 acre of vegetation of which about 0.2 acre could be tamarisk. This potential impact is addressed through the Drain Habitat Conservation Strategy.

3.4.2.4 Summary of Habitat Effects in the Imperial Valley

Within the Imperial Valley, the covered activities have the potential to permanently remove 65.5 acres of tamarisk and temporarily disturb 43.2 acres (Table 3.4-3). All of the tamarisk potentially temporarily affected is in the drains and is addressed under the Drain Habitat Conservation Strategy. Of the 65.5 acres potentially permanently lost, 15 acres would be located along the New and/or Alamo rivers, 43 would be along the East Highline Canal, and 7.5 acres would be in the drainage system. The potential loss of 7.5 acres of tamarisk in the drains is addressed under the Drain Habitat Conservation Strategy. The 65.5 acres of potential permanent loss of tamarisk constitutes less than one percent of the quantified acreage of tamarisk scrub (Table 3.4-1). Up to an additional 100 acres of tamarisk scrub habitat could be lost of the term of permit from construction activities along the AAC.

TABLE 3.4-3

Potential Impacts to Tamarisk Scrub Habitat in the Imperial Valley

Covered Activity	Acreage	Comments
Permanent Loss		
Lateral interceptors	15	
Subsurface recovery systems	43	
Piping drains	7	Covered by Drain Habitat Conservation Strategy
Structure maintenance	0.5	Covered by Drain Habitat Conservation Strategy
Total permanent loss	65.5	7.5 acres are covered by the Drain Habitat Conservation Strategy
Temporary Loss		
Vegetation control/sediment removal	43	Covered by Drain Habitat Conservation Strategy
Structure maintenance	0.2	Covered by Drain Habitat Conservation Strategy
Total temporary loss	43.2	Covered by Drain Habitat Conservation Strategy

3.4.3 Approach and Biological Goals

The overall goal of the Tamarisk Scrub Habitat Conservation Strategy is to provide habitat to support the species composition and seasonal occurrence of riparian-associated covered species that could use tamarisk scrub habitat in the HCP Area. This overall goal is to be accomplished through implementing measures to meet two specific objectives:

- Avoid and minimize take of covered species associated with removal of tamarisk scrub habitat
- Create or acquire and preserve native tree habitat to mitigate any take of covered species caused by removal of tamarisk

3.4.4 Tamarisk Scrub Habitat Mitigation and Management Measures

The mitigation and management measures described below are the specific actions that IID will undertake to fulfill the goals of the Tamarisk Scrub Habitat Conservation Strategy. The key elements of the conservation strategy are as follows:

- Minimize take, including disturbance, of covered species associated with tamarisk scrub habitat as a result of construction activities
- Acquire or create, and preserve native tree habitat to mitigate for the take of covered species resulting from the loss of tamarisk scrub or native tree/shrub habitat permanently removed as a result of construction activities

Tree Habitat–1. *For scheduled construction activities (except for the installation of subsurface seepage recovery systems – see Tree Habitat – 2), the site will be surveyed before initiation of construction activities. If tamarisk scrub habitat occurs on the project site and would be affected by the construction activities or operation of the constructed facilities, the acreage and plant species composition of the affected vegetation will be determined.*

For tamarisk that would be permanently lost, IID will create or acquire native tree habitat consisting of mesquite bosque or cottonwood-willow habitat. The amount of habitat to acquire or create will be calculated based on the following ratios.

- *If IID creates habitat prior to conducting the construction activities, the mitigation ratio for the acreage of created habitat to lost acreage of tamarisk will be 0.25:1 as long as the created habitat meets the success criteria.*
- *If IID creates habitat after conducting the construction activities or if IID acquires existing habitat, the mitigation ratio for the acreage of the created or acquired habitat to lost acreage of tamarisk will be 0.75:1. The habitat will be created or acquired within 1 year of initiation of the construction activities unless otherwise agreed to by IID, USFWS, and CDFG.*

For native tree habitat that would be removed by construction activities, IID will create or acquire native tree habitat consisting of mesquite bosque or cottonwood-willow habitat at a 3:1 ratio for the acreage impacted. The habitat will be created or acquired within 1 year of initiation of the construction activities unless otherwise agreed to by IID, USFWS, and CDFG.

If IID elects to acquire habitat, IID will work with the HCP IT to identify a property for acquisition. Habitat to be acquired must support mesquite bosque or cottonwood-willow habitat, occur within the Salton Sea Basin and meet with the approval of the USFWS and CDFG. If the only available properties that meet these requirements are larger than required to compensate for the lost acreage, IID will acquire the least expensive property. IID can use the additional acreage of the acquired habitat to fulfill the mitigation obligations of Tree Habitat–1 or Tree Habitat–2 for future projects, or Salton Sea–3. IID will place a conservation easement on acquired lands and provide for the property to be managed for covered species in perpetuity. With the approval of USFWS and CDFG, which approval shall not be unreasonably withheld, IID may transfer the land to a third party who agrees to and is authorized to manage the land for habitat conservation purposes. If IID transfers the land to a third party, IID will establish an endowment fund adequate to provide for the management of the lands in perpetuity.

If IID elects to create habitat, IID will work with the HCP IT to develop a habitat creation plan. The habitat creation plan will include the following information:

- *Location*
- *Planting plan (including species composition and layout)*
- *Grading and other construction activities*
- *Long-term management practices*
- *Vegetation and species use monitoring*
- *Success criteria for the plantings and the actions that iid will take if the success criteria are not met*

IID will submit habitat creation plans to the USFWS and CDFG for approval prior to initiation of habitat creation activities. IID will provide for the management of created native tree habitat in perpetuity.

For created and acquired habitat, IID will work with the HCP IT to prepare a management plan for the property that describes how the property will be managed. The management plan will describe the actions that IID will take to maintain the ecological functions of the created and acquired habitat. While the specific management needs will vary depending on the property, considerations for the management plan include:

- *Measures to control human access (e.g., fencing, signage)*
- *Frequency at which land will be visited to assess maintenance/management needs*
- *Types of maintenance action (e.g., removing garbage, repairing fences)*
- *Vegetation management practices (e.g., prescribed burning, removal of exotic plants)*

IID will submit management plans to the USFWS and CDFG for approval within 1 year of completing habitat creation activities or recording a conservation easement for acquired habitat.

IID will undertake a variety of construction activities in the future, primarily as part of the water conservation and transfer project and to modernize and rehabilitate its facilities. As described above, these construction activities have the potential to remove a small amount of tamarisk scrub vegetation which has a small potential to result in take of a covered species. This mitigation measure addresses this potential take by requiring site-specific surveys for every scheduled construction activity to determine if the construction would impact tamarisk scrub habitat and subsequently taking actions to compensate for the loss if habitat would be permanently lost because of the construction. By conducting site-specific surveys, IID will determine if any tamarisk scrub habitat will be affected and create native

tree habitat to replace lost habitat values. If areas of tamarisk scrub habitat will be affected, IID will create or acquire and preserve native tree habitat at a 0.25:1 or 0.75:1 mitigation ratio.

The 0.25:1 mitigation ratio for tamarisk was derived based on the relative value of the habitat affected (i.e., tamarisk scrub) and the habitat that would be created (i.e., cottonwood-willow or mesquite bosque). Anderson and Ohmart (1984) developed a classification system for riparian plant communities along the LCR based on the plant species composition and structural characteristics. Their plant species composition categories are cottonwood-willow, tamarisk, screwbean mesquite, honey mesquite, tamarisk / honey mesquite, and arrowweed. The structural classes and their characteristics are described in Table 3.4-4. Anderson and Ohmart (1984) further assigned a habitat value rating to each plant community / structural class that ranged from 1 (lowest value) to 26 (highest value). Based on this rating system, tamarisk scrub habitats have low habitat value ratings for all structural classes, ranging from 3 to 8 units (Table 3.4-5). Tamarisk is considered to be a relatively unimportant plant community for most bird species along the LCR (Rice et al. 1980). In contrast, the habitat value ratings for cottonwood-willow communities range from 17 to 26 for communities that contained trees greater than 15 feet tall. Cottonwood-willow stands with few cottonwood trees greater than 15 feet tall, have a similar habitat value rating as tamarisk communities. Similarly, honey mesquite communities have high habitat value ratings.

TABLE 3.4-4
Structural Characteristics of Riparian Vegetation According to Anderson and Ohmart (1984) Classification System

Structure Type	Characteristics
I	Mature stand with distinctive overstory greater than 15 feet in height, intermediate class from 2 to 15 feet, tall, and understory from 0 to 2 feet tall.
II	Overstory is greater than 15 feet tall and constitutes greater than 50 percent of the trees with little or no intermediate class present.
III	Largest proportion of trees is between 10 and 20 feet in height with few trees above 20 feet or below 5 feet in height.
IV	Few trees above 15 feet present. Fifty percent of the vegetation is 5 to 15 feet tall with the other 50 percent between 1 to 2 feet in height.
V	Sixty to 70 percent of the vegetation present is between 0 to 2 feet tall, with the remainder in the 5- to 15-foot class.
VI	Seventy-five to 100 percent of the vegetation from 0 to 2 feet in height.

The structural characteristics of the tamarisk scrub in the HCP area has not been determined with the exception of the tamarisk present in seepage areas along the AAC between Drops 2 and 3 and between Drops 3 and 4. The tamarisk scrub in these areas is structural types III and V (Reclamation and IID 1994). These structural types are likely to be the predominant types within the HCP area as well. Thus, the tamarisk scrub in the HCP area provides a relative habitat value of 5. The cottonwood-willow community between Drops 3 and 4 was structural type IV with a relative habitat value of 19 (Reclamation and IID 1994) suggesting that at least a structural type IV community can be created in the native tree habitats. This seepage community also supports a honey mesquite community of structural type IV with a relative habitat value rating of 21. Thus, it is reasonable to expect that created or acquired

TABLE 3.4-5
Wildlife Habitat Value Rating for Tamarisk and Cottonwood-Willow Habitats

Community/Structure	Value
Cottonwood-Willow	
Type I	17
Type II	23
Type III	26
Type IV	19
Type V	5
Type VI	6
Honey Mesquite	
Type III	20
Type IV	21
Type V	10
Type VI	9
Tamarisk	
Type I	4
Type II	8
Type III	5
Type IV	3
Type V	5
Type VI	7
Mixed Communities[a]	
Saltcedar/palms V	10
Saltcedar/honey mesquite IV	8
Saltcedar/honey mesquite V	7.5
Saltcedar/honey mesquite/palms V	12.5
Screwbean mesquite/palms IV	14
Screwbean mesquite/palms V	14

Source: Anderson and Ohmart (1984, presented in Reclamation and IID 1994) unless noted
[a]USFWS (1993)

native tree habitat would provide at least a relative habitat value of 19. As compared to tamarisk scrub with a relative habitat value of 5, the created native tree habitat with a relative habitat value of 19, would provide a habitat value about 4 times greater than the value of the tamarisk scrub currently available. As such, using a 0.25:1 mitigation ratio would result in a similar habitat value in the created native tree habitat as the tamarisk scrub habitat.

If native tree habitat is created prior to removal of tamarisk by construction activities, the habitat will be available to covered species at the time the tamarisk is removed. As described above, native tree habitat is four times more valuable to wildlife than tamarisk

Return to Contents

and creating native tree habitat at a 0.25:1 ratio prior to removal of tamarisk would ensure that there would be not net loss of habitat value for covered species. If native tree habitat is created after tamarisk is removed, there would be slight reduction in habitat value between when the tamarisk is removed and the created habitat is installed and develops into functional habitat. A higher mitigation ratio (0.75:1) is used to account for this delay. If IID elects to acquire existing habitat, there could still be a slight reduction in habitat value because of an overall net loss in acreage. A higher mitigation ratio (0.75:1) is used to account for the net loss.

Tree Habitat–2. *If IID installs subsurface seepage recovery systems on the East Highline Canal, prior to the initiation of construction, IID will determine the acreage of seepage community vegetation that will be removed and permanently lost because of the construction. For seepage community vegetation that would be permanently lost, IID will create or acquire native tree habitat consisting of mesquite bosque or cottonwood-willow habitat. The amount of habitat to acquire or create will be calculated based on the following ratios.*

- *If IID creates habitat prior to installing the subsurface recovery systems, the mitigation ratio for the acreage of created habitat to lost acreage of tamarisk will be 0.5:1 as long as the created habitat meets the success criteria.*
- *If IID creates habitat after installing the subsurface recovery systems, the mitigation ratio for the acreage of the created or acquired habitat to lost acreage of tamarisk will be 1.5:1. The habitat will be created or acquired within 1 year of initiation of construction activities unless otherwise agreed to by IID, USFWS, and CDFG.*

If IID elects to acquire habitat, IID will work with the HCP IT to identify a property for acquisition. Habitat to be acquired must support mesquite bosque or cottonwood-willow habitat, occur within the Salton Sea Basin and meet with the approval of the USFWS and CDFG. If the only available properties that meet these requirements are larger than required to compensate for the lost acreage, IID will acquire the least expensive property. IID can use the additional acreage of the acquired habitat to fulfill the mitigation obligations of Tree Habitat–1 or Tree Habitat–2 for future projects, or Salton Sea–3. IID will place a conservation easement on acquired lands and provide for the property to be managed for covered species in perpetuity. With the approval of USFWS and CDFG, which approval shall not be unreasonably withheld, IID may transfer the land to a third party who agrees to and is authorized to manage the land for habitat conservation purposes. If IID transfers the land to a third party, IID will establish an endowment fund adequate to provide for the management of the lands in perpetuity.

If IID elects to create habitat, IID will work with the HCP IT to develop a habitat creation plan. The habitat creation plan will include the following information:

- *Location*
- *Planting plan (including species composition and layout)*
- *Grading and other construction activities*
- *Long-term management practices*
- *Vegetation and species use monitoring*
- *Success criteria for the plantings and the actions that iid will take if the success criteria are not met*

IID will submit habitat creation plans to the USFWS and CDFG for approval prior to initiation of habitat creation activities. IID will provide for the management of created native tree habitat in perpetuity.

For created and acquired habitat, IID will work with the HCP IT to prepare a management plan for the property that describes how the property will be managed. The management plan will describe the actions that IID will take to maintain the ecological functions of the created or acquired habitat. While the specific management needs will vary depending on the property, considerations for the management plan include:

- *Measures to control human access (e.g., fencing, signage)*
- *Frequency at which land will be visited to assess maintenance/management needs*
- *Types of maintenance action (e.g., removing garbage, repairing fences)*
- *Vegetation management practices (e.g., prescribed burning, removal of exotic plants)*

IID will submit management plans to the USFWS and CDFG for approval within 1 year of completing habitat creation activities or recording a conservation easement for acquired habitat.

IID may install subsurface seepage recovery systems along the East Highline Canal as part of the water conservation and transfer program. The plant communities adjacent to the East Highline Canal that are supported by seepage from the canal consist of a wide variety of plants, including tamarisk, mesquite, arrowweed, common reed, and a few cottonwoods. Covered species associated with tamarisk scrub habitats could use these plant communities. Installation of subsurface seepage recovery systems would result in the loss of some vegetation and the USFWS and CDFG identified potential take of covered species from removal of a portion of the seepage community vegetation. This measure will mitigate potential impacts of the take of covered species that could result from construction of subsurface seepage recovery systems by acquiring or creating native tree vegetation sufficient to offset lost habitat value.

The 0.5:1 mitigation ratio was derived from relative habitat value ratings for mixed communities (Table 3.4-5). The vegetation of the seepage communities consists of a mix of species, including but not limited to tamarisk, mesquite, *Atriplex*, nonnative palms, cottonwoods, and *Phragmites*. Depending on the species composition and structural conditions, the habitat value ratings for mixed communities range from 7.5 to 14. The habitat value of seepage communities is probably on the lower end of this range because of the preponderance of nonnative species. As described above, the created or acquired habitat would be expected to have a habitat value of at least 19, about twice the value of the seepage communities. Thus, a 0.5:1 mitigation ratio would be adequate to offset any loss in habitat value from removal of seepage communities along the East Highline Canal.

For the same reason as described under Tree Habitat–1, a higher mitigation ration (1.5:1) is used if the habitat is created after the subsurface seepage recovery systems are installed or if habitat is acquired.

Tree Habitat–3. *For scheduled construction activities, including installation of subsurface seepage recovery systems, that will remove tamarisk, cottonwoods, willows or mesquite, the site will be surveyed to determine whether any covered species are potentially breeding at the site. If covered species are found to be potentially breeding on the project site, IID will schedule the construction activities that directly affect habitat to occur outside of the breeding season.*

In addition to potentially reducing the amount of tamarisk scrub habitat available to covered species, construction activities could disturb or injure covered species using the habitat. The effect of disturbance and the potential for injury would be greatest on covered species if covered species were nesting in the habitat to be removed by construction. To minimize the potential for take of covered species from construction activities, IID will survey tamarisk, cottonwood, willow or mesquite vegetation to determine if any covered species are breeding in the habitat that would be affected by the construction activities. If the surveys indicate that covered species are likely to be breeding in the habitat that would be affected, IID will schedule activities that would affect the habitat to occur outside of the breeding season. Outside of the breeding season, IID could remove the habitat. By scheduling construction activities that would affect habitat to occur outside of the breeding season, IID will minimize the potential to injure or disturb a covered species.

3.4.5 Effects on Habitat

Tamarisk is a nonnative species that has invaded riparian areas of the southwest and readily colonizes non-riparian areas with adequate soil moisture. Tamarisk is considered poor quality habitat for native wildlife species although some wildlife species have adapted to using tamarisk where it has displaced native vegetation. Tamarisk can form dense monocultures with little structural diversity. Bird species diversity and abundance have been found to be lower in tamarisk than in stands of native riparian vegetation. There have been 32 riparian-dependent bird species identified in the Southwestern U.S. (Anderson and Ohmart 1984, Kelly and Finch 1999), with 26 of these species requiring broadleaf trees for nesting and breeding along the Lower Color River and cannot fulfill these life requisites in tamarisk (Anderson and Ohmart 1984, Kelly and Finch 1999). Two groups, large raptors, and cavity nesting species, are not known to occur in tamarisk. Tamarisk's growth form is generally as a large shrub that does not possess the structural characteristics required by species such as raptors or woodpeckers that rely on trees as perch and/or nest sites. Some birds have been found to use tamarisk for nesting along the Rio Grande and Pecos Rivers in New Mexico, but are broadleaf obligates at lower elevations along the Colorado River. The discrepancy in use of tamarisk between these two areas is believed to be caused by a difference in temperature extremes between the higher elevation eastern watersheds and the low elevation rivers of southwest Arizona and California. Most tamarisk habitat along the LCR lacks the species diversity and canopy structure necessary to ameliorate extreme climate conditions and as a result does not provide suitable habitat for many of the species known to successfully breed in tamarisk farther east (Hunter et al. 1985, 1987, and 1988). These studies indicate the poor quality of tamarisk as wildlife habitat.

Tamarisk currently is common and abundant in the HCP area, having colonized areas adjacent to the New and Alamo Rivers, agricultural drains, areas adjacent to the Salton Sea and areas receiving seepage or agricultural runoff (Table 3.4-1). Construction of lateral interceptors and subsurface recovery systems could result in the removal of 58 acres of tamarisk scrub which constitutes less than one percent of the quantified acreage of tamarisk scrub in the HCP area (Table 3.4-3). These acres are addressed through Tamarisk Scrub Habitat Conservation Strategy (Tree Habitat–1 and –2). Thus, tamarisk would be expected to remain locally and regionally abundant. Furthermore, because of its poor quality and high abundance, the distribution and amount of tamarisk is not likely to limit the abundance or distribution of any covered species. Nonetheless, because tamarisk is known

to be used by several covered species, the Tamarisk Scrub Habitat Conservation Strategy includes habitat creation or acquisition to offset any take of covered species resulting from a local reduction in the distribution or abundance of tamarisk. Created or acquired native tree habitat would provide higher quality habitat, increase habitat diversity in the HCP area, and provide true tree habitat for covered species.

3.4.6 Effects on Covered Species

Tamarisk is not a preferred habitat for any of the covered species. Most of the covered species potentially using this habitat are considered riparian species associated with native riparian plant communities such as cottonwoods, willows, palo verde, and mesquite. Covered species associated with tamarisk scrub fall into this category because tamarisk scrub represents the only tree-dominated habitat in the HCP area. Covered species potentially using tamarisk scrub habitats in the HCP area include resident breeding species, migratory breeding species, winter visitors, and transient species that may visit tamarisk scrub habitat during migration or other wanderings. The effects of the Tamarisk Scrub Habitat Conservation Strategy on covered species are evaluated below.

As part of the Monitoring and Adaptive Management Program (Chapter 4), IID could implement a survey or study program requiring capture of covered species. Capture of covered species constitutes take under both the federal and state ESAs. Take that occurs in association with surveys or studies conducted for this HCP is a covered activity and will be authorized under the state and federal ITPs. Any of the covered species could be taken through surveys or studies.

Studies and surveys conducted during the course of this HCP will be developed by IID in coordination with the HCP IT and will be subject to the approval of CDFG and USFWS prior to implementation. In approving the studies/surveys, the CDFG and USFWS will require capture methods that minimize the potential for death and injury of covered species. In addition, these agencies will specify the number of individuals of covered species that may be captured. Thus, the level of take authorized to occur through this mechanism will be specified on a case-by-case basis through the approval of the CDFG and USFWS.

3.4.6.1 Willow Flycatcher

Willow flycatchers consistently occur in the HCP area during migration. They are not known to breed in the HCP area, but recent observations of willow flycatchers during the breeding season along the Whitewater River suggest that this species could breed in the HCP area in the future. Willow flycatchers typically are associated with willow thickets. Willow thickets do not exist in the HCP area, but willow flycatchers have been reported using tamarisk and common reed along the Salton Sea and agricultural drains, and in seepage communities adjacent to the East Highline Canal during migration.

Willow flycatchers could be directly or indirectly taken as a result of several covered activities. Willow flycatchers have been reported using vegetation in the drains and could occur along the New and Alamo rivers as well. Drain and river maintenance activities could flush willow flycatchers from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Much of this vegetation could be used by willow flycatchers. The New and Alamo rivers are dredged about every four years which similarly could affect willow flycatchers. Currently, willow flycatchers are only known to occur in the HCP area during migration. With 80 percent of the drain vegetation undisturbed each year and considering IID would be actively cleaning only a fraction of the 20 percent of the drainage system that is maintained each year during the period when willow flycatchers are in the HCP area, the potential for take and the level of take resulting from displacement of birds by drain maintenance activities is low. In the event that willow flycatchers currently are breeding in drain vegetation in the HCP area or start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

Drain maintenance activities and several other covered activities also have the potential to result in take of willow flycatchers through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging opportunities and cover for willow flycatchers. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction. Because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), low level of use of the HCP area by willow flycatchers and poor quality of tamarisk as habitat for willow flycatchers, overall population-level effects would not be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by willow flycatchers. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities over the term of the permit, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal. If willow flycatchers nest in the HCP area over the term of the permit, construction activities could result in the destruction of nests during habitat removal. Tamarisk is poor quality habitat for willow flycatchers and the HCP area is outside this species' currently known breeding range. As such, the number of willow flycatchers potentially breeding in the HCP area over the term of the permit would be expected to be low. Given this low level of expected use and the small amount of habitat that would be impacted, the amount of take attributable to nest destruction during construction activities would be very low.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for willow flycatchers in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat

that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for willow flycatchers than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset the reduction in habitat value for willow flycatchers resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

Although willow flycatchers currently are not known to breed in the HCP area, IID will implement measures to avoid and minimize impacts of construction activities on willow flycatchers that could breed in the HCP area in the future. Under Tree Habitat–3 and Drain Habitat–3, prior to conducting scheduled construction activities IID will survey construction areas and if covered species are found breeding in impacted areas, IID will schedule construction to occur outside the breeding season. With this measure, IID will minimize the potential for construction activities to destroy nests.

Implementation of the HCP measures would minimize and mitigate the impact of take of willow flycatchers that could result from the covered activities and would not jeopardize the continued existence of this species. Based on (1) the low level of use of the HCP area by willow flycatchers, (2) the low quality of tamarisk as habitat for this species, (3) the abundance of potential habitat in and around the HCP area, and (4) implementation of measures to minimize take of flycatchers, the potential for take and the magnitude of take of willow flycatchers as a result of the covered activities is low. Creation or acquisition and long-term protection of native tree habitat would provide high quality habitat for willow flycatcher in perpetuity. This long-term protection of native habitat would ensure the availability of migratory stopover habitat and nesting opportunities for willow flycatcher of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of willow flycatcher that could result from reductions in the amount of tamarisk scrub habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of willow flycatcher.

3.4.6.2 Least Bell's Vireo

Least Bell's vireo occurs accidentally in the HCP area during migration. This low level of use is reflected by only two observations of this species at the Salton Sea NWR. On the rare occasion that it does occur in the HCP area, it could use tamarisk as the only available tree or shrub habitat. Because of the very low level of use, it is very unlikely that any least Bell's vireo would be taken as a result of the covered activities. Nonetheless, over the term of the permit, it is possible for a covered activity to directly or indirectly cause take of a least Bell's vireo.

On the rare occasions that this species occurs in the HCP area, they would be expected to use trees or shrubs because their typical habitat consists of native riparian habitat. As the dominant tree and shrub, tamarisk is the most likely habitat that least Bell's vireo would use in the HCP area. Among other locations, tamarisk occurs in the drains. Drain maintenance

activities could flush least Bell's vireo from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Much of this vegetation could be used by least Bell's vireo. Currently, least Bell's vireo are known only as accidentals in the HCP area. As a result, the likelihood of drain maintenance activities being conducted in an area coincident with a vireo is remote and the potential for take and the extent of take through this mechanism is very low.

Drain maintenance activities and several other covered activities have the potential to result in take of least Bell's vireo through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea and construction along the AAC or other canals adjacent to desert habitat could remove up to 100 acres of tamarisk scrub habitat. These reductions in tamarisk scrub habitat could reduce foraging opportunities and cover for least Bell's vireo. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), accidental use of the HCP area by least Bell's vireo and poor quality of tamarisk as habitat for this species, no adverse population-level effects would be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by least Bell's vireo. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres), the small amount of habitat the would be permanently impacted by construction activities over the term of that permit, and few individuals anticipated to occur in the HCP area, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for least Bell's vireo in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for least Bell's vireo than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset any reduction in habitat value for least Bell's vireo resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

Implementation of the HCP measures would minimize and mitigate the impact of take of least Bell's vireo that could result from the covered activities and would not jeopardize the continued existence of this species. Based on (1) the accidental use of the HCP area by least

Bell's vireo, (2) the low quality of tamarisk as habitat for this species, and (3) the abundance of potential habitat in and around the HCP area, the potential for take and the magnitude of take of least Bell's vireo as a result of the covered activities is very low. Creation or acquisition and long-term protection of native tree habitat would provide high quality habitat for least Bell's vireo in perpetuity. This long-term protection of native habitat would ensure the availability of habitat in the HCP area for least Bell's vireo of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of least Bell's vireo that could result from reductions in the amount of tamarisk scrub habitat. With the compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of least Bell's vireo.

3.4.6.3 Arizona Bell's Vireo

Historically and currently, the distribution of Arizona Bell's vireo is limited to areas along the LCR. The nearest known occurrence of this species to the HCP area is from eastern Imperial County near the Colorado River. Arizona Bell's vireo is closely associated with native riparian habitat.

The Arizona Bell's vireo has not be reported in the Imperial Valley, but over the term of the permit its range could expand to include this portion of the HCP area. If such a range expansion occurs, Arizona Bell's vireo could be subject to take from the covered activities in the same manner as described for the willow flycatcher. Arizona Bell's vireo is more likely to occur in seepage areas along the AAC or in other shrub or tree habitats closer to the LCR than tamarisk scrub habitat found in the Imperial Valley. Temporary or permanent removal of tamarisk scrub habitat along the AAC (e.g., in the seepage community between Drops 3 and 4) is not anticipated. Construction and O&M activities along the AAC present a minor potential to disturb Arizona Bell's vireo that might use tamarisk scrub habitat in seepage areas.

Implementation of the HCP measures would minimize and mitigate the impact of take of Arizona Bell's vireo that could result from the covered activities and would not jeopardize the continued existence of this species. Based on: (1) the very low level of use of the HCP area by Arizona Bell's vireo, (2) the low quality of tamarisk as habitat for this species, and (3) the abundance of potential habitat in and around the HCP area, the potential for take and the magnitude of take of Arizona Bell's vireo as a result of the covered activities is very low. Creation / acquisition and long-term protection of native tree habitat would make high quality habitat available for this species in perpetuity. This long-term protection of native habitat would ensure the availability of habitat in the HCP area for Arizona Bell's vireo of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of Arizona Bell's vireo that could result from reductions in the amount of tamarisk scrub habitat. With the compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of Arizona Bell's vireo.

3.4.6.4 Swainson's Hawk

Swainson's hawks are occasional visitors to the Salton Sea area during their spring and fall migrations. They are not known to breed in the HCP area. For foraging, Swainson's hawk

frequent agricultural fields. Trees and utility poles are used as perch and roost sites. Agricultural fields that Swainson's hawks can use for foraging are abundant in the HCP area.

The extent to which the Swainson's hawks use individual fields could be related to the availability of perch sites in the vicinity of the fields. Although tamarisk is abundant in the HCP area, tamarisk probably provides few perching opportunities for Swainson's hawk because it typically remains a large shrub, lacking the more robust and open structure required by Swainson's hawk for perching and roosting. As such, Swainson's hawks probably would not be affected by the projected reduction in tamarisk scrub habitat. Take of Swainson's hawks potentially resulting from reductions in agricultural field habitat is described in Section 3.8.6.2: Agricultural Field Habitat Conservation Strategy.

Under the Tamarisk Scrub Habitat Conservation Strategy, native tree habitat would be created/acquired, and preserved to replace tamarisk scrub habitat that would be permanently lost as a result of the construction activities. This created or acquired habitat would provide better habitat for Swainson's hawk because of the presence of trees that the hawks could use for roosting or perching while foraging. Additional benefits could be realized if native tree habitat is created as part of the Salton Sea Habitat Conservation Strategy. Creation of native tree habitat could increase the accessibility of foraging habitat for Swainson's hawks by providing perch sites near agricultural fields in areas previously lacking suitable perches. If native tree habitat was acquired to compensate for reductions in tamarisk scrub habitat, Swainson's hawks could benefit from the long-term certainty that perch and roost sites would be available in the HCP area. No take of Swainson's hawks is anticipated as a result of removal of tamarisk, but this species could benefit from implementation of the Tamarisk Scrub Habitat Conservation Strategy.

3.4.6.5 Gila Woodpecker

Gila woodpeckers have been observed at a number of locations in the Imperial Valley in areas that support large trees, such as near towns and houses. They also are known to occur along the AAC in areas with trees supported by seepage, or in association with telephone poles that may also be used to create nesting cavities. The species may breed in these locations. The Gila woodpecker has declined dramatically in California. Loss and degradation of mature riparian habitat and saguaros have been implicated as the primary reason for this decline.

Tamarisk is very poor habitat for Gila woodpeckers. The few birds that have been observed using tamarisk along the LCR are believed to be dispersing juveniles rather than territorial adults (Larsen 1987). Gila woodpeckers have not been found to nest in tamarisk (Larsen 1987). Where other tree species occur within tamarisk scrub habitat (e.g., seepage communities along the East Highline Canal or AAC), Gila woodpeckers could find suitable nesting habitat. Based on the overall low level of use and lack of use by breeding birds, the potential for the covered activities to result in take of Gila woodpeckers is low. In the Imperial Valley, Gila woodpeckers are only known to occur in association with trees in urban areas or agricultural operations (e.g., ranch yards).

Drain maintenance activities would not be expected to impact Gila woodpeckers because, as a result of regular maintenance trees do not grow large enough to provide habitat for this

species. However, as shown in Table 3.4-3, various other covered activities have the potential to permanently impact about 65.5 acres and tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Installation of seepage recovery systems along the East Highline Canal in particular, have the potential to impact habitat for Gila woodpecker. Depending on the plant species composition of the areas impacted, the loss of tamarisk scrub habitat could reduce foraging and/or nesting opportunities for Gila woodpeckers. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction. Because of the low level of use of the HCP area by Gila woodpeckers, generally poor quality of tamarisk scrub habitat as habitat for Gila woodpeckers, and continued availability of trees in urban areas or in ranch yards, no adverse population-level effects would be expected.

The potential for Gila woodpeckers to be disturbed or injured as a result of the covered activities is low because this species is typically found in association with trees in urban areas or agricultural fields. Few, if any, of the covered activities would be conducted near areas supporting trees. Nonetheless, some potential for take of Gila woodpeckers is associated with construction activities that could destroy a nest if an occupied nest tree is removed. Under the Tamarisk Scrub Habitat Conservation Strategy, IID will survey areas that would be disturbed during construction to determine if any covered species, including Gila woodpeckers, are breeding in habitat that would be disturbed. Removal of habitat will be avoided until after the breeding season and native tree habitat created to compensate for tamarisk scrub or cottonwood-willow habitat that is permanently lost. These measures will minimize and mitigate any take of Gila woodpeckers as a result of construction activities.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy could benefit Gila woodpeckers. The availability of trees suitable for excavating nesting cavities has been identified as a limiting factor for Gila woodpeckers (Larsen 1987). Under the Tamarisk Scrub Habitat Conservation Strategy, native tree habitat would be created/acquired, and preserved in perpetuity. Native trees such as cottonwoods and mesquite would be an important component of this habitat. Given the limited availability of trees of suitable size and wood characteristics in the HCP area, the creation or long-term preservation of native tree habitat would contribute to maintaining or increasing the availability of nest trees suitable for Gila woodpecker over the term of the permit. With their apparent tolerance for human activity and willingness to exploit suitably sized trees, regardless of species, Gila woodpeckers would likely exploit the trees provided under Tamarisk Scrub Habitat Conservation Strategy. Gila woodpeckers would further benefit if native tree habitat was created or acquired, and preserved as part of the Salton Sea Habitat Conservation Strategy. Given the limited potential for take of Gila woodpecker as a result of covered activities, the beneficial aspects of the Tamarisk Scrub Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of this species.

3.4.6.6 Gilded Flicker

Gilded flickers have habitat requirements similar to those of the Gila woodpecker described above and similarly are believed to have declined in California because of loss of mature riparian habitat and saguaros. Unlike Gila woodpeckers, they appear intolerant of human

activity and have not been reported in the Imperial Valley. Their occurrence along the AAC is unknown but possible.

Little potential habitat for gilded flickers exists in the HCP area. The few trees available in the Imperial Valley are generally located near human activity, such as in parks, residential areas, or on ranches. Because they have a low tolerance for human activity and are not known to use tamarisk, gilded flickers are unlikely to occur in the Imperial Valley. Like the Gila woodpecker, they would be most likely to occur in association with the seepage communities along the East Highline Canal or AAC.

Drain maintenance activities would not be expected to impact gilded flicker because, as a result of regular maintenance trees do not grow large enough to provide habitat for this species. However, as shown in Table 3.4-3, various other covered activities have the potential to permanently impact about 65.5 acres and tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Installation of seepage recovery systems along the East Highline Canal in particular, have the potential to impact habitat for gilded flicker. Depending on the plant species composition of the areas impacted, the loss of tamarisk scrub habitat could reduce foraging and/or nesting opportunities for gilded flicker. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction. Because of the low level of use of the HCP area by gilded flicker, and generally poor quality of tamarisk scrub habitat as habitat for this species, no adverse population-level effects would be expected.

The Tamarisk Scrub Habitat Conservation Strategy would minimize and mitigate impacts to gilded flickers in the event that they occur in the HCP area. Some potential for take of gilded flickers is associated with construction activities that could destroy a nest if an occupied nest tree is removed. Under the Tamarisk Scrub Habitat Conservation Strategy, IID will survey areas that would be disturbed during construction to determine if any covered species, including gilded flickers, are breeding in habitat that would be disturbed. Removal of habitat will be avoided until after the breeding season and native tree habitat created or acquired, and preserved to compensate for tamarisk scrub habitat that is permanently lost.

The creation or long-term preservation of native tree habitat would contribute to maintaining or increasing the availability of suitable nesting conditions for gilded flickers if located in areas of limited human activity. Additional nesting habitat could be gained if native tree habitat is created or acquired, and preserved as part of the Salton Sea Habitat Conservation Strategy. Given the limited potential for take of gilded flicker as a result of covered activities, the beneficial aspects of the Tamarisk Scrub Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of this species.

3.4.6.7 Western Yellow-Billed Cuckoo

Yellow-billed cuckoos are rare in the HCP area and occur only as accidentals. The species has been observed on two occasions at the Salton Sea NWR, but has not been reported in the Imperial Valley. On one occasion, a single individual was observed along the AAC. The absence of yellow-billed cuckoos from the HCP area is expected because riparian cottonwood-willow habitat that yellow-billed cuckoos require does not exist in the HCP

area. On the rare occasion that it does occur in the HCP area, it could use tamarisk as the only available tree or shrub habitat. Because of the low level of use of the HCP area by yellow-billed cuckoos, the potential for take is very low. Nonetheless, over the term of the permit, it is possible for a covered activity to directly or indirectly cause take of a yellow-billed cuckoo.

Drain maintenance activities would not be expected to impact yellow-billed cuckoo because, as a result of regular maintenance, trees do not grow large enough to attract this species. However, as shown in Table 3.4-3, various other covered activities have the potential to permanently impact about 65.5 acres and tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Installation of seepage recovery systems along the East Highline Canal in particular, have the potential to impact habitat for yellow-billed cuckoo. The permanent loss of tamarisk scrub habitat could reduce foraging and cover opportunities for yellow-billed cuckoo. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction. Because of the accidental use of the HCP area by yellow-billed cuckoo, and generally poor quality of tamarisk scrub habitat as habitat for this species, no adverse population-level effects would be expected.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for yellow-billed cuckoo in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (See Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would provide better habitat quality for yellow-billed cuckoo than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset any reduction in habitat value for yellow-billed cuckoo resulting from reductions in the amount of tamarisk scrub habitat thus mitigating the impact of take potentially resulting from changes in habitat.

Implementation of the HCP measures would minimize and mitigate the impact of take of yellow-billed cuckoo that could result from the covered activities and would not jeopardize the continued existence of this species. Based on the accidental use of the HCP area by yellow-billed cuckoo, and the low quality of tamarisk as habitat for this species, the potential for take and the magnitude of take of yellow-billed cuckoo as a result of the covered activities is very low. Creation or acquisition and long-term protection of native tree habitat would make high-quality habitat for yellow-billed cuckoo available in perpetuity. This long-term protection of native habitat would ensure the availability of habitat in the HCP area for yellow-billed cuckoo of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of yellow-billed cuckoo that could result from reductions in the amount of tamarisk scrub habitat. With the compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of yellow-billed cuckoo.

3.4.6.8 White-Tailed Kite

White-tailed kites can occur in the HCP area throughout the year. Their current breeding status in the HCP area is uncertain. They have bred in the HCP area previously, but have not been verified to breed there recently. White-tailed kites typically forage in agricultural fields and are known to roost in Bermuda grass fields. Nests are located in trees. If white-tailed kites currently nest in the HCP area, they are most likely to use landscape trees or eucalyptus trees bordering agricultural fields as there are few other trees available in the Imperial Valley. Use of tamarisk is probably minimal because it does not provide a structure conducive to perching or nesting by raptors. Where other tree species occur within tamarisk scrub habitat (e.g., seepage communities along the East Highline Canal), white-tailed kites could find suitable nesting habitat.

Drain maintenance activities would not be expected to impact white-tailed kites because, as a result of regular maintenance trees do not grow large enough to provide habitat for this species. However, as shown in Table 3.4-3, various other covered activities have the potential to permanently impact about 65.5 acres and tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Installation of subsurface recovery systems along the East Highline Canal in particular, have the potential to impact habitat for white-tailed kites. Depending on the plant species composition of the areas impacted, the loss of tamarisk scrub habitat could reduce nesting opportunities for white-tailed kites. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of removal of this habitat. Although not known to currently nest in the HCP area, white-tailed kites have nested in the HCP area in the past. Potentially, white-tailed kites could nest in the HCP area in the future, and the seepage communities adjacent to the East Highline Canal could support suitable trees for nesting. If kites nest in the seepage communities in the future, installation of subsurface recovery systems could result in take of white-tailed kites. Because they are not known to currently nest in the HCP, the probability and the level of take potentially occurring through this mechanism is low.

The potential for white-tailed kites to be disturbed or injured as a result of the covered activities is also low because this species is most likely to be found in association with trees in urban areas or along agricultural fields. Few, if any, of the covered activities would be conducted in areas supporting potentially suitable nest trees with the exception of installation of subsurface recovery systems described above. Nonetheless, some potential for disturbance of white-tailed kites is associated with construction activities that could occur in the vicinity of an active nest. Under the Tamarisk Scrub Habitat Conservation Strategy, IID will survey areas that would be disturbed during construction to determine if any covered species, including white-tailed kites, are breeding in habitat that would be disturbed. Removal of habitat will be avoided until after the breeding season and native tree habitat created to compensate for tamarisk scrub or cottonwood-willow habitat that is permanently lost.

The Tamarisk Scrub Habitat Conservation Strategy could benefit white-tailed kites. Foraging and roosting habitat is abundant in the HCP area, but few trees are available for nesting. The native tree habitat that would be created or acquired, and preserved under the Tamarisk Scrub Habitat Conservation Strategy could provide suitable nest and perch

locations for white-tailed kites if located in proximity to suitable foraging habitat. White-tailed kites will readily use lone trees adjacent to agricultural fields for nesting. Although they have not been reported to nest in the HCP area in recent years, white-tailed kites previously nested in the area. The native tree habitat created or acquired, and preserved under Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy could increase the likelihood that this species would breed in the HCP area again. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset a reduction in habitat value for resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

Implementation of the HCP measures would minimize and mitigate the impact of take of white-tailed kites that could result from the covered activities and would not jeopardize the continued existence of this species. Creation or acquisition and long-term protection of native tree habitat would provide high-quality habitat for white-tailed kites and, given the small amount of potentially suitable nesting habitat for this species, would benefit the species by increasing nesting opportunities over the long term. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of white-tailed kites.

3.4.6.9 Summer Tanager

Summer tanagers are rare in the HCP area, but have been reported in the HCP area in summer and winter. Although they have not been reported to breed in the HCP area, reports of summer tanagers in the HCP area during the summer suggest that the species could become a breeding species in the future. Summer tanagers are typically associated with mature cottonwood-willow riparian forest habitat; however, they are known to use areas supporting large tamarisk. In the HCP area they could use tamarisk along the drains, rivers, Salton Sea, and seepage communities adjacent to the East Highline Canal.

Summer tanagers could be directly or indirectly taken as a result of several covered activities. If summer tanagers use vegetation in the drains or rivers, drain and river maintenance activities could flush summer tanagers which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed they are subject to predation. On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Much of this vegetation could be used by summer tanagers. The New and Alamo rivers are dredged about every four years which similarly could affect summer tanagers. Currently, summer tanagers are rare in the HCP area. Considering that only 20 percent of the drainage system is maintained each year, and dredging of the river mouths is only conducted about once every four years, the likelihood of these activities coinciding with the presence of a summer tanager and thereby resulting in take from displacement of birds is low. In the event that summer tanagers start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

Drain maintenance activities and several other covered activities also have the potential to result in take of summer tanagers through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water

conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging opportunities and cover for summer tanagers. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), low level of use of the HCP area by summer tanagers and poor quality of tamarisk as habitat for summer tanagers, no adverse population-level effects would be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by summer tanagers. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities (about 65 acres in the Imperial Valley and up to 100 acres adjacent to the AAC and other canals adjacent to desert habitat) over the term of the permit, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal. If summer tanagers nest in the HCP area over the term of the permit, construction activities could result in the destruction of nests during habitat removal. Tamarisk is poor quality habitat for summer tanagers and the HCP area is outside this species' currently known breeding range. As such, the number of summer tanagers potentially breeding in the HCP area over the term of the permit would be expected to be low. Given this low level of expected use and the small amount of habitat that would be impacted, the amount of take attributable to nest destruction during construction activities would be very low.

Summer tanagers could benefit from the creation or long-term protection of native tree habitat under the Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy. Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for summer tanagers in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. The native tree habitat would consist of cottonwoods, willows, mesquite, and other plant species typical of southwestern riparian areas. Native riparian habitat is preferred by summer tanagers and the decline in this habitat type is believed to have been the primary cause of declines in this species. At least the current level of use of the HCP area by summer tanagers would be expected to continue but use could increase over the tern of the permit if breeding pairs were attracted to native tree habitat created or acquired and preserved under the Tamarisk Scrub Habitat Conservation Strategy.

The Tamarisk Scrub Habitat Conservation Strategy also includes measures to minimize injury or disturbance to summer tanagers if construction activities would affect habitat that summer tanagers use for nesting. Under the Tamarisk Scrub Habitat Conservation Strategy, IID will survey areas that would be disturbed during construction to determine if any covered species, including summer tanagers, are breeding in habitat that would be disturbed. If summer tanagers are found likely to be breeding in affected habitat, removal of habitat will be avoided until after the breeding season. Native tree habitat also will be created to compensate for tamarisk scrub or cottonwood-willow habitat that is permanently lost. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of summer tanager.

3.4.6.10 Vermilion Flycatcher

Vermilion flycatchers are known to occur within the HCP area, but are considered rare (Shuford et al. 1999). Although the species is thought to have bred in the HCP area at one time, no nesting populations currently are known. Historically, vermilion flycatchers were associated with native riparian plant communities. However, unlike some other riparian habitat associates, vermilion flycatchers have come to exploit nonnative habitats such as common reed and tamarisk supported in agricultural drains.

Vermilion flycatchers could be directly or indirectly taken as a result of several covered activities. This species has been reported using vegetation in the drains. Drain maintenance activities could flush vermilion flycatchers from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Much of this vegetation could be used by vermilion flycatchers. The New and Alamo rivers are dredged about every four years which similarly could affect summer tanagers. Currently, vermilion flycatchers are rare in the HCP area. Considering that only 20 percent of the drainage system is maintained each year, and dredging of the river mouths is only conducted about once every four years, the likelihood of these activities coinciding with the presence of a vermilion flycatcher and thereby resulting in take from displacement of birds is low. In the event that vermilion flycatchers start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

Drain maintenance activities and several other covered activities also have the potential to result in take of vermilion flycatchers through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging opportunities and cover for vermilion flycatchers. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the

abundance of tamarisk scrub in the HCP area (more than 7,500 acres), low level of use of the HCP area by vermilion flycatchers and poor quality of tamarisk as habitat for vermilion flycatchers, overall population-level effects would not be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by vermilion flycatchers. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities over the term of the permit, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal. If vermilion flycatchers nest in the HCP area over the term of the permit, construction activities could result in the destruction of nests during habitat removal. Tamarisk is poor quality habitat for vermilion flycatchers and the species is not known to currently breed in the HCP area. As such, the number of vermilion flycatchers potentially breeding in the HCP area over the term of the permit would be expected to be low. Given this low level of expected use and the small amount of habitat that would be impacted, the amount of take attributable to nest destruction during construction activities would be very low.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for vermilion flycatchers in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for vermilion flycatcher than the tamarisk scrub habitat that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset the reduction in habitat value for vermilion flycatcher resulting from reductions in the amount of tamarisk scrub, thus mitigating the impact of take potentially resulting from changes in habitat.

Although vermilion flycatchers currently are not known to breed in the HCP area, IID will implement measures to avoid and minimize impacts of construction activities on vermilion flycatcher that might breed in the HCP area in the future. Under Tree Habitat–3 and Drain Habitat–3, prior to conducting scheduled construction activities IID will survey construction areas and if covered species are found breeding in impacted areas, IID will schedule construction to occur outside the breeding season. With this measure, IID will minimize the potential for construction activities to destroy nests.

Implementation of the HCP measures would minimize and mitigate the impact of take of vermilion flycatcher that could result from the covered activities and would not jeopardize the continued existence of this species. Based on: (1) the low level of use of the HCP area by vermilion flycatcher, (2) the low quality of tamarisk as habitat for this species, (3) the abundance of potential habitat in and around the HCP area, and (4) implementation of measures to minimize take of vermilion flycatchers, the potential for take and the magnitude of take of vermilion flycatcher as a result of the covered activities is low. Creation or acquisition and long-term protection of native tree habitat would provide

high-quality habitat for vermilion flycatcher in perpetuity. This long-term protection of native habitat would ensure the availability of migratory stopover and wintering habitat as well as nesting opportunities for vermilion flycatcher of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of vermilion flycatcher that could result from reductions in the amount of tamarisk scrub habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of vermilion flycatcher.

3.4.6.11 Harris' Hawk

Historically Harris' hawks bred at the south end of the Salton Sea, but have not been reported in the HCP area in recent years. Harris' hawks occur in desert scrub dominated by saguaro, palo verde, and ironwood; cottonwood-mesquite forests; and semi-desert prairies. Saguaro cacti, palo verde, mesquite, and riparian trees, especially cottonwoods, are used as nest sites. Harris' hawks are somewhat tolerant of human activity and will use trees in urban settings as well as utility poles. They are not known to use tamarisk. Where other tree species occur within tamarisk scrub habitat (e.g., seepage communities along the East Highline Canal), Harris' hawk could find suitable nesting habitat.

Drain maintenance activities would not be expected to impact Harris' hawk because, as a result of regular maintenance trees do not grow large enough to provide habitat for this species. However, as shown in Table 3.4-3, various other covered activities have the potential to permanently impact about 65.5 acres of tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Installation of subsurface recovery systems along the East Highline Canal in particular, have the potential to impact habitat for Harris' hawk. Depending on the plant species composition of the areas impacted, the loss of tamarisk scrub habitat could reduce nesting and foraging opportunities for Harris' hawk. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of removal of this habitat.

Although not known to currently nest in the HCP area, Harris' hawk have nested in the HCP area in the past. Potentially, Harris' hawk could nest in the HCP area in the future, and the seepage communities adjacent to the East Highline Canal could support suitable trees for nesting. If Harris' hawk nested in the seepage communities, installation of subsurface recovery systems could result in take. Because they are not known to currently nest in the HCP, the probability and the level of take potentially occurring through this mechanism is currently low.

A reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. Potentially some of this habitat could be used by Harris' hawk for nesting in the future. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), current lack of use of this habitat by Harris hawk the poor quality of tamarisk as habitat for Harris' hawk, no adverse population-level effects would be expected.

The potential for Harris' hawks to be disturbed or injured as a result of the covered activities is also low. Harris' hawks are probably most likely to occur in the HCP area in the seepage community between Drops 3 and 4 on the AAC. This community contains cottonwoods and mesquite that could be used for nesting with adjacent desert scrub, a commonly used habitat for foraging. O&M activities would not affect this community and no construction activities affecting that seepage area are anticipated under this HCP. In addition, under the Tamarisk Scrub Habitat Conservation Strategy and Desert Habitat Conservation Strategy, IID will survey areas that would be disturbed during construction to determine if any covered species, including Harris' hawk, are breeding in habitat that would be disturbed. Removal of habitat will be avoided until after the breeding season and native tree or desert habitat created or acquired to compensate for habitat that is permanently lost. These measures will minimize and mitigate any take of Harris' hawk as a result of construction activities.

The Tamarisk Scrub Habitat Conservation Strategy could benefit Harris' hawk. The native tree habitat that would be created or acquired, and preserved under the Tamarisk Scrub Habitat Conservation Strategy could provide suitable nest and perch locations for Harris' hawk if located in proximity to suitable foraging habitat. Although they have not been reported to nest in the HCP area in recent years, Harris' hawk previously nested in the area. The native tree habitat created or acquired, and preserved under Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy could increase the likelihood that this species would breed in the HCP area again. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would more than offset a reduction in habitat value for resulting from reductions in the amount of tamarisk scrub, thus mitigating the impact of take potentially resulting from changes in habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of Harris' hawk.

3.4.6.12 Crissal Thrasher

The crissal thrasher occupies dense thickets of shrubs or low trees in desert habitats. Mesquite, ironwood, catclaw acacia, and arrowweed willow are preferred vegetation. Crissal thrashers are resident, breeding species in the HCP area and have been reported along the Alamo River and near the towns of Niland and Brawley. Tamarisk represents the primary shrub vegetation available in the HCP area. The extent to which crissal thrasher use tamarisk is uncertain, but invasion of mesquite scrub habitats by tamarisk has been implicated as contributing to declines of this species, suggesting that tamarisk scrub is poor-quality habitat, if it is used at all. Crissal thrasher also could occur in seepage communities adjacent to the East Highline Canal.

Crissal thrasher could be directly or indirectly taken as a result of several covered activities. This species has been reported along the Alamo River and in other locations in the HCP area and could also use vegetation in the drains. Drain and river maintenance activities could flush crissal thrasher which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. IID conducts annual drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Some of this vegetation could be used by crissal thrasher. The river mouths are dredged about once every four years.

Assuming that crissal thrasher currently are breeding in drain vegetation or along the rivers, drain and river maintenance activities could result in the direct destruction of nests.

IID has and will continue to conduct O&M activities of the drains. The vegetation currently supported in the drains is a product of these maintenance activities and current use of this habitat by crissal thrasher occurs in light of these activities. Although water conservation activities could reduce the amount and quality of water in the drains, this potential reduction is not expected to result in a substantial change in the extent and characteristics of vegetation in the drains. Thus, the drains would continue to support habitat for crissal thrasher at a level similar to existing conditions.

Drain maintenance activities and several other covered activities also have the potential to result in take of crissal thrasher through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging, nesting and cover opportunities for crissal thrasher. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), no adverse population-level effects would be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by crissal thrasher. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (over 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities over the term of the permit, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal. Assuming crissal thrasher nest in the HCP area, construction activities could result in the destruction of nests during habitat removal.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for crissal thrasher in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat –1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for crissal thrasher than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset the reduction in habitat value for crissal thrasher resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

IID will implement measures to avoid and minimize impacts of construction activities on nesting by crissal thrasher. Under Tree Habitat–3, Drain Habitat–3 and Desert Habitat–3, prior to conducting scheduled construction activities IID will survey construction areas, and if covered species are found breeding in impacted areas, IID will schedule construction to occur outside the breeding season. With this measure, IID will minimize the potential for construction activities to destroy nests.

The Imperial Valley is composed of highly modified habitats. Crissal thrashers apparently have adapted to this highly modified environment as evidenced by their persistence and continued breeding in the Imperial Valley. Little change in the extent or availability of tamarisk is expected with implementation of the HCP and the habitat conditions of the Imperial Valley would remain largely the same as existing conditions. As such, crissal thrasher would be expected to persist at levels similar to existing levels.

Implementation of the HCP measures would minimize and mitigate the impact of take of crissal thrasher that could result from the covered activities and would not jeopardize the continued existence of this species. Based on: (1) abundance of tamarisk scrub habitat in the HCP area, (2) creation / acquisition and protection of higher quality habitat to offset habitat reductions, and (3) implementation of measures to minimize take of crissal thrasher, the potential for take and the magnitude of take of crissal thrasher as a result of the covered activities is low. Creation or acquisition and long-term protection of native tree habitat would provide high-quality habitat for crissal thrasher in perpetuity. This long-term protection of native habitat would ensure the availability of habitat for crissal thrasher of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of crissal thrasher that could result from reductions in the amount of tamarisk scrub habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of crissal thrasher.

3.4.6.13 Bank Swallow

Bank swallows are casual visitors to the HCP area, potentially occurring in the HCP area as migrants during the spring and fall. For foraging, they are not strongly associated with any particular habitat type, although they often forage near water where insects are abundant. The covered activities are unlikely to adversely affect bank swallows because of the swallow's rare occurrence in the HCP area and broad habitat use for foraging. However, a few individuals could be taken because of changes in foraging habitat availability or quality potentially resulting from permanent or temporary reductions in drain vegetation (see Section 3.5.2.2), permanent or temporary reductions in tamarisk scrub habitat (see Section 3.4.2), or changes in the composition and amount of agricultural field habitat (see Section 3.8.2).

The Tamarisk Scrub Habitat and Salton Sea Conservation Strategies would contribute to mitigating the impact of any take of bank swallows that could result from the covered activities. Under the these two strategies, native tree habitat would be created or acquired and protected over the long-term to offset changes in habitat value resulting from reductions in tamarisk scrub (see Sections 3.3.4.2 and 3.4.5). By supporting more abundant and diverse insect populations than tamarisk scrub, native tree habitat would provide higher quality foraging opportunities for bank swallow. The Agricultural Field Habitat (see Section 3.8.6.4)

and Drain Habitat (see Section 3.5.6.7) Conservation Strategies would also contribute to mitigating impacts to bank swallow that could result from the covered activities.

3.4.6.14 Elf Owl

The elf owl population in California has declined to low levels, such that it currently is only known from a few locations along the LCR and some isolated locations in Riverside County. Given the low population size and limited distribution, it is very unlikely that elf owls would occur in the HCP area. Thus, the potential for take of elf owls is very low.

Seepage communities along the AAC are the most likely places where elf owls would occur in the HCP area, given the AAC's closer proximity to the LCR than the Imperial Valley and the presence of adjacent desert scrub habitat. For nesting, elf owls appear to prefer forest habitat bordering desert habitat, conditions that exist in this seepage community. No construction activities affecting that seepage area are anticipated under this HCP.

The seepage communities adjacent to the East Highline Canal constitute other potential habitat for elf owl. Installation of subsurface recovery systems would remove about 43 acres of vegetation, some of which could provide habitat for elf owl. The primary concern for elf owls regarding installation of subsurface recovery systems would be disturbance of nesting birds or removal of a nest site. Elf owls also rely on tall shrubs and trees as perch sites from which to forage. Removal of these features could adversely affect elf owls and potentially result in take by reducing foraging efficiency. Although these mechanisms could conceivably result in take of an individual elf owl, the likelihood of a take resulting from installation of subsurface recovery systems and the level of take potentially occurring is considered to be very low because this species is rare in the HCP area and the available habitat is of poor quality.

Some potential for take of elf owls is associated with construction activities that could destroy a nest if an occupied nest tree is removed. Under the Tamarisk Scrub Habitat Conservation Strategy, IID will survey areas that would be disturbed during construction to determine if any covered species, including elf owls, are breeding in habitat that would be disturbed. Removal of habitat will be avoided until after the breeding season and native tree habitat created or acquired, and preserved to compensate for tamarisk scrub habitat that is permanently lost. These measures will minimize and mitigate any take of elf owls as a result of construction activities.

The creation or long-term preservation of native tree habitat under the Tamarisk Scrub Habitat Conservation Strategy could contribute to maintaining or increasing the availability of suitable nesting conditions for elf owls. Additional nesting habitat could be gained if native tree habitat is created or acquired, and preserved as part of the Salton Sea Habitat Conservation Strategy. Given the limited potential for take of elf owl as a result of covered activities, the beneficial aspects of the Tamarisk Scrub Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of this species.

3.4.6.15 Brown-Crested Flycatcher

Brown-crested flycatchers are most numerous in riparian groves of cottonwood, mesquite, and willow, which afford suitable nest sites, but often forage in adjacent desert scrub or tamarisk (Garrett and Dunn 1981). In the HCP area, brown-crested flycatchers have been observed along the AAC in seepage communities and the northern shoreline of the Salton Sea. Given its apparent ability to use tamarisk for foraging, brown-crested flycatchers could occur throughout much of the HCP area. Brown-crested flycatchers are secondary cavity nesters. As such, breeding by this species in the HCP area is limited to the few areas supporting trees that are suitable for woodpeckers. Tamarisk is not suitable for woodpeckers and potentially suitable trees are principally landscape trees or where other tree species occur within tamarisk scrub habitat (e.g., seepage communities along the East Highline Canal or AAC).

Brown-crested flycatchers could be directly or indirectly taken as a result of several covered activities. Although this species has not been reported using vegetation in the drains, its use of tamarisk scrub elsewhere in the HCP area indicates that it could forage in vegetation in the drains as well. On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Only a portion of this vegetation would be tamarisk (estimated 43 acres) and be potential habitat for this species. The river mouths are dredged about every four years. Drain and river maintenance activities could flush brown-crested flycatchers that are foraging or roosting in drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation such that they are subject to predation. This species is a secondary cavity nester and because drain vegetation is not suitable for primary cavity nesters, suitable nesting habitat for brown-crested flycatchers is not supported in the drains.

Drain maintenance activities and several other covered activities also have the potential to result in take of brown-crested flycatcher through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging opportunities for brown-crested flycatcher. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), overall population-level effects would be negligible.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by brown-crested flycatcher. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities over the term of the permit,

the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal.

Construction activities could result in the destruction of nests of brown-crested flycatcher during habitat removal. Installation of seepage recovery systems along the East Highline Canal in particular, has the greatest potential to cause destruction of nests of brown-crested flycatcher because these areas have the greatest likelihood to support woodpeckers on which brown-crested flycatchers depend to create nesting cavities (see for example discussion of Gila woodpecker and gilded flicker). Under the Tamarisk Scrub Habitat and Desert Habitat Conservation Strategies, IID will survey areas that would be disturbed during construction to determine if any covered species, including brown-crested flycatcher, are breeding in habitat that would be disturbed. Removal of habitat will be avoided until after the breeding season and native tree habitat created to compensate for tamarisk scrub or cottonwood-willow habitat that is permanently lost. These measures will minimize and mitigate any take of brown-crested flycatcher as a result of construction activities.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy could benefit brown-crested flycatcher. As a secondary cavity nester, brown-crested flycatchers depend on woodpeckers to create nesting cavities. Trees suitable for excavating nesting cavities are limited in the HCP area. Under the Tamarisk Scrub Habitat Conservation Strategy, native tree habitat would be created / acquired, and preserved in perpetuity. Trees such as cottonwoods or mesquite would be an important component of this habitat. Given the limited availability of trees of suitable size and wood characteristics in the HCP area, the creation and / or long-term preservation of native tree habitat would contribute to maintaining or increasing the availability of nest trees suitable for woodpeckers over the term of the permit, which could increase nesting opportunities for brown-crested flycatchers. Brown-crested flycatchers would further benefit if native tree habitat was created or acquired, and preserved as part of the Salton Sea Habitat Conservation Strategy. Given the limited potential for take of brown-crested flycatcher as a result of covered activities, the beneficial aspects of the Tamarisk Scrub Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of this species.

3.4.6.16 Yellow-Breasted Chat

Yellow-breasted chats are occasional migrants and summer residents in the HCP area. Preferred habitat for the chat consists of cottonwood-willow riparian habitats, in which they primarily use the willow scrub component. This type of habitat is rare in the HCP area. However, yellow-breasted chats have been reported to use tamarisk scrub habitat and to breed in tamarisk scrub habitats around the Salton Sea.

Yellow-breasted chats could be directly or indirectly taken as a result of several covered activities. Although this species has not been reported using vegetation in the drains, its use of tamarisk scrub elsewhere in the HCP area indicates that it could use vegetation in the drains as well, including for nesting. Drain maintenance activities could flush yellow-breasted chats from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. Nests also could be destroyed by drain

maintenance activities. On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Much of this vegetation could be used by yellow-breasted chats. Currently, yellow-breasted chats are only known to occur in the HCP area during the summer and as occasional migrants. With 80 percent of the drain vegetation undisturbed each year and considering IID would be actively cleaning only a fraction of the 20 percent of the drainage system that is maintained each year during the period when yellow-breasted chats are in the HCP area, the potential for take and the level of take resulting from displacement of birds by drain maintenance activities is low.

The drains would continue to support tamarisk that could be used by yellow-breasted chats. The tamarisk currently in the drains persists under IID's drain maintenance activities. As these activities would continue, tamarisk would remain available in the drains as potential habitat for yellow-breasted chats. Although water conservation activities could reduce the amount and quality of water in the drains, this potential reduction is not expected to result in a substantial change in the extent and characteristics of vegetation in the drains. Thus, the drains would continue to support habitat for yellow-breasted chats at a level similar to existing conditions.

Drain maintenance activities and several other covered activities also have the potential to result in take of yellow-breasted chats through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging and nesting opportunities for yellow-breasted chats. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), overall population-level effects would be negligible.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by yellow-breasted chat. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities over the term of the permit, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal. Construction activities could result in the destruction of nests of yellow-breasted chats during habitat removal. With the small amount of habitat that would be impacted and considering that tamarisk is poor quality habitat for yellow-breasted chats, the amount of take attributable to nest destruction during construction activities would be low.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for yellow-breasted chat in the HCP area. Native tree

habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for yellow-breasted chat than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset the reduction in habitat value for yellow-breasted chat resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

IID will implement measures to avoid and minimize impacts of construction activities on yellow-breasted chats breeding in the HCP area. Under Tree Habitat–3 and Drain Habitat–3, prior to conducting scheduled construction activities IID will survey construction areas and if covered species are found breeding in impacted areas, IID will schedule construction to occur outside the breeding season. With this measure, IID will minimize the potential for construction activities to destroy nests.

Implementation of the HCP measures would minimize and mitigate the impact of take of yellow-breasted chat that could result from the covered activities and would not jeopardize the continued existence of this species. Based on: (1) the low quality of tamarisk as habitat for this species, (2) the abundance of potential habitat in and around the HCP area, and (3) implementation of measures to minimize take of chats, the potential for take and the magnitude of take of yellow-breasted chat as a result of the covered activities is low. Creation or acquisition and long-term protection of native tree habitat would provide high-quality habitat for yellow-breasted chat in perpetuity. This long-term protection of native habitat would ensure the availability of migratory stopover habitat and nesting opportunities for yellow-breasted chat of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of yellow-breasted chat that could result from reductions in the amount of tamarisk scrub habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of yellow-breasted chat.

3.4.6.17 Yellow Warbler

The yellow warbler is a common spring and fall migrant and a rare winter visitor to the Salton Sea area. Small numbers regularly winter in the Imperial Valley, and have been observed near the towns of Niland and Calexico. The species has not been reported to breed in the HCP area but could in the future. Yellow warblers are typically associated with riparian shrub habitats, consisting of willows and young cottonwoods. This type of habitat is largely absent in the HCP area. Agricultural drains support tamarisk as well as dense stands of common reed and yellow warblers have been observed to use these habitats.

Yellow warblers could be directly or indirectly taken as a result of several covered activities. This species has been reported using vegetation in the drains. Drain maintenance activities could flush yellow warblers from drain vegetation which could constitute take as

harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. Much of this vegetation could be used by yellow warblers. Currently, yellow warblers are only known to occur in the HCP area as fall and spring migrants and rare winter visitors. With 80 percent of the drain vegetation undisturbed each year and considering IID would be actively cleaning only a fraction of the 20 percent of the drainage system that is maintained each year during the period when yellow warblers are in the HCP area, the potential for take and the level of take resulting from displacement of birds by drain maintenance activities is low. In the event that yellow warblers currently are breeding in drain vegetation in the HCP area or start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

IID has and will continue to conduct O&M activities of the drains. The vegetation currently supported in the drains is a product of these maintenance activities and current use of this habitat by yellow warblers occurs in light of these activities. Although water conservation activities could reduce the amount and quality of water in the drains, this potential reduction is not expected to result in a substantial change in the extent and characteristics of vegetation in the drains. Thus, the drains would continue to support habitat for yellow warblers at a level similar to existing conditions.

Drain maintenance activities and several other covered activities also have the potential to result in take of yellow warblers through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging opportunities and cover for yellow warblers. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), low level of use of the HCP area by yellow warblers and poor quality of tamarisk as habitat for yellow warblers, overall population-level effects would not be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by yellow warblers. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities (about 65 acres) over the term of the permit, the amount of take potentially occurring from displacement of individuals as habitat is removed would be minimal. If yellow warblers nest in the HCP area over the term of the permit, construction activities could result in the destruction of nests during habitat removal. Tamarisk is poor quality habitat for yellow warblers and the HCP area is outside

this species' currently known breeding range. As such, the number of yellow warblers potentially breeding in the HCP area over the term of the permit would be expected to be low. Given this low level of expected use and the small amount of habitat that would be impacted, the amount of take attributable to nest destruction during construction activities would be very low.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for yellow warblers in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for yellow warblers than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset the reduction in habitat value for yellow warblers resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

Although yellow warblers currently are not known to breed in the HCP area, IID will implement measures to avoid and minimize impacts of construction activities on yellow warblers that could breed in the HCP area in the future. Under Tree Habitat–3 and Drain Habitat–3, prior to conducting scheduled construction activities IID will survey construction areas and if covered species are found breeding in impacted areas, IID will schedule construction to occur outside the breeding season. With this measure, IID will minimize the potential for construction activities to destroy nests.

Implementation of the HCP measures would minimize and mitigate the impact of take of yellow warblers that could result from the covered activities and would not jeopardize the continued existence of this species. Based on: (1) the low level of use of the HCP area by yellow warblers, (2) the low quality of tamarisk as habitat for this species, (3) the abundance of potential habitat in and around the HCP area, and (4) implementation of measures to minimize take of yellow warblers, the potential for take and the magnitude of take of yellow warbler as a result of the covered activities is low. Creation or acquisition and long-term protection of native tree habitat would provide high quality habitat for yellow warbler in perpetuity. This long-term protection of native habitat would ensure the availability of migratory stopover and wintering habitat as well as nesting opportunities for yellow warbler of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of yellow warbler that could result from reductions in the amount of tamarisk scrub habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of yellow warbler.

3.4.6.18 Large-Billed Savannah Sparrow

This subspecies of savannah sparrow is a rare to uncommon postbreeding and winter visitor to the Salton Sea area. It occurs in the HCP area from mid-July through the winter, migrating to the Colorado River Delta and Mexico to breed (Garrett and Dunn, 1981).

Although not currently known to breed in the HCP area it could do so in the future. Large-billed savannah sparrows are known to use only tamarisk scrub near mouths of the New and Alamo Rivers at the Salton Sea (Garrett and Dunn, 1981). Given this association with tamarisk at the Salton Sea, large-billed savannah sparrows also could use tamarisk scrub throughout the HCP area.

Large-billed savannah sparrows could be directly or indirectly taken as a result of several covered activities. Although this species has not been reported using vegetation in the drains, its use of tamarisk scrub elsewhere in the HCP area indicates that it could use vegetation in the drains as well. Drain maintenance activities could flush large-billed savannah sparrows from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. If this species breeds in the HCP area in the future, nests also could be destroyed by drain maintenance activities.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. A portion of this vegetation (an estimated 215 acres of tamarisk) could be used by large-billed savannah sparrows. Currently, large-billed savannah sparrows are only known to occur in the HCP area during the late summer and as occasional migrants at other times of the year. With 80 percent of the drain vegetation undisturbed each year, and considering IID would be actively cleaning only a fraction of the 20 percent of the drainage system that is maintained each year during the period when large-billed savannah sparrows are in the HCP area, the potential for take and the level of take resulting from displacement of birds by drain maintenance activities is low. River dredging also could flush birds. The potential for take and the level of take potentially resulting from displacement of birds during river dredging is low, given that this activity is conducted only every four years.

Drain maintenance activities and several other covered activities also have the potential to result in take of large-billed savannah sparrows through temporary or permanent reductions in the amount of tamarisk scrub habitat. As shown in Table 3.4-3, various maintenance and water conservation activities have the potential to temporarily impact about 43.2 acres of tamarisk scrub habitat and permanently impact about 65.5 acres in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. In addition, a reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. These reductions in tamarisk scrub habitat could reduce foraging and nesting opportunities for large-billed savannah sparrows. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), no adverse population-level effects would be expected.

Various construction activities anticipated by IID have the potential to remove tamarisk scrub habitat that could be used by large-billed savannah sparrow. Construction activities could displace individuals and result in take if displaced birds were unable to find alternate habitat or were exposed to other hazards (e.g., predation). Because of the abundance of tamarisk scrub habitat in the HCP area (more than 7,500 acres) and small amount of habitat that would be permanently impacted by construction activities over the term of the permit, the amount of take

potentially occurring from displacement of individuals as habitat is removed would be minimal. Construction activities could result in the destruction of nests of large-billed savannah sparrows during habitat removal. With the small amount of habitat that would be impacted and considering that tamarisk is poor-quality habitat for large-billed savannah sparrows, the amount of take attributable to nest destruction during construction activities would be low.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat value for large-billed savannah sparrow in the HCP area. Native tree habitat would be created or acquired, and preserved to replace any tamarisk scrub habitat that would be permanently lost as a result of the construction activities (see Tree Habitat–1 and –2). As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also would be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat quality for large-billed savannah sparrow than the tamarisk that would be lost. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would offset the reduction in habitat value for large-billed savannah sparrow resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat.

IID will implement measures to avoid and minimize impacts of construction activities on large-billed savannah sparrows breeding in the HCP area. Under Tree Habitat–3 and Drain Habitat–3, prior to conducting scheduled construction activities IID will survey construction areas and if covered species are found breeding in impacted areas, IID will schedule construction to occur outside the breeding season. With this measure, IID will minimize the potential for construction activities to destroy nests if this species breeds in the HCP area.

Implementation of the HCP measures would minimize and mitigate the impact of take of large-billed savannah sparrow that could result from the covered activities and would not jeopardize the continued existence of this species. Considering the abundance of potential habitat in and around the HCP area, and implementation of measures to minimize take of savannah sparrows, the potential for take and the magnitude of take of large-billed savannah sparrow as a result of the covered activities is low. Creation or acquisition and long-term protection of native tree habitat would provide high-quality habitat for large-billed savannah sparrow in perpetuity. This long-term protection of native habitat would ensure the availability of post-breeding habitat and nesting opportunities for large-billed savannah sparrow of at least equivalent value (considering both acreage and quality) as the tamarisk scrub habitat impacted by the covered activities, thus mitigating take of large-billed savannah sparrow that could result from reductions in the amount of tamarisk scrub habitat. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of large-billed savannah sparrow.

3.4.6.19 Sharp-Shinned Hawk

Sharp-shinned hawks occur in the HCP area as migrants and winter visitors (USFWS, 1997b). Sharp-shinned hawks typically use woodland habitats; they primarily prey on small birds. In the HCP area, woodland habitats are relatively rare and consist mainly of tamarisk scrub along the Salton Sea, the New and Alamo Rivers, and agricultural drains. Sharp-shinned hawks have been observed along larger drains in the Imperial Valley (Hurlbert et al. 1997).

Various covered activities have the potential to permanently impact about 65.5 acres of tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of removal of this habitat. A reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. Sharp-shinned hawk could forage in association with this habitat. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction. Because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), current low level of use of the HCP area by sharp-shinned hawk and the poor quality of tamarisk as habitat for this species, no adverse population-level effects would be expected.

The Tamarisk Scrub Habitat Conservation Strategy could benefit sharp-shinned hawk. The native tree habitat that would be created or acquired, and preserved under the Tamarisk Scrub Habitat Conservation Strategy could improve foraging opportunities by providing higher-quality habitat that attracts songbirds on which sharp-shinned hawks prey. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would more than offset a reduction in habitat value for resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat. With the compensation for the minimal amount take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of sharp-shinned hawk.

3.4.6.20 Cooper's Hawk

Cooper's hawks currently are known to occur in the HCP area only in the winter (USFWS, 1997b) although they could breed in the HCP area over the term of the permit. Cooper's hawks typically use open woodland habitats where they primarily prey on small birds. In the HCP area, woodland habitats are relatively rare and consist mainly of tamarisk scrub along the Salton Sea, the New and Alamo Rivers, and agricultural drains. Cooper's hawks have been observed along larger drains in the Imperial Valley (Hurlbert et al. 1997).

A number of covered activities have the potential to permanently impact about 65.5 acres and tamarisk scrub habitat in the Imperial Valley. Up to an additional 100 acres of tamarisk scrub habitat could be removed during construction activities along the AAC or other canals adjacent to desert habitat. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of removal of this habitat. In particularly, installation of subsurface recovery systems along the East Highline Canal would reduce tamarisk scrub habitat that could be used by Cooper's hawk for foraging and nesting. Potentially, Cooper's hawk could nest in the HCP area in the future, and the seepage communities adjacent to the East Highline Canal could support suitable trees for nesting. If Cooper's hawk nest in the seepage communities, installation of subsurface recovery systems could result in take. Because of they are not known to currently nest in the HCP, the probability and extent of take potentially occurring through this mechanism is low.

A reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. Potentially some of this habitat could be used by Cooper's hawk for nesting in the

future. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), current lack of use of this habitat by Cooper's hawk the poor quality of tamarisk as habitat for this species, no adverse population-level effects would be expected.

The Tamarisk Scrub Habitat Conservation Strategy could benefit Cooper's hawk. The native tree habitat that would be created or acquired, and preserved under the Tamarisk Scrub Habitat Conservation Strategy could provide suitable nest and perch locations for Cooper's hawk and potentially improve foraging habitat quality by attracting songbirds. The native tree habitat created or acquired, and preserved under Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy could increase the likelihood that this species would breed in the HCP area again. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would more than offset a reduction in habitat value for resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat. The Drain Habitat Conservation Strategy also could benefit this species as the 190 to 652 acres of managed marsh habitat could attract a variety of songbirds, on which this species preys. With the take minimization measures and compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of Cooper's hawk.

3.4.6.21 Long-Eared Owl

Long-eared owls are occasional winter visitors to the Salton Sea area (USFWS, 1997b). They are not known to breed in the area. Potential habitat for long-eared owls in the HCP area consists mainly of tamarisk scrub habitat along the New and Alamo Rivers, Salton Sea, and agricultural drains. They predominantly prey on small mammals.

Various covered activities have the potential to permanently impact about 65.5 acres of tamarisk scrub habitat. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of removal of this habitat. A reduction in the water surface elevation of the Salton Sea resulting from water conservation could impact up to 2,642 acres of tamarisk scrub habitat adjacent to the Salton Sea. Long-eared owls could forage in association with this habitat. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the abundance of tamarisk scrub in the HCP area (more than 7,500 acres), current low level of use of the HCP area by long-eared owl and the poor quality of tamarisk as habitat for this species, no adverse population-level effects would be expected.

The Tamarisk Scrub Habitat Conservation Strategy could benefit long-eared owl. The native tree habitat that would be created or acquired, and preserved under the Tamarisk Scrub Habitat Conservation Strategy could improve foraging opportunities by providing perch sites and potentially supporting more abundant small mammal populations. The creation or acquisition of native tree habitat under Tree Habitat–1 and –2 and Salton Sea–3 would more than offset a reduction in habitat value for resulting from reductions in the amount of tamarisk scrub thus mitigating the impact of take potentially resulting from changes in habitat. With the compensation for take potentially resulting from reduced habitat, implementation of the HCP would not jeopardize the continued existence of long-eared owl.

3.5 Drain Habitat Conservation Strategy

3.5.1 Amount and Quality of Habitat in the HCP Area

Habitat in the HCP area potentially used by species associated with drain habitat occurs in association with the drainage system, in managed marsh on the state and federal refuges, and on private duck clubs. Species associated with drain habitat also could use seepage areas adjacent to the AAC or East Highline Canal. Seepage areas adjacent to the AAC would not be affected by the covered activities. Potential effects to seepage areas adjacent to the East Highline Canal are addressed under the Tamarisk Scrub Conservation Strategy. The quality and quantity of habitat on the state and federal refuges and on private duck clubs will not be affected by the covered activities. Thus, potential effects to covered species are restricted to habitat in the drains.

For drain-associated species, cattail/bulrush vegetation is preferred and provides the highest quality habitat in the HCP area. Although potentially used, nonnative plants provide poor quality habitat for covered species. Additional information on the habitat preferences of the covered species associated with drain habitat is provided in Appendix A, Species Covered by the HCP.

Drains support an estimated 63 acres of cattail vegetation and 589 acres of other vegetation consisting of tamarisk, common reed, and other plant species (see discussion of drain habitat in Chapter 2). This vegetation has developed and coexists with IID's drain cleaning activities and other maintenance activities. During the HCP term, IID would continue its current drain maintenance practices; thus, the existing type and amount of vegetation supported in the drains would be expected to remain similar to existing conditions but its physical location would move throughout the drains in the HCP area. In conducting drain maintenance, IID only cleans drains when necessary to maintain gravity flow of tilewater from the farm fields into the drains. About one-fifth of the drain system is cleaned annually. Drain cleaning is focused on removing sediment that accumulates in the bottom of the drain. Flow-obstructing vegetation is removed during this process as well but bank vegetation is often retained to maintain bank stability and to control erosion. These practices moderate fluctuations in habitat availability in the drains and reduce the exposure of covered species to disturbance as a result of drain cleaning activities.

In addition to vegetation in the drains, cattail/bulrush vegetation also occurs in the seepage area between Drops 3 and 4 along the AAC and in small patches in some of the seepage areas adjacent to the East Highline Canal. Table 3.5-1 summarizes the amount and location of drain habitat and areas of emergent vegetation in the HCP area.

TABLE 3.5-1
Estimated Acreage and Characteristics of Drain Habitat in Drains and Seepage Areas in the IID HCP Area

Location	Acreage	Characteristics
Drains	652	63 acres of cattail vegetation
		589 acres of tamarisk, common reed and other plant species
AAC Seepage Areas	111	Primarily cattails

3.5.2 Effects of the Covered Activities

The covered activities have the potential to take a covered species via changes in water quality or through changes in the amount of habitat, disturbance, injury or mortality. The following describes the potential effects to covered species from changes in water quality. Habitat changes, disturbance, injury or mortality potentially resulting from the covered activities are addressed collectively following the water quality evaluation.

3.5.2.1 Water Quality Effects

System-based and on-farm water conservation activities, in combination, could contribute to increased selenium concentrations in drain water and affect reproductive success of some covered species associated with drain habitat. The potential effect of the water conservation activities on selenium concentrations in drain water and the subsequent potential effects on reproductive success were predicted using the IID Water Conservation Model and mathematical equations that relate selenium concentrations in water to egg concentrations and hatchability as described below.

Prediction of Selenium Concentrations

The IID Water Conservation Model was used to predict selenium concentrations (in parts per billion [ppb]) in drain water at specific locations (nodes)[2] in the drainage system over a 12-year period for the following scenarios:

- Conservation of 130 KAFY of on-farm conservation (130 KAFY on-farm)
- Conservation of 230 KAFY of on-farm conservation (230 KAFY on-farm)
- Conservation of 230 KAFY consisting of 130 KAFY from on-farm measures and 100 KAFY from system improvements (130 KAFY on-farm + 100 KAFY system-based)
- Conservation of 300 KAFY consisting of 200 KAFY from on-farm measures and 100 KAFY from system improvements (230 KAFY on-farm + 70 KAFY system-based).

On-farm conservation of 130 KAFY is the lowest level of conservation under the IID/San Diego County Water Authority (SDCWA) water conservation and transfer project. Under the QSA, a minimum of 230 KAFY is to be conserved. The maximum amount of conservation and transfer is 300 KAFY under both agreements. The maximum amount of water conservation that can be achieved using system-based measures is 100 KAFY. Thus, the scenarios reflect the range of water conservation levels (130 KAFY to 300 KAFY) and techniques (up to 100 KAFY system-based measures).

Implementation of various on-farm conservation methods would vary from year to year and cannot be predicted with certainty for each node. Therefore, a number of model runs for each level of conservation were completed and the average selenium concentration at each node over the various runs was computed for use in the analysis of potential toxic effects. The number of miles of drain associated with each node was used to compute summary statistics that express the overall number of miles of drain with waterborne selenium concentrations in the following categories:

0-5 ppb	5-6 ppb	6-7 ppb	7-8 ppb	8-9 ppb
9-10 ppb	10-11 ppb	11-12 ppb	12-13 ppb	>13 ppb

[2] In the IID Water Conservation Model, nodes were located at the end of each drain where the drain empties into the New or Alamo River or the Salton Sea.

For both the conversion from waterborne selenium to egg selenium concentrations and the probability of effects on hatchability (described below), the upper end of each concentration category was used (e.g., 5, 6, 7,… ppb). For the category representing greater than 13 ppb of waterborne selenium, the maximum selenium concentration predicted by the model under each conservation level was used. The number of miles associated with each node was converted to number of acres by assuming that the vegetated area along drains averaged 14 feet in width.

$$\text{No. of acres} = (\text{No. of miles} \times 5{,}280 \times 14) / 43{,}560$$

Conversion of Waterborne Selenium to Egg Selenium Concentration

Based on samples of eggs from 18 different pond systems and three non-drainwater reference sites in the San Joaquin Valley (Skorupa et al. unpub. data), there is a very strong correlation between mean waterborne selenium and mean egg concentrations ($r=0.901$, $N=36$, $P<0.01$) with the following regression equation for the relationship as reported by Ohlendorf et al. (1993):

$$\log \text{egg Se } (\mu g / g) = 0.44 + 0.434 \log \text{water Se } (\mu g / l)$$

Based on this relationship, the predicted selenium concentrations in drainwater were converted to selenium concentrations in eggs for black-necked stilt. Black-necked stilt was used because of the extensive data available on this species and because it displays an intermediate level of sensitivity to selenium (Skorupa 1998). The “stilt standard” is considered the appropriate standard for generalized assessments of toxic impacts (Skorupa 1998).

Probability of Toxic Effects

The probability of effects on the hatchability of eggs was computed from the following logistic equation reported in Skorupa (1998).

$$P(>1 \text{ inviable egg}) = \text{EXP}(-2.327 + 0.0503[\text{selenium conc.}]) / \{1 + \text{EXP}(-2.327 + 0.0503[\text{selenium conc.}])\}$$

Although the probability of teratogenic effects (e.g., embryonic deformities) could have been used as a measure of potential impact, egg hatchability was chosen as the response variable for assessing the potential impact of selenium toxicity because of the relative insensitivity of teratogenesis as a response variable. Egg hatchability effects were expressed as the probability of a hen producing a clutch in which at least one egg was inviable (did not hatch). Hatchability effects were corrected for background rates of inviability as described in Skorupa (1998).

Computation of Affected Acreage

The number of miles (acres) at each selenium concentration and the probability of hatchability effects at that concentration were used to predict the level of potential effect at each level of water conservation. The probability of hatchability effects in each category of waterborne selenium concentration was multiplied by the number of miles (acres) in each category as predicted by the water quality model and summed over all categories to produce an estimate of the overall number of miles (acres) of drain habitat that would be necessary to offset potential selenium effects.

Only a portion of the drainage system is vegetated and covered species associated with drain habitat primarily use vegetated areas. Some of the covered species (e.g., white-faced ibis and long-billed curlew) forage occasionally in unvegetated portions of the drains. However, these species primarily forage in other habitats (e.g., agricultural fields or on the

state and federal refuges) such that their exposure to selenium in the drains is sporadic. Selenium is metabolized by birds when exposed through their diet, and losses from tissue begin within a few weeks following exposure if not continuously resupplied through elevated dietary concentrations of selenium. As a result, occasional use of unvegetated portions of the drains would not be expected to result in accumulation of selenium to levels that would compromise the reproductive success of the covered species. Therefore, the analysis of the potential effects of increased selenium on covered species was restricted to vegetated portions of the drains, and the maximum effects value was adjusted by the proportion of the drainage system that is vegetated. Currently, this proportion is estimated to be 0.26. This conversion was used to determine the number of acres of additional vegetated drain habitat needed to offset potential selenium effects attributable to the water conservation and transfer program.

The estimated number of additional vegetated drain acres necessary to offset the potential effects (reduced hatchability) of increased selenium concentrations in the drains under each alternative are presented in Table 3.5-2. Hatchability effects are presented at the level of the clutch (or hen) rather than at the level of an individual egg. Hens that are affected may still produce viable eggs, but this analysis assumes that the entire clutch is lost, making the estimate of overall effect a conservative measure of potential impacts.

TABLE 3.5-2
Estimated Number of Additional Vegetated Acres Necessary to Offset Potential Selenium Effects on Hatchability Associated With Varying Water Conservation Amounts and Techniques

			Acres of Additional Drain Habitat Needed to Offset Effect			
Maximum Water Se conc. (µg/L)	**Egg Se conc. (µg/g)**	**Probability of >1 inviable eggs in clutch (Corrected)**	**130 KAFY on-farm**	**230 KAFY on-farm**	**130 KAFY on-farm + 100 KAFY system-based**	**200 KAFY on-farm + 100 KAFY system-based**
5	5.538	0.02767	1.48	1.14	1.00	0.83
6	5.994012	0.03024	3.55	1.79	1.75	1.04
7	6.408738	0.03261	5.84	4.75	4.40	3.54
8	6.791115	0.03484	4.94	5.49	5.92	4.99
9	7.147287	0.036946	2.87	3.98	4.40	5.05
10	7.481695	0.03894	1.49	2.69	2.46	3.68
11	7.797662	0.04085	0.64	1.38	1.24	1.89
12	8.097756	0.04269	0.37	0.65	0.63	0.96
13	8.384003	0.0444	0.3	0.36	0.38	0.58
>13	Variable	Variable	1.15[a]	1.31[a]	14.88[b]	19.76[b]
		Total	22.64	23.53	37.06	42.32

[a] Maximum water concentration = 46.5; egg concentration = 14.6; probability of hatchability effects = 0.0876714813
[b] Maximum water concentration = 2658; egg concentration = 84.4; probability of hatchability effects = 0.8594

Return to Contents

Results of the analysis indicate that conservation of 130 KAFY using on-farm methods would require the addition of up to 23 acres as indicated by predicted decreases in hatchability. Increasing the conservation level to 230 KAFY using only on-farm methods would increase the level of impact only slightly to 24 acres. A maximum of about 42 acres of drain vegetation would be necessary under a water conservation program using both on-farm and system-based conservation methods at the 300 KAFY level of conservation (Table 3.5-2).

Other Water Quality Effects

Water conservation activities would reduce tailwater entering the drains. This reduction in tailwater would result in less sediment reaching the drains with an associated reduction in DDT and metabolite levels and other organochlorides attached to sediments. Likewise, reductions in organophosphate pesticides and phosphate and nitrogen fertilizers would be achieved. Exposure of covered species to these compounds therefore would be reduced.

3.5.2.2 Habitat and Direct Effects

The mechanisms through which the covered activities could take a covered species are changes in habitat (permanent or temporary changes), disturbance, or mortality/injury. The potential effects of each of the covered activities on drain vegetation and covered species using drain habitat are described in Table 3.5-3. Activities with the potential to affect habitat are described in more detail below. Activities that are not expected to affect habitat have a very limited potential to affect covered species, with potential effects limited to disturbance.

TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated With Drain Habitat

Activity	Potential Effects (Positive and Negative)
Water Use and Conservation	
Combined effects of on-farm and system-based water conservation	Water conservation will reduce the flow in the drains. However, the small reduction in the flow in the drains is not expected to result in changes in the amount of vegetation supported in the drains.
Installation of on-farm water conservation features	On-farm water conservation practices would be constructed within agricultural fields or their margins and therefore would not likely affect drain habitat or covered species using drain habitat. Constructed tailwater return ponds and delivery ponds could serve as added freshwater foraging areas to aquatic species in drains.
Installation of System-Based Water Conservation Features	
Canal lining and piping	Canal lining or piping results in modifications to canals with no physical changes to drains. Therefore, canal lining or piping would not likely affect drain habitat or covered species using drain habitat.
Construction of new canals	New canals would be constructed through agricultural fields and would tie into the existing canal system. Modifications, if any, to drains would occur where a crossing was necessary for the canal and one did not already exist. It is anticipated that construction of new canals would not likely affect drain habitat or covered species using drain habitat to any meaningful level. However, although drain crossings can remove vegetation when installed, they provide refugia for small fish and invertebrates that provide prey for foraging birds.

TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated With Drain Habitat

Activity	Potential Effects (Positive and Negative)
Lateral interceptors	Lateral interceptors would be constructed in agricultural fields but would cross some drains. As described under Structure Maintenance below, IID anticipates constructing up to six drain crossings each year. Drain crossings for lateral interceptors are encompassed by those described under Structure Maintenance.
Reservoirs	IID could construct up to 100 reservoirs, 1 to 10 acres in size and encompassing up to 1,000 acres. These reservoirs would be on agricultural lands or barren lands and would not impact drain habitat. Farmers are expected to construct 1- to 2-acre reservoirs to better regulate irrigation water. These reservoirs would be installed in agricultural fields and would not impact drain habitat.
Seepage recovery systems	Seepage recovery systems are proposed along the East Highline Canal. Potential effects to covered species using plant communities supported by seepage from the East Highline Canal are addressed under the Tamarisk Scrub Conservation Strategy. For covered species using drain habitat, potential effects of construction of seepage recovery systems are limited to construction of check structures for the surface recovery systems. Approximately 1.6 acres of drain vegetation could be permanently lost because of installation of surface seepage recovery systems.
Operation and Maintenance	
Conveyance system operation	Conveyance system operation is limited to moving water through the canals to meet maintenance and customer needs. Other than the filling, draining and moving water through the canals, no physical effects are encompassed by conveyance system operation. No effects to drain habitat or covered species using drain habitat would be expected.
Drainage System Operation	
Rerouting or constructing new drains	IID reroutes or constructs about 2 miles of drains every 10 years. Newly constructed drains would increase habitat for covered species associated with drain habitat. If IID constructed 2 miles of drains every 10 years, 15 miles of new drains would be created over the 75-year permit term, which could increase habitat for species associated with drain habitat. Rerouting drains would not change the amount of drain habitat. Rerouting drains could result in the temporary reduction in vegetation in the drains during the period between abandonment of the old drain and when vegetation develops in the rerouted drain. No net loss of vegetation would occur because the rerouted portion would replace the abandoned section.
Piping drains	Over the 75-year term IID anticipates that about 50 miles of open drains would be pipelined, with an annual average of 0.67 mile of drain piping. About 22 acres of drain vegetation could be lost over the term of the permit from piping drains.
Inspection activities	Potential effects of inspection activities would be limited to a minor potential for disturbance of covered species if they occur in the vicinity of structures at the time of inspection.

Return to Contents

TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated With Drain Habitat

Activity	Potential Effects (Positive and Negative)
Canal lining maintenance	Canal lining maintenance consists of repairing the concrete lining of canals only with no physical changes to drains. Therefore, canal lining maintenance would not likely affect drain habitat or covered species using drain habitat.
Right-of-way maintenance Embankment maintenance Erosion maintenance	Along drains, right-of-way maintenance, including embankment and erosion maintenance, is conducted in association with vegetation control/sediment removal along drains. Potential impacts to covered species from these activities are encompassed by those under vegetation control.
Seepage maintenance	Seepage maintenance is conducted only along the canal system. Therefore, seepage maintenance would not likely affect drain habitat or covered species using drain habitat.
Structure maintenance	IID estimates that about 300 structures will be replaced each year. About 100 of these structures would be drainage structures. Along lateral drains, replacing each structure temporarily disturbs an area about 75 feet long. Thus, each year about 7,500 feet (1.4 miles) of the drains would be disturbed, temporarily removing 0.6 acres of vegetation. ([7500 ft X 14 ft / 43560]*26 percent vegetated) Installation of new drain crossings could result in the permanent loss of drain vegetation. IID estimates that six 40-foot-wide crossings will be constructed each year. Based on this estimate, 18,000 feet (3.4 miles) of drain would be affected by drain crossings over the term of the permit, potentially resulting in the loss of 1.5 acres of drain vegetation. ([18,000 ft X 14 ft / 43560]*26 percent vegetated) New structures that would be constructed on the drainage system would consist of control structures. Control structures are installed in steep drains that are eroding. Because of the erosion, drains needing control structures support little vegetation. Thus, construction of new control structures has a limited potential to affect drain habitat or associated covered species
Pipeline maintenance	Drain pipelines primarily occur in farm fields while conveyance system pipelines occur through developed areas. Neither of these areas support vegetation used by species associated with drain habitat. As such, the potential for pipeline maintenance to affect covered species is very low.
Reservoir maintenance	Reservoirs are located on the conveyance system. The reservoir embankments are relatively steep and vegetation is tightly controlled. These features make the reservoirs unattractive to covered species such that the potential for reservoir maintenance to affect covered species associated with drain habitat is very low.
Sediment removal	IID removes sediment from about 300 miles of drains annually. While IID strives to maintain vegetation on drain banks, vegetation within the channel is removed with sediment. Sediment removal temporarily reduces vegetation in the drains. An estimated 130 acres of vegetated drain is affected by sediment removal each year.

TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated With Drain Habitat

Activity	Potential Effects (Positive and Negative)
Vegetation control	Vegetation control along canals focuses on removing moss and algae, and has little potential to affected covered species associated with drain habitat. Covered species associated with drain habitat are not expected to use canals because of the lack of vegetation, deep water, and high water velocity. Along drains, mechanical and chemical methods are used to control vegetation. Mechanical and chemical control of vegetation is conducted in association with sediment removal described above. Thus, an estimated 130 acres of vegetation are temporarily affected each year.
New and Alamo River maintenance	IID dredges the deltas of the New and Alamo rivers about once every four years. In conducting this dredging, IID retains the vegetation on the banks. Thus, habitat is not affected by these dredging operations, but the dredging could temporarily disturb covered species using vegetation along the river channels. IID coordinates with USFWS at the refuge prior to conducting these activities.
Salton Sea dike maintenance	Salton Sea dike maintenance activities consist of replacing riprap, grooming embankments and repairing damaged sections of the dikes. Because the dikes do not support vegetation that covered species associated with drain habitat use, no change in habitat would occur with these activities. Potential effects are limited to a minor potential for disturbance.
Gravel and rock quarrying	Gravel and rock quarries do not occur in drains or immediately adjacent to marsh habitats. Thus, the potential for quarrying to affect covered species associated with drain habitat is minor.
Fish hatchery operation and maintenance	The fish hatchery is a developed facility and does not support habitat for covered species associated with drain habitat.
Recreational facilities	Because new recreational facilities would not be constructed in the drain prism, construction of recreational facilities would not be expected to affect habitat for species associated with drain habitat. If recreational facilities were constructed adjacent to drains, there would be a minor potential for disturbance of covered species during construction. The HCP does not cover take of covered species by recreationists.

Permanent Habitat Loss

Covered activities potentially resulting in the permanent loss of drain habitat are installation of seepage recovery systems, piping drains, and structure maintenance. The potential habitat effects of each of these activities is described below. In total, an estimated 25.1 acres of drain vegetation could be lost because of the covered activities over the term of the permit.

Seepage recovery systems are proposed along the East Highline Canal. Surface recovery systems are proposed where there is an existing drain that currently collects seepage from the East Highline Canal. Construction in the drain for these systems is minimal consisting of installation of a small check structure. Conservatively assuming 0.1 acre is impacted by each check structure, a maximum of 1.6 acres of drain vegetation could be permanently lost because of installation of surface seepage recovery systems.

Over the 75-year term, IID anticipates that about 50 miles of open drains (an annual average of 0.67 mile) would be pipelined. The entire drainage system encompasses an estimated 2,471 acres of which an estimated 26 percent (652 acres) is vegetated. Assuming that 26 percent of the 50 miles of drains piped is vegetated, 22 acres of drain vegetation could be lost over the term of the permit from piping drains.

Structure maintenance with the potential to eliminate drain vegetation consists of installation of new drain crossings. IID estimates that six, 40-foot-wide crossings will be constructed each year. Based on this estimate, 18,000 feet (3.4 miles) of drain would be affected by drain crossings over the term of the permit. Assuming the impacted area is 26 percent vegetated, about 1.5 acres of drain vegetation could be lost.

Temporary Habitat Disturbance

Covered activities potentially resulting in the temporary loss of drain habitat are sediment removal/vegetation control and structure maintenance. The potential effects of these activities are described below. In total, an estimated 130 acres of drain vegetation could be temporarily disturbed by the covered activities each year.

The amount of vegetation in the drains was conservatively estimated at 652 acres; about 63 acres are cattail/bulrush and about 589 acres support other vegetation. IID anticipates that it will clear vegetation/sediment from approximately one-fifth (about 130 acres) of the vegetated acreage in the drains each year. Thus, on average, covered species in one-fifth of the habitat in the drains are exposed to drain cleaning each year. Drain cleaning could displace individuals, temporarily reduce habitat in the localized area of the cleaning, or destroy nests if covered species breed in the drains at the time of cleaning.

Structure replacement could temporarily remove drain vegetation. IID estimates that about 100 structures on drains will need to be replaced each year. Along lateral drains, replacing each structure temporarily disturbs an area about 75 feet long. Thus, each year about 7,500 feet (1.4 miles) of the drains would be disturbed, potentially resulting in the temporary removal of 0.6 acre of vegetation.

Drain cleaning and structure replacement does not permanently eliminate habitat. Rather, it results in a temporary reduction of vegetation in portions of the drains. Vegetation remains undisturbed in the remainder of the drainage system. In conducting drain cleaning activities, IID focuses sediment and vegetation removal on the center of the drain and strives to maintain vegetation on the drain banks. These aspects of IID's drain cleaning activities minimize impacts to covered species potentially resulting from fluctuations in the amount or type of vegetation. Furthermore, the existing habitat conditions in the drains are the product of IID's drain cleaning regime in which about one-fifth of the drainage system is cleaned each year. Thus, habitat would be expected to persist in the drains at a level and species composition similar to existing conditions.

Drain cleaning and other activities occurring near the drains is ongoing. Covered species use drain habitats in the HCP area and persist in the HCP area coincident with these activities. Yuma clapper rails have been reported in Holtville Main Drain annually since 1995 and in Trifolium No. 1 drain in all but one year since 1994 (USFWS unpublished data). In addition to Yuma clapper rails, the following covered species were reported in surveys of drains in the Imperial Valley: Cooper's hawk, loggerhead shrike, long-billed curlew,

northern harrier, peregrine falcon, sharp-shinned hawk, short-eared owl, tricolored blackbird, white-faced ibis, white-tailed kite, willow flycatcher, and yellow warbler (Hurlbert 1997). The observed use of the drains by American bitterns also suggests that least bitterns could use the drains. Because these species currently coexist with drain cleaning and other maintenance activities and habitat conditions in the drains are expected to remain similar to existing conditions, use of drain habitat by covered species is expected to remain similar to existing levels.

3.5.3 Approach and Biological Goals

The biological goal of the Drain Habitat Conservation Strategy is to maintain the species composition and life history functions (i.e., seasonal occurrence) of covered species using drain habitat within the HCP area. The specific objectives are to:

- Create managed marsh habitat that supports covered species associated with drain habitat
- Optimize management of the created marsh habitat to support covered species associated with drain habitat over the term of the permit

The Drain Habitat Conservation Strategy is composed of minimization and mitigation measures. Under the water conservation and transfer programs, the amount of water conservation will gradually increase. Thus, changes in water quality caused by the water conservation and transfer programs will occur gradually. This gradual increase in water conservation constitutes a minimization aspect of the HCP. Additional HCP measures that would minimize effects on covered species using drain habitats include:

- Avoiding dredging of the river deltas during the period when covered species could be breeding at the deltas (Drain Habitat–2)
- Survey for covered species prior to conducting scheduled construction activities and schedule construction activities to avoid the breeding season if covered species are found breeding in the area that would be affected (Drain Habitat–3)
- Seasonal restrictions on construction activities in areas inhabited by burrowing owls (Owl–4, –5, and –8)
- Seasonal restrictions on activities in pupfish drains (Pupfish–1)

These measures will reduce the potential for covered activities to result in take of covered species. In addition to these minimization aspects of the HCP, impacts to covered species potentially resulting from increased selenium concentration in the drains or from operation and maintenance activities associated with the drains will be mitigated by creating managed marsh habitat.

Creating additional habitat directly addresses actual effects of the covered activities that relate to changes in the amount or quality of habitat by providing alternative habitat. It also addresses disturbance and other risks to covered species using drain habitats by creating a safe haven where they are not exposed to the covered activities. By creating habitat that provides equal or greater habitat value than that currently supported in the HCP area, a similar or greater number of individuals of the covered species can be supported,

particularly because the amount of habitat in the drains is not expected to change substantially over the term of the permit. Thus, the impact of the take of any individuals using impacted habitats in the HCP area (e.g., drains) is minimized and mitigated by increasing the overall quality and quantity of available habitat in the HCP area and thereby creating conditions capable of supporting larger populations of the covered species than currently inhabit the HCP area.

3.5.4 Habitat Mitigation and Management Measures

The mitigation and management measures presented below are the specific actions that IID will undertake to fulfill the goals of the Drain Habitat Conservation Strategy. These measures serve as the basis for the contractual commitments described in the Implementation Agreement. The text following each measure provides additional clarification and describes the rationale for the measure. The key elements of the Drain Habitat Conservation Strategy are as follows:

- Create at least 190 acres of managed marsh habitat and up to a total of 652 acres of managed marsh habitat
- Reduce disturbance and mortality / injury of covered species from covered activities

Drain Habitat–1. *IID will create at least 190 acres of managed marsh habitat. Within 1 year of the issuance of the incidental take permit, IID will conduct a vegetation survey of the drainage system following the protocol in Appendix B. Based on this vegetation survey, the HCP Implementation Team will determine the amount of habitat for covered species supported in the drains. The acreage required to compensate for selenium effects will be recalculated based on the results of the vegetation survey following the same methodology described in Section 3.5.2: Effects of the Covered Activities. If the acreage of habitat for covered species found in the drains through the vegetation survey plus the acreage required to compensate for selenium effects exceeds 190 acres, IID will create managed marsh habitat in an amount equal to the greater acreage up to a maximum of 652 acres. Creation of the managed marsh habitat will be phased over 15 years, with at least one-third of the total amount created within 5 years, two-thirds within 10 years, and the total amount created within 15 years of issuance of the incidental take permit.*

IID will ensure that the water used to support the managed marsh habitat is irrigation water from the LCR or is other water with the same selenium concentration as water from the LCR or that meets an EPA selenium standard for protection of aquatic life that has received a No Jeopardy determination from the USFWS, whichever is greatest.

The managed marsh habitat will be created on lands owned by IID. IID will work with the HCP IT to determine the location and characteristics of the managed marsh habitat and develop long-term management plans. IID will submit habitat creation plans to the USFWS and CDFG for approval prior to initiation of habitat creation activities. Within 1 year of completing construction of managed marsh, IID will submit long-term management plans to the USFWS and CDFG for approval. IID will provide for the management of managed marsh habitat for the term of the permit.

Under Drain Habitat–1, IID will create at least 190 acres of managed marsh habitat and up to 652 acres. The specific amount of managed marsh that IID will create will be determined through a vegetation survey completed within 1 year of issuance of the incidental take permit. Based on this survey, the HCP IT will determine the total amount of habitat for

covered species in the drains and the amount of managed marsh habitat necessary to offset selenium impacts. IID will create managed marsh habitat equal to the total amount of habitat in the drains plus additional habitat based on predicted toxicity effects from increases in selenium under the water conservation and transfer program.

The quality of the created managed marsh habitat is expected to be much higher than the habitat quality of the vegetation supported in the drains. Emergent freshwater marsh units on the state and federal refuges of the Imperial Valley currently support Yuma clapper rails. For at least the first third of created habitat, it is anticipated that the managed marsh will be created and managed in a similar same manner as the USFWS and CDFG manage emergent freshwater marsh units on the refuges. Based on the current management practices, the created managed marsh habitat is expected to consist of cattail/ bulrush vegetation. Cattail/bulrush vegetation provides higher quality habitat conditions for the covered species than the vegetation in the drains. Most of the vegetation in the drains is tamarisk or common reed; only a small amount of cattail/bulrush vegetation (about 63 acres) is estimated to be in the drains. Although current information indicates that covered species could use areas dominated by common reed and tamarisk, the level of use is low relative to cattail/bulrush areas. Further, habitat in the drains occurs as a narrow strip from about 3 to 15 feet wide and therefore, consists entirely of edge habitat. While cattail/bulrush in the drains is used by some covered species, the created marsh habitat is expected to support greater use (both in number of species and number of individuals) because the habitat will be in larger blocks with less edge habitat. Species diversity increases with the size of habitat patches (Harris and Silva-Lopez 1992; Brown and Dinsmore 1986) and reproductive success can be greater in larger patches than in narrow, linear habitats. Linear habitats have a high degree of edge habitat, and predation pressure is typically greater in edge-dominated habitats than more insular habitats (Harris and Silva-Lopez 1992).

The managed marsh habitat will be created on land owned by IID. The HCP IT will determine where to locate the created managed marsh habitat. In making this determination, the HCP IT will consider factors such as:

- Location relative to other wildlife habitat and populations of covered species (e.g., refuges)
- Potential conflicts with restoration projects for the Salton Sea
- Availability of facilities to deliver water to the managed marsh habitat
- Soils
- Land value

The HCP IT will ensure that the habitat is created in the best location to maximize the long-term benefits to covered species.

IID will support the created marsh habitat with better quality water than currently occurs in the drainage system. Under this measure, IID has committed to using irrigation water from the Colorado River or water of equivalent quality with respect to selenium or water that meets the EPA selenium standard with a No Jeopardy opinion. Irrigation water from the Colorado River is the best quality water available in the Imperial Valley. The selenium concentration in the LCR has averaged about 2.1 ppb in recent years (Table 2.2.1). For comparison, the average concentration of selenium in the New and Alamo rivers and selected drains emptying into these rivers has ranged from about 4 ppb to near 10 ppb (Table 2.2.1). Thus, in addition to the better habitat quality resulting from the plant species

composition and physical characteristics, the managed marsh habitat will have better water quality than the drains.

IID will manage the managed marsh or provide for its management by a third party for the term of the permit. The managed marsh will mitigate the impacts to species using drain habitat as a result of the water conservation and transfer project and O&M activities. At the end of the permit, IID will either continue the water conservation and transfer project or discontinue it. If the water conservation and transfer project is continued, then IID will have to extend incidental take authorization to cover the continued impacts associated with water conservation and transfer. It is reasonable that IID would continue to maintain the managed marsh. Alternatively, if IID discontinued the water conservation and transfer project, water quality conditions in the drains would return to pre-Project levels thus, obviating the need to continue to support the managed marsh to mitigate water quality effects.

With the termination of incidental take authorization for O&M activities at the end of the permit, IID would either have to avoid take of state and federal listed species or extend incidental take authorization. If IID elected to avoid take, there would be no need to continue to maintain the managed marsh to mitigate impacts of take associated with O&M activities. Alternatively, IID could extend its permit and continue to maintain the managed marsh habitat. Because take of covered species associated with drain habitat as a result of covered activities would cease at the end of the permit, it is not necessary or appropriate for IID to maintain managed marsh habitat in perpetuity. However, 5 years before the end of the permit (i.e., in year 70), IID will meet with the USFWS and CDFG to develop a strategy for minimizing impacts to covered species using the managed marsh habitat at the end of the permit term (See Section 5.6: End of Term of Incidental Take Authorization).

Drain Habitat–2. *IID will not dredge the river deltas between February 15 and August 31, except as necessary to prevent flooding during storm events.*

IID dredges portions of the river deltas of the New and Alamo rivers about once every 4 years to maintain flow to the sea. In conducting this dredging, IID retains the vegetation on the banks of the river channels to maintain the stability of channels. Because vegetation is retained, habitat is not affected by these dredging operations and the principal concern for covered species that may be using the deltas is disturbance or injury. By not conducting these activities between February 15 and August 31, except in emergency situations, IID will avoid the breeding periods of covered species that could be using the river deltas for nesting. This commitment will minimize the potential for take of covered species breeding in the deltas.

Drain Habitat–3. *For scheduled construction activities associated with the drainage system, before initiation of construction activities, IID will survey the construction site surveyed to determine whether any covered species are likely to breed at the site as evidenced by the occurrence of appropriate vegetation and/or surveys for covered species. If covered species are found to be potentially breeding on the project site, IID will schedule construction activities that would remove habitat to occur outside of the breeding season.*

In addition to potentially impacting suitable habitat, construction activities could disturb or injure covered species using the habitat. To minimize the potential for take of covered species from construction activities, IID will survey suitable habitat to determine if any

covered species are breeding in habitat that would be impacted by the construction activities. If the surveys indicate that covered species are likely to be breeding in habitat that would be affected, IID will schedule activities that would affect the habitat to occur outside of the breeding season. Outside of the breeding season, IID could remove habitat. By scheduling construction activities that would remove habitat to occur outside of the breeding season, IID will minimize the potential to injure or disturb covered species.

3.5.5 Effects on Habitat

The approach to the Drain Habitat Conservation Strategy is to create managed marsh habitat of greater value than habitats actually affected by the covered activities. Under the Drain Habitat Conservation Strategy, an amount of managed marsh habitat equal to the total amount of habitat in the drains plus an additional amount of habitat based on predicted toxicity effects from increases in selenium under the water conservation and transfer program would be created. At least 190 acres of high-quality marsh habitat and up to 652 acres would be created within 15 years of issuance of the ITP. This habitat would be created in large blocks, and would be expected to consist of cattails, bulrush, sedges, and other emergent wetland plants, depending on the USFWS management of habitat for Yuma clapper rails on the Salton Sea NWR.

The Drain Habitat Conservation Strategy would more than double the acreage of habitat for drain-associated species. Consisting of cattails and bulrush, the created habitat also would provide substantially greater habitat value than the existing vegetation in the drains. The larger blocks of created habitat also would increase its attractiveness and value to wildlife as compared to the narrow, linear habitat of the drains.

The drains would continue to support vegetation similar in character and quantity to existing vegetation. IID has been conducting O&M activities along the drainage system for many decades and would continue these O&M activities over the term of the permit. The vegetation currently supported in the drains is a product of these maintenance activities. Although the water conservation activities could reduce the quantity and quality of water in the drains, this potential reduction is not expected to result in a substantial change in the extent and characteristics of vegetation in the drains (see Section 4.7 of the EIS/EIR). Thus, the drains would continue to support habitat and species composition at a level similar to that which currently exists in the drains, and covered species could continue to use this habitat.

IID would use water with selenium concentration low enough to avoid adverse reproductive effects to support the managed marsh habitat. The selenium concentration of water used to support the managed marsh is expected to be close to 2 ppb. This selenium concentration is considerably lower than the selenium concentration in most of the drains in the HCP area. Adverse effects from selenium toxicity would be avoided in the managed marsh and the quality of the managed marsh habitat would be further enhanced beyond that in the drains.

3.5.6 Effects on Covered Species

Covered species associated with marsh habitats known to use or potentially using habitats in the HCP area include resident breeding species, migratory breeding species, winter visitors, and transient species that may use marsh habitat during migration or other

wanderings. Many of the covered species associated with marsh habitat are not likely to use vegetation within the confines of a drain to a great degree (e.g., short-eared owls, greater sandhill cranes), but would likely use the larger, more open configuration of the created marsh habitat. As such, these species would be largely unaffected by the covered activities, but would benefit from creation of high-quality marsh habitat. Even though individuals of some of the covered species could be taken as a result of the covered activities, the Drain Habitat Conservation Strategy is expected to maintain or increase the level of use of the HCP area by covered species because conditions in the drains are not expected to change substantially while the Drain Habitat Conservation Strategy will approximately double the amount of habitat. The effects of the Drain Habitat Conservation Strategy on covered species are evaluated below.

As part of the Monitoring and Adaptive Management Program (Chapter 4), IID could implement a survey or study program requiring capture of covered species. Capture of covered species constitutes take under both the federal and state ESAs. Take that occurs in association with surveys or studies conducted for this HCP is a covered activity and will be authorized under the state and federal ITPs. Any of the covered species could be taken through surveys or studies.

Studies and surveys conducted during the course of this HCP will be developed by IID in coordination with the HCP IT and will be subject to the approval of CDFG and USFWS prior to implementation. In approving the studies/surveys, the CDFG and USFWS will require capture methods that minimize the potential for death and injury of covered species. In addition, these agencies will specify the number of individuals of covered species that may be captured. Thus, the level of take authorized to occur through this mechanism will be specified on a case-by-case basis through the approval of the CDFG and USFWS.

3.5.6.1 Yuma Clapper Rail

In the HCP area, Yuma clapper rails predominantly occur on the state and federal refuges. Since 1990, the number of clapper rails counted on the Imperial WA has varied between 90 and 331, and on the Salton Sea NWR, clapper rail numbers have fluctuated between 13 and 102. Combined, the refuges in the HCP area have supported 106 to 411 clapper rails each year. Although comprehensive surveys have not been completed in areas off of the refuges, habitat availability is limited off of the refuges. Consistent with the limited habitat availability off of the refuges, the number of clapper rails reported off of the refuges has been low, ranging from 3 to 43 in surveys conducted between 1990 and 1999. Few of these sightings were in the drains and clapper rails have only been reported in three drains (Holtville Main, Trifolium No. 1, Bruchard).

Agricultural drains support limited use by clapper rails. High quality habitat for Yuma clapper rails consists of mature stands of dense or moderately dense cattails intersected by water channels. Rails breed, forage and find cover in this type of habitat. Rails have also been reported using areas of common reed although nesting is uncertain and the density is lower than in cattail marshes. The IID drainage system is estimated to contain about 63 acres of cattails. Common reed, tamarisk, and arrowweed are the predominant species of the remaining 589 acres of vegetation estimated in the drainage system. The vegetation characteristics of the drains suggest that the drains provide poor quality habitat for rails. Further, Anderson and Ohmart (1985) found the home ranges of rails to average about

18.5 acres / pair. The drains are unlikely to support a block of vegetation of this size, which further suggests that habitat in the drains is of limited quality to rails. A maximum of nine rails have been reported in two drains. Breeding has not been verified in the drains but rails have been documented to be present in surveys of drains during the breeding season.

Potential effects of the covered activities on clapper rails consist of disturbance, temporary and permanent loss of habitat, destruction of nests, and exposure to increased selenium concentrations. IID cleans about one-fifth of the drainage system each year. Thus, about 12.6 acres of cattails could be subject to drain cleaning each year. Rails inhabiting these areas could be displaced as a result of drain cleaning and if they breed in the drains, there is some potential for a nest to be lost because of the drain cleaning. To the extent that rails use common reed, a few individuals could be displaced by drain cleaning activities. Considering the poor quality of common reed habitat and availability of this vegetation in areas unaffected by covered activities (e.g., along the New or Alamo Rivers), displaced individuals would likely quickly find alternate habitat.

Drain maintenance activities and several other covered activities also have the potential to result in take of clapper rail through temporary or permanent reductions in the amount of habitat. As described in Section 3.5.2.2, various maintenance and water conservation activities have the potential to temporarily and permanently impact drain vegetation. Drain maintenance results in the temporary loss of an estimated 12.6 acres of cattail vegetation, some of which could be used by clapper rail. In total, an estimated 25.1 acres of drain vegetation of which only a few acres (estimated 2.5 acres) could be cattails would be permanently impacted. These temporary and permanent reductions in cattails in the drains could result in a minor reduction in potential habitat for Yuma clapper rail.

Rails could be exposed to slightly higher concentrations of selenium in the drains. Based on the evaluation of the effects of increased selenium concentrations, using the stilt standard, the reproductive success of rails foraging in the drains could be reduced slightly relative to existing conditions. Assuming that all of the vegetation in the drains provides potential foraging habitat for Yuma clapper rails, up to 42 acres of managed marsh habitat could be needed to offset the maximum projected decline in reproductive rate resulting from selenium concentrations in the drains at the maximum level of water conservation and transfer (see Section 3.5.2.1).

Under the HCP, IID will create at least 190 acres and up to 652 acres of managed marsh habitat. Based on the vegetation survey, IID will create at least an equivalent amount of habitat as is supported in the entire drainage system. The created habitat will be of substantially better quality for Yuma clapper rails than the habitat in the drains because it will contain preferred plant species (i.e., cattails and bulrush), have better water quality than the drains, and be configured to provide a mix of dense vegetation interspersed with open water. The created habitat is anticipated to be managed in a similar manner as emergent freshwater marsh units are managed on the refuges. The units on the refuges support the majority of the clapper rail population in the Imperial Valley. With an equivalent or greater acreage as supported in the drains, but with much higher quality, the created marsh habitat is expected to support a larger population of Yuma clapper rails than currently is supported in the drains.

Clapper rails establish territories as early as February with nesting and incubation beginning in mid-March. IID will avoid potential impacts to birds that could be using the river deltas during the breeding season by not dredging the deltas of the New or Alamo rivers after mid-February. In addition, prior to conducting scheduled construction activities in the drains, IID would survey the construction area. If covered species are found to be breeding in the construction area, IID would schedule the construction activity to occur after the breeding season. These measures will avoid and minimize the potential for destruction of nests and disturbance that could interfere with breeding behavior.

Estimates of rail densities vary widely, ranging from 0.06 to 1.26 rails / acre (Table 3.5-4). Based on these estimates, the number of rails supported by 190 acres of created marsh could range from 11 to 239 rails if all the habitat were designed for Yuma clapper rails. Probably, a smaller number of clapper rails would be supported because a portion of the marsh would be managed for other covered species (e.g., black rails). Habitat for Yuma clapper rails would continue to be available in the drains and clapper rails would be expected to persist in the drains at existing levels. Therefore, the created marsh would act to increase the amount of habitat and overall population of clapper rails in the HCP area and thereby benefit the species. With implementation of the minimization and avoidance measures, and creation of high quality managed marsh habitat, the Drain Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of Yuma clapper rail.

TABLE 3.5-4
Reported Densities of Yuma Clapper Rails

Location	Density Rails/Acre[a]	Source
LCR	0.10	Anderson and Ohmart (1985)
Cienega de Santa Clara	0.36	Piest and Campoy (1998)
Cienega de Santa Clara	0.60[b]	Piest and Campoy (1998)
Topock Marsh	0.06	Smith (1975, reported in Piest and Campoy [1998])
Mittry Lake Wildlife Area	0.39	Todd (1980, reported in Piest and Campoy [1998])
Hall Island	1.26	Todd (1980, reported in Piest and Campoy [1998])

[a] Acres of cattail habitat
[b] Estimated density taking into account nonresponding birds

3.5.6.2 California Black Rail

California black rails occur in the HCP area in small numbers. In a 1989 survey for the species at the Salton Sea and surrounding areas, 13 birds were recorded at the mouth of the New River, eight were in seepage communities along the Coachella Canal, and one was found at Finney Lake. Up to 50 black rails have been reported in the wetland complex supported by seepage from the AAC between Drops 3 and 4. Black rails have not been reported to occur in the drains. Black rails are most closely associated with bulrush vegetation although they will use areas dominated by cattails. Their apparent low occurrence in the HCP area may reflect this preference for bulrush, which is not as common in the HCP area as are cattails.

California black rails could be directly or indirectly taken as a result of several covered activities. Drain maintenance activities could flush rails from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. In the event that black rails breed in drain vegetation in the HCP area or start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. However, only a very small amount of this vegetation might be suitable for California black rails. The IID drainage system is estimated to contain about 63 acres of cattails, a species that can be used by black rails but is not preferred. If 20 percent of the estimated 63 acres of cattails are subject to drain maintenance each year, black rails could be exposed to drain maintenance activities in about 12.6 acres. Because of the limited occurrence and distribution of black rails in the HCP area, particularly in the drains, the potential for take of black rails by drain maintenance activities and the number of rails potentially affected is low.

Drain maintenance activities and several other covered activities also have the potential to result in take of black rail through temporary or permanent reductions in the amount of habitat. As described in Section 3.5.2.2, various maintenance and water conservation activities have the potential to temporarily and permanently impact drain vegetation. Drain maintenance results in the temporary loss of an estimated 12.6 acres of cattail vegetation, some of which could be used by black rail. In total, an estimated 25.1 acres of drain vegetation, of which only a few acres (estimated 2.5 acres) could be cattails, would be permanently impacted. These temporary and permanent reductions in cattails in the drains could result in a minor reduction in potential habitat for California black rail. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the low level of use of cattails by black rail, and the low level of use of drains in the HCP area by black rail, overall population-level effects would not be expected.

California black rails that forage in the drains could be exposed to increased selenium levels. Assuming that all of the vegetation in the drains provides potential foraging habitat for black rails, as was assumed for Yuma clapper rails, up to 42 acres of managed marsh habitat could be needed to offset the maximum projected decline in reproductive rate resulting from selenium concentrations in the drains at the maximum level of water conservation and transfer (see Section 3.5.2.1).

Implementation of the Drain Habitat Conservation Strategy would be expected to increase the amount and quality of habitat for black rail in the HCP area. Under the Drain Habitat Conservation Strategy, IID will create at least 190 acres of managed marsh habitat and up to 652 acres. The HCP IT will consider the specific habitat needs of black rails in developing site-specific creation and management plans for the managed marsh. The managed marsh habitat will be of better quality for black rails than the habitat affected in the drains because it would:

- Consist of one or more large blocks
- Contain preferred vegetation (bulrush)
- Have better water quality

Flores and Eddleman (1991) have suggested that California black rails are capable of rapidly colonizing new habitat. Thus, black rails could take advantage of the newly created habitat within a short period of time. Given the current low level of use of the HCP area by black rails, the high-quality habitat created under the HCP, and the rail's ability to rapidly colonize new habitats, the HCP could contribute to increasing the population and distribution of California black rails.

The few records of black rails in the HCP area include areas adjacent to the Salton Sea and the New River deltas among others. Like clapper rails, black rails breed in the early spring. Black rails have been reported using the New River delta. IID will avoid potential impacts to birds that could be nesting in this area by not dredging the deltas of the New or Alamo rivers after mid-February. In addition, prior to conducting scheduled construction activities in the drains, IID would survey the construction area. If covered species are found to be breeding in the construction area, IID would schedule the construction activity to occur after the breeding season. These measures will avoid and minimize the potential for destruction of nests and disturbance that could interfere with breeding behavior.

Few estimates are available on the naturally occurring density of California black rails in marsh habitats. Repking and Ohmart (1977) estimated the density of black rails in spring along the LCR as 0.4 to 0.6 rail/acre. At this density, the 190 acres of marsh habitat created under the HCP could support up to 114 black rails. However, because the needs of all of the covered species associated with drain habitat will be considered in designing the managed marsh, the level of use by black rails probably would not reach this maximum level. Nonetheless, with implementation of the minimization and avoidance measures, and creation of high quality managed marsh habitat, the Drain Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of California black rail.

3.5.6.3 Bald Eagle

A few bald eagles (three or fewer) are regularly observed at the Salton Sea during winter. The principal potential effect of the covered activities on bald eagles is a potential decline in the availability of fish in the Salton Sea. As described in more detail in Section 3.3.5.13, a few bald eagles could be taken as a result of reduced foraging opportunities at the Salton Sea over the term of the permit. Bald eagles are not known to use the drains and because of the abundance of fish and waterfowl at the Salton Sea and adjacent refuges, the drains do not provide essential foraging habitat for bald eagles. Thus, no adverse effects to bald eagles would be expected from covered activities operating in the drainage system.

Bald eagles could benefit from the Drain Habitat Conservation Strategy. Although fish are the primary prey of bald eagles, they also prey on waterfowl. Under the Drain Habitat Conservation Strategy, at least 190 acres and up to 652 acres of marsh habitat would be created. The Imperial Valley and Salton Sea areas are heavily used by wintering and migrating waterfowl. While not target species of the HCP, the created marsh habitat would attract migrating and wintering waterfowl. As such, it would provide additional foraging opportunities for bald eagles, overall benefiting the species. If foraging opportunities became limited because of reductions in fish availability at the Salton Sea, the managed marsh habitat would provide alternate foraging habitat and thereby, mitigate potential impacts. Therefore, implementation of the HCP would not jeopardize the continued existence of bald eagles.

3.5.6.4 Bank Swallow

Bank swallows are casual visitors to the HCP area, potentially occurring in the HCP area as migrants during the spring and fall. For foraging, they are not strongly associated with any particular habitat type, although they often forage near water where insects are abundant. The covered activities are unlikely to adversely affect bank swallows because of the swallow's rare occurrence in the HCP area and broad habitat use for foraging. However, a few individuals could be taken because of changes in foraging habitat availability or quality potentially resulting from permanent or temporary reductions in drain vegetation (see Section 3.5.2.2), permanent or temporary reductions in tamarisk scrub habitat (see Section 3.4.2), or changes in the composition and amount of agricultural field habitat (see Section 3.8.2).

The Drain Habitat Conservation Strategy would contribute mitigating the impact of any take of bank swallows that could result from the covered activities. Under the Drain Habitat Conservation Strategy, at least 190 acres and up to 652 acres of marsh habitat would be created. The created marsh habitat would benefit bank swallows by increasing foraging opportunities. Loss of tamarisk scrub habitat at the Salton Sea and in the Imperial Valley would be offset through the creation / acquisition and long-term protection of native tree habitat (see Sections 3.3.4.2 and 3.4.5). By supporting more abundant and diverse insect populations than tamarisk scrub, native tree habitat would provide higher quality foraging opportunities for bank swallows. Critical to the perpetuation of agriculture field habitat in the Imperial Valley where bank swallows could forage is the reliability and availability of water. Implementation of the water conservation and transfer program and this HCP will enhance the likelihood that agriculture will remain the dominant land use in the Imperial Valley and thereby continue to provide foraging opportunities for bank swallows. In combination, these strategies would mitigate the minimal amount of take potentially occurring and would not jeopardize the continued existence of the species.

3.5.6.5 White-Faced Ibis

White-faced ibis typically nest in extensive marshes, constructing nests in tall marsh plants such as cattails and bulrushes over water. In the HCP area, white-faced ibis use tamarisk and mesquite snags in the Salton Sea for nesting in addition to marshes on the state and federal refuges and other areas adjacent to the Salton Sea. They roost at these locations as well as on private duck clubs. Habitat quality and quantity on the state and federal refuges and private duck clubs would not be affected under the HCP. It is unlikely that any ibis nest or roost in vegetation in the drains because of the species' association with extensive marshes or other isolated and protected locations for nesting. Thus, temporary or permanent loss of vegetation in the drains from the covered activities would not likely affect white-faced ibis.

White-faced ibis are known to forage in the drains (Hurlbert et al. 1997) and some individuals could be exposed to increased selenium levels. Based on the assumption that white-faced ibis forage throughout the entire drainage system, the acreage of managed marsh required to offset the maximum potential reproductive impairment attributable to exposure to selenium in the drains was calculated following the procedure in Section 3.5.2.1. This analysis showed that 160 acres of managed marsh habitat would be necessary to offset potential selenium effects under the circumstance that white-faced ibis foraged exclusively in the drains and used the entire drainage system. However, white-faced ibis appear to

predominantly forage in agricultural fields. Thus, with prey from the drains comprising only a portion of the diet, the potential for ibis to experience reduced reproductive output because of increased selenium concentrations in the drains is limited.

Some nesting sites could be lost if a reduction in the elevation of the Salton Sea, exposes snags currently used by white-faced ibis. However, tamarisk stands over water would continue to be available along the New and Alamo River deltas although the deltas are disturbed every few years for channel dredging. These river maintenance activities could result in disturbance or removal of active nests and thereby result in take of a white-faced ibis. To avoid this potential for take, under the Drain Habitat Conservation Strategy dredging would not occur between February 15 and August 31, except as necessary to prevent flooding during storm events.

Under the HCP, IID would create at least 190 acres and up to 652 acres of marsh habitat. This acreage would more than compensate for the maximum acreage necessary to offset selenium effects (i.e., 160 acres). White-faced ibis would be expected to benefit from the creation of marsh habitat under the HCP. The new habitat would be created in large blocks, creating extensive, undisturbed marsh habitat preferred by white-faced ibis. Riparian trees and shrubs could be integrated with the created marsh habitat as mitigation for tamarisk scrub habitat. These features, as well as the cattail and bulrush vegetation supported in the marsh, would provide preferred nesting and roosting habitats for white-faced ibis. Considering the poor quality of habitat in the drains, and expected persistence of currently used habitat in the HCP area, the habitat created under the HCP would increase the overall amount and quality of habitat in the HCP area for this species. Implementation of the Drain Habitat Conservation Strategy would not jeopardize the continued existence of white-faced ibis.

3.5.6.6 Least Bittern

Least bitterns typically are associated with extensive cattail and bulrush marshes. In the HCP area, least bitterns nest in marsh habitats adjacent to the Salton Sea, principally on the state and federal refuges. The extent to which least bitterns use vegetation in the drains is uncertain. Least bitterns probably forage in the drains, but are not likely to nest in drain vegetation. Least bitterns typically nest in large marsh areas and the drains provide only scattered patches of emergent vegetation.

Least bitterns could be directly or indirectly taken as a result of several covered activities. Drain maintenance activities could flush bitterns from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. In the event that bitterns breed in drain vegetation in the HCP area or start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. However, only a small amount of this vegetation likely would be suitable for least bitterns. The IID drainage system is estimated to contain about 63 acres of cattails with which bittern are typically associated. If 20 percent of the estimated 63 acres of cattails are subject to drain maintenance each year, least bittern could be exposed to drain maintenance activities in about 12.6 acres. Because of

the limited occurrence and distribution of least bitterns in the HCP area, particularly in the drains, the potential for take of least bitterns by drain maintenance activities and the number of bitterns potentially affected is low.

Drain maintenance activities and several other covered activities also have the potential to result in take of least bitterns through temporary or permanent reductions in the amount of habitat. As described in Section 3.5.2.2, various maintenance and water conservation activities have the potential to temporarily and permanently impact drain vegetation. Drain maintenance results in the temporary loss of an estimated 12.6 acres of cattail vegetation, some of which could be used by least bitterns. In total, an estimated 25.1 acres of drain vegetation, of which only a few acres (estimated 2.5 acres) could be cattails, would be permanently impacted. These temporary and permanent reductions in cattails in the drains could result in a minor reduction in potential habitat for least bittern. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the low level of use of cattails by least bitterns, and the low level of use of drains in the HCP area by least bitterns, no adverse population-level effects would be expected.

Least bitterns probably forage in the drains to some degree, and individuals could be exposed to increased selenium levels. Assuming that all of the vegetation in the drains provides potential foraging habitat for least bitterns, as was assumed for Yuma clapper rails, up to 42 acres of managed marsh habitat could be needed to offset the maximum projected decline in reproductive rate resulting from selenium concentrations in the drains at the maximum level of water conservation and transfer (see Section 3.5.2.1).

Implementation of the Drain Habitat Conservation Strategy would be expected to increase the amount and quality of habitat for least bittern in the HCP area. Under the HCP, IID would create at least 190 acres and up to 652 acres of marsh habitat. The HCP IT will consider the specific habitat needs of least bitterns in developing site-specific creation and management plans for the managed marsh. The new habitat could be created in large blocks, creating the extensive, undisturbed marsh habitat preferred by least bitterns. Riparian trees and shrubs probably would be integrated with the managed marsh habitat as mitigation for tamarisk scrub habitat. These features as well as the cattail and bulrush vegetation supported in the marsh would provide preferred nesting and roosting habitats for least bitterns. Considering the poor quality of habitat in the drains, and expected persistence of currently used habitat in the HCP area, the habitat created under the HCP would increase the overall amount and quality of habitat in the HCP area for this species. Given the current low level of use of the HCP area by least bittern, the high-quality habitat created under the HCP could contribute to increasing the population and distribution of this species.

The created marsh habitat would be concentrated in one or more large blocks of marsh vegetation interspersed with open water areas. This habitat would be expected to be used by least bitterns to a greater degree and would likely support nesting by these birds. Rosenberg et al. (1991) estimated the breeding density of least bitterns in marshes of the LCR as 0.4 bird / acre. At this density, the 190 acres of created marsh habitat could support 76 least bitterns while 652 acres could support 260 bitterns. The least bittern population at the Salton Sea has been estimated at 550 birds. Thus, the managed marsh habitat created under the HCP could increase the population by 14 percent and possibly up to 47 percent if 652 acres of habitat is created. However, because the needs of all of the covered species associated with

Return to Contents

drain habitat will be considered in designing the managed marsh, the level of use by least bitterns probably would not reach this maximum level. Nonetheless, with implementation of the minimization and avoidance measures, and creation of high quality managed marsh habitat, the Drain Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of California least bittern.

3.5.6.7 Fulvous Whistling-Duck

The Salton Sea area has supported up to about 200 whistling-ducks during the spring and summer, with a much smaller breeding population. In recent decades, the fulvous whistling-duck has declined in the southwestern United States, while increasing in numbers in the Southeast. Primary factors contributing to the decline of fulvous whistling-ducks in California are draining and development of marsh habitats and hunting.

Fulvous whistling-ducks nest in areas of dense cattails near the south end of the Salton Sea and forage on wetland plants and submerged aquatic vegetation in freshwater habitats that occur on the state and federal refuges and private duck clubs. Drains could provide some foraging and nesting habitat for fulvous whistling-ducks, although the quality of nesting habitat probably is limited

Fulvous whistling-ducks could be directly or indirectly taken as a result of several covered activities. Drain maintenance activities could flush ducks from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. In the event that fulvous whistling-ducks breed in drain vegetation in the HCP area or start breeding in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. However, only a small amount of this vegetation might be suitable for fulvous whistling-ducks. The IID drainage system is estimated to contain about 63 acres of cattails, preferred nesting habitat for fulvous whistling-ducks. If 20 percent of the estimated 63 acres of cattails are subject to drain maintenance each year, the ducks could be exposed to drain maintenance activities in about 12.6 acres. Because of the limited occurrence and distribution of fulvous whistling-ducks in the HCP area, particularly in the drains, the potential for take by drain maintenance activities and the number of ducks potentially affected are low.

Drain maintenance activities and several other covered activities also have the potential to result in take of fulvous whistling-ducks through temporary or permanent reductions in the amount of habitat. As described in Section 3.5.2.2, various maintenance and water conservation activities have the potential to temporarily and permanently impact drain vegetation. Drain maintenance results in the temporary loss of an estimated 12.6 acres of cattail vegetation, some of which could be used by fulvous whistling-ducks. In total, an estimated 25.1 acres of drain vegetation of which only a few acres (estimated 2.5 acres) could be cattails would be permanently impacted. These temporary and permanent reductions in cattails in the drains could result in a minor reduction in potential habitat for fulvous whistling-ducks. Over the term of the permit, a few individuals could be adversely

affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the low level of use of the drains by fulvous whistling-ducks and continued availability of habitat on the state and federal refuges where this species currently predominantly occurs, no adverse population-level effects would be expected.

Implementation of the Drain Habitat Conservation Strategy would be expected to increase the amount and quality of habitat for fulvous whistling-duck in the HCP area. Under the Drain Habitat Conservation Strategy, IID will create at least 190 acres of managed marsh habitat and up to 652 acres. The HCP IT will consider the specific habitat needs of fulvous whistling-duck in developing site-specific creation and management plans for the managed marsh. The managed marsh habitat will be of better quality for fulvous whistling-ducks than the habitat affected in the drains because it would:

- Consist of one or more large blocks
- Contain preferred vegetation
- Have better water quality

Given the current low level of use of the HCP area by fulvous whistling-ducks, the high-quality habitat created under the HCP could contribute to increasing the population and distribution of this species.

In addition to creating managed marsh habitat to compensate for potential habitat effects, prior to conducting scheduled construction activities in the drains, IID will survey the construction area. If covered species (including fulvous whistling-ducks) are found to be breeding in the construction area, IID will schedule the construction activity to occur after the breeding season. These measures will avoid and minimize the potential for destruction of nests and disturbance that could interfere with breeding behavior. With implementation of the minimization and avoidance measures, and creation of high-quality managed marsh habitat, the Drain Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of fulvous whistling-ducks.

3.5.6.8 Golden Eagles

Golden eagles occur at the Salton Sea only as accidentals during the winter and spring. Much of the HCP area could be used by golden eagles for foraging; however, golden eagles are most likely to concentrate foraging activities in areas of high prey concentrations. In the HCP area, the Salton Sea and managed marsh at the state and federal wildlife refuges, as well as private duck clubs, attract abundant waterfowl populations during winter. Agricultural fields also attract waterfowl and golden eagles may forage in desert habitat as well. With the abundance of waterfowl at the Salton Sea and adjacent refuges, the potential for and level of take of golden eagles as a result of changes in drain habitat would be minimal. However, over the term of the permit, a few golden eagles could be taken as a result of changes in foraging opportunities associated with agricultural fields. Take of golden eagles could result from reductions in agricultural fields; this potential effect is evaluated in Section 3.8.6.18.

Implementation of the Drain Habitat Conservation Strategy would benefit this species and offset impacts that could result from changes in agricultural field habitat. Under the Drain Habitat Conservation Strategy, at least 190 acres and up to 652 acres of marsh habitat would

be created. The Imperial Valley and Salton Sea areas are heavily used by wintering and migrating waterfowl. While waterfowl are not target species of the HCP, the created marsh habitat would attract migrating and wintering waterfowl and provide additional foraging opportunities for golden eagles. Therefore, implementation of the HCP would not jeopardize the continued existence of golden eagles.

3.5.6.9 Short-Eared Owl

Short-eared owls are rare winter visitors to the Salton Sea area, but are more common in the fall. The USFWS (1997) characterizes them as occasional visitors with normally fewer than five individuals at the Salton Sea National Wildlife Refuge (NWR). Short-eared owls forage for small mammals in open habitats such as agricultural fields and marshes.

As described in more detail in Section 3.8.6.5, over the term of the permit, a few individual short-eared owls could be taken as a result of reduced foraging opportunities in agricultural fields of the Imperial Valley. Short-eared owls are not known to use the drains and the drains do not provide essential foraging habitat. Thus, no adverse effects to short-eared owls would be expected from covered activities occurring in the drainage system.

Short-eared owls could benefit from the Drain Habitat Conservation Strategy. Under the Drain Habitat Conservation Strategy, at least 190 acres and up to 652 acres of marsh habitat would be created. This managed marsh habitat would provide additional foraging opportunities for short-eared owls, overall benefiting the species. If foraging opportunities were reduced to any extent because of changes in agricultural fields, the managed marsh habitat would provide alternate foraging habitat and thereby, mitigate potential impacts. Implementation of the HCP would not jeopardize the continued existence of short-eared owls.

3.5.6.10 Northern Harrier

Northern harriers are common fall and winter residents in the HCP area, but occur only occasionally during the spring and summer. They are not currently known to breed in the HCP area but could in the future. Northern harriers forage for small mammals typically in agricultural fields and marshes. They have been reported in surveys of agricultural drains in the Imperial Valley (Hurlbert et al. 1997).

Northern harriers could be directly or indirectly taken as a result of several covered activities associated with the drainage system. Drain maintenance activities could flush harriers from drain vegetation which could constitute take as harassment. Death or injury as a result of being flushed is unlikely. If northern harriers breed in drain vegetation in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests. On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. However, only a small amount of this vegetation might be suitable for harriers such that the potential for take and level of take from drain maintenance activities is low.

Drain maintenance activities and several other covered activities also have the potential to result in take of northern harrier through temporary or permanent reductions in the amount of habitat. As described in Section 3.5.2.2, various maintenance and water conservation activities have the potential to temporarily and permanently impact drain vegetation. Drain

maintenance results in the temporary disturbance of an estimated 130 acres of vegetation each year, some of which could be used by northern harriers. In total, an estimated 25.1 acres of drain vegetation could be permanently impacted. These temporary and permanent reductions in vegetation in the drains could reduce foraging and nesting opportunities for northern harriers. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this habitat reduction.

Implementation of the Drain Habitat Conservation Strategy is expected to increase the amount and quality of habitat for northern harrier in the HCP area. Under the Drain Habitat Conservation Strategy, IID will create at least 190 acres of managed marsh habitat and up to 652 acres. The managed marsh habitat will be of better quality for northern harrier than the habitat affected in the drains. The high-quality habitat created under the HCP could contribute to increasing the population and distribution of this species.

In addition to creating managed marsh habitat to compensate for potential habitat effects, prior to conducting scheduled construction activities in the drains, IID will survey the construction area. If covered species (including northern harriers) are found to be breeding in the construction area, IID would schedule the construction activity to occur after the breeding season. These measures will avoid and minimize the potential for destruction of nests and disturbance that could interfere with breeding behavior. With implementation of the minimization and avoidance measures, and creation of high quality managed marsh habitat, the Drain Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of northern harriers.

3.5.6.11 Tricolored Blackbird

Tricolored blackbirds are rare in the HCP area. They occur during spring and winter (USFWS 1997b; Garrett and Dunn 1981). They are not known to breed in the HCP area although they could in the future. Tricolored blackbirds are associated with marsh habitat, principally cattail vegetation. One individual was reported during surveys of drains in the Imperial Valley (Hurlbert et al. 1997).

Tricolored blackbirds could be directly or indirectly taken as a result of several covered activities. Drain maintenance activities could flush birds from drain vegetation which could constitute take as harassment or cause death or injury to individuals if as a result of being flushed from the cover of drain vegetation they are subject to predation. In the event that tricolored blackbirds breed in drain vegetation in the HCP area over the 75-year permit term, drain maintenance activities could result in the direct destruction of nests.

On an annual basis, IID conducts drain maintenance activities on about 20 percent of the drainage system, affecting about 130 acres of vegetation. However, only a small amount of this vegetation might be suitable for tricolored blackbird. The IID drainage system is estimated to contain about 63 acres of cattails, preferred nesting habitat for tricolored blackbirds. If 20 percent of the estimated 63 acres of cattails are subject to drain maintenance each year, the blackbirds could be exposed to drain maintenance activities in about 12.6 acres. Because of the rare occurrence of tricolored blackbirds in the HCP area, particularly in the drains, the potential for take by drain maintenance activities and the number of birds potentially affected is low.

Drain maintenance activities and several other covered activities also have the potential to result in take of tricolored blackbirds through temporary or permanent reductions in the amount of habitat. As described in Section 3.5.2.2, various maintenance and water conservation activities have the potential to temporarily and permanently impact drain vegetation. Drain maintenance results in the temporary loss of an estimated 12.6 acres of cattail vegetation, some of which could be used by tricolored blackbirds. In total, an estimated 25.1 acres of drain vegetation, of which only a few acres (estimated 2.5 acres) could be cattails, would be permanently impacted. These temporary and permanent reductions in cattails in the drains could result in a minor reduction in potential habitat for tricolored blackbirds. Over the term of the permit, a few individuals could be adversely affected (e.g., killed, injured, or harmed) as a result of this reduction, but because of the low level of use of the HCP area by tricolored blackbirds, no adverse population-level effects would be expected.

Implementation of the Drain Habitat Conservation Strategy would be expected to increase the amount and quality of habitat for tricolored blackbirds in the HCP area. Under the Drain Habitat Conservation Strategy, IID will create at least 190 acres of managed marsh habitat and up to 652 acres. The managed marsh habitat will be of better quality for tricolored blackbirds than the habitat affected in the drains because it would provide large blocks that could support a nesting colony and would consist of preferred vegetation (i.e., cattails and tules). The high-quality habitat created under the HCP could encourage establishment of a nesting colony of tricolored blackbirds.

In addition to creating managed marsh habitat to compensate for potential habitat effects, prior to conducting scheduled construction activities in the drains, IID will survey the construction area. If covered species (including tricolored birds) are found to be breeding in the construction area, IID would schedule the construction activity to occur after the breeding season. These measures will avoid and minimize the potential for destruction of nests and disturbance that could interfere with breeding behavior. With implementation of the minimization and avoidance measures, and creation of high quality managed marsh habitat, the Drain Habitat Conservation Strategy would minimize and mitigate the impact of any take of this species resulting from the covered activities. Implementation of the HCP would not jeopardize the continued existence of tricolored blackbirds.

3.6 Desert Habitat Conservation Strategy

3.6.1 Amount and Quality of Habitat in the HCP Area

Desert habitat in the HCP area occurs in the rights-of-way of the AAC, East Highline and portions of the Westside Main, Thistle, and Trifolium Extension canals (see Figure 2.3-9). Table 3.6-1 shows the miles of each canal adjacent to desert habitat. IID's right-of-way along the AAC varies from about 750 to 2,000 feet wide. IID's rights-of-way on the East Highline, Westside Main, Thistle, and Trifolium Extension canals are highly variable ranging from about 80 feet to 300 feet. The canal, canal embankments, and maintenance roads take up much of the rights-of-way of these canals, such that the amount of desert habitat actually within IID's rights-of-way is limited.

TABLE 3.6-1
Miles of Canals Adjacent to Desert Habitat

Canal	Miles
All American	60
Westside Main	6
East Highline	40
Thistle	5
Trifolium Extension	10
Total	**121**

The desert habitat consists predominantly of creosote bush scrub; dune habitat occurs along the AAC where it traverses the Algodones Dunes. Some of the covered species (e.g., Algodones Dunes sunflower) could only occur in the HCP area where the AAC passes through the dunes, but most of the covered species are associated with creosote bush habitat. Habitat quality varies along the AAC and the other canals. However, O&M activities have been ongoing within the rights-of-way since the canals were constructed. As a result, much of the area within IID's right-of-way is disturbed. In addition, offroad vehicle use is common in the vicinity of the AAC and has contributed to habitat degradation.

3.6.2 Effects of the Covered Activities

Many of the covered activities have no potential to take or adversely affect covered species associated with desert habitat. These covered activities and an explanation of why species associated with desert habitat would not be impacted are listed in Table 3.6-2. The remaining covered activities have a limited potential to take a covered species as discussed below.

Covered activities with some potential to affect covered species associated with desert habitat are:

- Conveyance system operation
- Inspection activities
- Canal maintenance
- Right-of-way maintenance
- Sediment removal
- Structure maintenance
- Vegetation control
- Hydroelectric power plant maintenance

The potential for these activities to impact covered species associated with desert habitat is low and generally is limited to direct injury or mortality from being struck by motor vehicles and disturbance of covered species inhabiting desert habitat adjacent to the rights-of-way. Potential effects of these activities on covered species associated with desert habitat are described below. Burrowing owls also can inhabit desert areas and be impacted by these activities but they are addressed individually as described in Section 3.7.1.

Return to Contents Continue >>