CHAPTER 3
Habitat Conservation Plan Components and Effects on Covered Species

3.1 Approach to and Framework for the Conservation Strategy

The draft HCP employs both habitat-based and species-specific approaches. The habitat-based component of the conservation strategy of the draft 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 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 individual species (i.e., burrowing owls, desert pupfish, razorback sucker) that are not easily accommodated by habitat approach. Consistent with the guidance provided by the USFWS, all HCP effects are evaluated on a species-by-species basis. In addition to the habitat-based and species-specific strategies, the draft 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 three species-specific strategies are as follows:

- Burrowing owl
- Desert pupfish
- Razorback sucker

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 of a project to restore the Salton Sea 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.
CHAPTER 3: HABITAT CONSERVATION PLAN COMPONENTS AND EFFECTS ON COVERED SPECIES

General – 1. Within 1 year of issuance of the 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 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 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 DHCS)
- Developing specific methodologies for survey programs and studies, and
- 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 non-piscivorous 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, *Tilapia mozambicus*, 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 mi² (square miles) 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).

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.

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

<table>
<thead>
<tr>
<th>Area</th>
<th>Catch Per Unit Effort (kg/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pelagic</td>
<td>0.22</td>
</tr>
<tr>
<td>Nearshore</td>
<td>2.37</td>
</tr>
<tr>
<td>River deltas</td>
<td>3.29</td>
</tr>
<tr>
<td>River channels</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Source: Costa-Pierce and Riedel (2000a)

Tilapia have a high salinity tolerance. 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 level of 120 ppt, 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 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-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 (2001) 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 (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.

![Projected Salinity Levels With and Without Implementation of the Water Conservation and Transfer Programs](image-url)
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 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 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 or 2016, six to seven years earlier than under the baseline condition, depending on where the water is transferred.

The preceding discussion could be interpreted as suggesting that the rate and magnitude 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 Restoration Project; variations in IID diversion levels because of legal or political changes, drought in the upper basins states, or others factors. 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 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 increased incidences 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) June 2001 (Table 3.3-2).

### TABLE 3.3-2
American White Pelicans Reported at the Salton Sea, California.

<table>
<thead>
<tr>
<th>Date</th>
<th>Number Counted</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 1999</td>
<td>5,000</td>
</tr>
<tr>
<td>January 2000</td>
<td>8,875</td>
</tr>
<tr>
<td>February 2000</td>
<td>24,110</td>
</tr>
<tr>
<td>March 2000</td>
<td>15,408</td>
</tr>
<tr>
<td>April 2000</td>
<td>7,255</td>
</tr>
<tr>
<td>May 2000</td>
<td>3,510</td>
</tr>
<tr>
<td>June 2000</td>
<td>3,459</td>
</tr>
<tr>
<td>July 2000</td>
<td>1,147</td>
</tr>
</tbody>
</table>
TABLE 3.3-2
American White Pelicans Reported at the Salton Sea, California.

<table>
<thead>
<tr>
<th>Date</th>
<th>Number Counted</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2000</td>
<td>994</td>
</tr>
<tr>
<td>September 2000</td>
<td>13,997</td>
</tr>
<tr>
<td>October 2000</td>
<td>5,075</td>
</tr>
<tr>
<td>November 2000</td>
<td>3,000</td>
</tr>
<tr>
<td>December 2000</td>
<td>7,380</td>
</tr>
<tr>
<td>January 2001</td>
<td>8,736</td>
</tr>
<tr>
<td>February 2001</td>
<td>18,705</td>
</tr>
<tr>
<td>March 2001</td>
<td>15,036</td>
</tr>
<tr>
<td>April 2001</td>
<td>3,200</td>
</tr>
<tr>
<td>May 2001</td>
<td>1,245</td>
</tr>
<tr>
<td>June 2001</td>
<td>770</td>
</tr>
<tr>
<td>July 2001</td>
<td>1,320</td>
</tr>
<tr>
<td>August 2001</td>
<td>7,430</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>7,412</strong></td>
</tr>
</tbody>
</table>

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 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. As such, the actual level of take resulting from changes in fish abundance 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.). 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 3.3-3).
CHAPTER 3: HABITAT CONSERVATION PLAN COMPONENTS AND EFFECTS ON COVERED SPECIES

TABLE 3.3-3
California Brown Pelicans Reported at the Salton Sea, California.

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

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 U.S. 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.).
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 3.3-4). In addition to the California nesting sites, black skimmers nest at Montague Island in the Gulf of California (Collins and Garrett 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.

TABLE 3.3-4
Number of Pairs or Nest Initiations* by Black Skimmers at Various Locations in California, 1972-1995.

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

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

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 WA and forage at lakes on this unit as well as in agricultural drains, reservoirs, and Fig Lagoon. The New and Alamo River deltas also 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 at a salinity 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. Similarly, the mean salinity would not be expected to exceed 90 ppt in 75 years with use of all fallowing to conserve water. (Table 3.3-5). Thus, under both of these conditions (baseline and conservation of 300 KAF with all fallowing), pupfish would be expected to be able to continue to use the sea to move among drains.

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 3.3-5). 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.

**TABLE 3.3-5**
Mean Year that Salinity of the Salton Sea is Projected to Exceed 90 ppt Under the Baseline Condition and Various Water Conservation and Transfer Scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>&gt;2074*</td>
</tr>
<tr>
<td>300 KAFY to SDCWA by Fallowing</td>
<td>&gt;2074*</td>
</tr>
<tr>
<td>200 KAFY to SDCWA + 100 KAFY to CVWD by Fallowing</td>
<td>&gt;2074*</td>
</tr>
<tr>
<td>130 KAFY to SDCWA</td>
<td>2060</td>
</tr>
<tr>
<td>130 KAFY to SDCWA + 100 KAFY to CVWD</td>
<td>2029</td>
</tr>
<tr>
<td>200 KAFY to SDCWA + 100 KAFY to CVWD</td>
<td>2022</td>
</tr>
<tr>
<td>300 KAFY to SDCWA</td>
<td>2022</td>
</tr>
</tbody>
</table>

*The model projections stopped in 2074.
Source: Reclamation (2001)
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 msl in the years 2070 to 2075 (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/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 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 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 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 agriculture entitlement of 3.85 MAFY. This is included in the baseline and combined with the salt leaching projection results in less diversions 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 which resulted in less flows 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 water surface elevation would stabilize at about –246 ft msl (Figure 3.3-4). With conservation of 300 KAFY through fallowing, the water surface elevation would decline at a slightly faster rate than under the baseline condition (Figure 3.3-4), but would approach the baseline projections after about 35 years when the water surface elevation would stabilize at about –236 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 declines in water surface elevations projected for the baseline and the water conservation scenarios would result in these islands becoming connected to the mainland. Under the baseline condition and with implementation of water conservation through all fallowing, the water surface elevation would decline by about 8 to 9 feet. With conservation of 300 KAFY through on-farm and system-based measures, the water surface elevation is projected to decline about 19 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 3.3-6). 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.

### Table 3.3-6

<table>
<thead>
<tr>
<th>Elevation Decline</th>
<th>2 Feet</th>
<th>3 Feet</th>
<th>4 Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>2006</td>
<td>2010</td>
<td>2015</td>
</tr>
<tr>
<td>300 to SDCWA by Fallowing</td>
<td>2006</td>
<td>2008</td>
<td>2011</td>
</tr>
<tr>
<td>200 to SDCWA + 100 to CVWD by Fallowing</td>
<td>2006</td>
<td>2008</td>
<td>2010</td>
</tr>
<tr>
<td>130 to SDCWA</td>
<td>2005</td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>130 to SDCWA + 100 to CVWD</td>
<td>2005</td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>300 to SDCWA + 100 to CVWD</td>
<td>2005</td>
<td>2007</td>
<td>2008</td>
</tr>
<tr>
<td>300 to SDCWA</td>
<td>2005</td>
<td>2007</td>
<td>2008</td>
</tr>
</tbody>
</table>

**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 3.3-7 summarizes the relationships of other covered activities to covered species associated with the Salton Sea.

**TABLE 3.3.7**
Potential Effects of Covered Activities on Covered Species Associated with the Salton Sea

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Use and Conservation</strong></td>
<td></td>
</tr>
<tr>
<td>Combined effects of on-farm and system-based water conservation</td>
<td>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.</td>
</tr>
<tr>
<td>Installation of on-farm water conservation features</td>
<td>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.</td>
</tr>
<tr>
<td>Installation of system-based water conservation features</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Operation and Maintenance</strong></td>
<td></td>
</tr>
<tr>
<td>Conveyance system operation</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Drainage System Operation</strong></td>
<td></td>
</tr>
<tr>
<td>Rerouting or constructing new drains</td>
<td>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. 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.</td>
</tr>
<tr>
<td>Piping drains</td>
<td>IID does not anticipated piping drains at the Salton Sea.</td>
</tr>
<tr>
<td>Inspection activities</td>
<td>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.</td>
</tr>
<tr>
<td>Canal lining maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Right-of-way maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Embankment maintenance</td>
<td></td>
</tr>
<tr>
<td>Erosion maintenance</td>
<td></td>
</tr>
<tr>
<td>Seepage maintenance</td>
<td>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.</td>
</tr>
</tbody>
</table>
### TABLE 3.3.7
Potential Effects of Covered Activities on Covered Species Associated with the Salton Sea

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Pipeline maintenance</td>
<td>No piped drains occur at the Salton Sea.</td>
</tr>
<tr>
<td>Reservoir maintenance</td>
<td>No reservoirs occur at the Salton Sea.</td>
</tr>
<tr>
<td>Sediment removal</td>
<td>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.</td>
</tr>
<tr>
<td>Vegetation control</td>
<td>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.</td>
</tr>
<tr>
<td>New and Alamo River maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Salton Sea dike maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Gravel and rock quarrying</td>
<td>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.</td>
</tr>
<tr>
<td>Fish hatchery operation and</td>
<td>The fish hatchery is located in the Imperial Valley, removed from the Salton Sea.</td>
</tr>
<tr>
<td>maintenance</td>
<td></td>
</tr>
<tr>
<td>Recreational facilities</td>
<td>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.</td>
</tr>
<tr>
<td>HCP/EIS/EIR mitigation</td>
<td>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).</td>
</tr>
</tbody>
</table>

### 3.3.3 Approaches for Mitigating Impacts of Reduced Fish Abundance

As previously described, with or without implementation of the water conservation and transfer project, the salinity of the Salton Sea is expected to increase to a level that would no longer support fish. The effect of implementation of the water conservation and transfer programs is temporal (up to 11 years earlier), causing a condition (i.e., reduced fish abundance) to occur sooner but one that is expected to occur regardless of implementation.
of the project. Thus, effects on covered piscivorous bird species would occur earlier with implementation of the water conservation and transfer project but also is expected to occur without the project.

In identifying potential mitigation approaches to address the earlier reduction in fish availability at the Salton Sea, the IID recognized and considered the following:

- The salinity of the Salton Sea will continue to increase in the absence of the proposed water conservation and transfer programs and reduce the suitability of the Salton Sea for fish-eating birds
- It is unreasonable and impractical for the water conservation and transfer programs to bear the burden of restoring the Salton Sea and
- The level of mitigation should be scaled to the impact attributable to the water conservation and transfer programs.

In accordance with these considerations, IID and others have developed and are considering various approaches for minimizing and mitigating the impact of the anticipated take of piscivorous birds. These mitigation approaches include creating replacement habitat (ponds), constructing and operating of hatcheries to augment food supplies for piscivorous birds, and allowing conserved water to flow to the Sea.

IID has not identified a preferred approach for addressing piscivorous birds and presents the various approaches under consideration in this draft HCP as means to seek input on which approach or combination of approaches is most appropriate. These approaches are described below.

3.3.3.1. Approach 1: Hatchery and Habitat Replacement

Under this approach proposed by USFWS and CDFG, IID would implement a phased program for maintaining fish to provide foraging opportunities for piscivorous birds at the Salton Sea. In the first phase, IID would construct a hatchery to ensure continued availability of tilapia as forage base for piscivorous birds. It is expected that as salinity in the Salton Sea increases, tilapia reproduction would be affected before adult survival is threatened. IID would stock tilapia in the Salton Sea when the CDFG determines that natural reproduction of tilapia has ceased in the Salton Sea based on annual young-of-year abundance surveys conducted by CDFG. IID would continue stocking tilapia in the Salton Sea for as long as tilapia could continue to survive and grow or until a Salton Sea restoration project were to be funded and its implementation initiated.

The hatchery element would be intended to extend the period of time when fish would be present in the Salton Sea. Juvenile and adult tilapia are capable of withstanding high salinity levels; tilapia have been collected at a salinity as high as 120 ppt. However, the ability of tilapia to reproduce is more sensitive to salinity. At salinity above 60 ppt, tilapia reproduction has been predicted to decline. Fish produced by the hatchery under this approach would be used to replace reproduction of tilapia lost in the Sea because of high salinity. Because juvenile and adult tilapia can tolerate higher salinity levels, the hatchery would extend the time that the Sea supports fish. This extension would have the dual benefit of continuing to support fish as prey for fish-eating birds and providing additional time for implementation of a long-term restoration project.
Hatchery operations likely would be located near the Salton Sea on land not currently under cultivation. The acreage could vary depending on the level of production needed to augment natural reproduction. For the purpose of planning, it is anticipated that up to 50 acres would be needed to accommodate the hatchery operation. The facility would be designed to ensure that any discharged hatchery effluent to the Salton Sea would be adequately treated to avoid adverse water quality impacts. Water requirements would vary depending on the level of production needed.

The second component of the approach would be initiated if a long-term restoration Project were not implemented before the Sea could no longer support fish. Under this component of the approach, IID would create 5,000 acres of ponds at the Salton Sea that would support fish and provide a forage base for piscivorous birds. The purpose of these ponds would be to maintain some foraging opportunities at the Salton Sea for piscivorous birds for the remainder of the permit term. The objective of creating ponds would be to maintain a level of foraging habitat that would help ensure that piscivorous birds would continue to be represented at the Salton Sea. IID would stock the ponds with tilapia (from continued hatchery operations) and manage the ponds to provide foraging opportunities for covered piscivorous bird species for the remainder of the 75-year permit term. If a project to restore the Salton Sea were implemented at any time during the term of the permit, IID would contribute the remaining funding committed to the creation and operation of a hatchery and for creation and management of ponds to the restoration project.

The ponds would be about 5 feet deep and constructed using berms. To obtain the soil characteristics necessary for berm construction, the ponds would be constructed on farmland. The construction cut and fill would be balanced such that transport of soil to or from the construction site would not be required. The ponds likely would be constructed along the southern edge of the Salton Sea in land blocks 160 and 640 acres in size. The water supply for the mitigation ponds would be of the same quality as that delivered to farmers. Based on preliminary calculations performed by CDFG, close to 30 KAFY would be required to maintain the ponds. The water associated with the 5,000 acres of farmland removed from production to construct the ponds would be sufficient to support the ET losses in the ponds if the historic water use on those acres was equivalent to about 6 AFY. If historic water use were less, additional conservation could be required to generate water necessary to maintain the ponds. In addition to the water necessary to support the ponds, additional water could be necessary to provide adequate water circulation in the ponds. The requirements for water circulation would not be defined until the specific pond locations were identified and the characteristics of the pond system design developed. Any impacts associated with obtaining water to maintain circulation in the ponds would be addressed in subsequent environmental documentation.

3.3.3.2. Approach 2: Use of Conserved Water as Mitigation

Approach 1 outlines a strategy for mitigating the potential incidental take of piscivorous birds by using hatchery production and creating replacement habitat. In lieu of this approach, IID could reduce or avoid the effects of water conservation on salinity and mitigate impacts on piscivorous birds by conserving additional water and allowing it to flow to the Salton Sea. This approach, which could be used in combination with other approaches or used to avoid impacts entirely, would make up for conservation-related reductions in flow to the Sea. Under this approach, water conserved for mitigation purposes
could be generated through system improvements, on-farm conservation, fallowing, or any combination.

To avoid or mitigate the temporal impacts of reducing flows to the Sea, IID could fallow or otherwise conserve an amount of water equivalent to the project-related inflow reduction and allow the conserved water to flow to the Sea. (This amount would be in addition to the amount of water conserved for transfer.) For example, if all water conservation was achieved through fallowing, approximately 50,000 acres of fallowed land would be required to generate the water necessary for transfer and approximately an additional 25,000 acres of fallowing would be required to generate the water necessary to offset changes in inflow to the Sea. An additional 9,800 acres of fallowing would be required to provide water necessary for the IOP. This mitigation would maintain salinity and elevation changes on the baseline trajectory, thereby avoiding salinity increases and elevation decreases related to the water conservation.

3.3.3.3. Other Approaches Considered

In addition to the two approaches outlined above, IID considered several other approaches for mitigating salinity impacts in the Salton Sea. Each of these approaches contributed to mitigating the impacts at the Salton Sea, but was removed from consideration for various reasons. These approaches are briefly described in the following.

**Habitat Replacement Approach**

This approach entailed creation of over 65,000 acres of deepwater ponds to provide foraging opportunities sufficient to support the current level of use of the Salton Sea by piscivorous birds. The ponds would be operated for a period of about 11 years to correspond to the number of years that water conservation would accelerate the point at which salinity in the Sea would be too high to support fish. This approach was removed from consideration because the estimated cost of implementing the mitigation exceeded $8 billion.

**Tri-Delta Wetland Project**

This approach, developed by CVWD, would entail construction of vinyl sheet pile walls in the Salton Sea to capture drain flow from the Whitewater, Alamo, and New rivers. The vinyl sheet pile walls would create low salinity areas in the river deltas to support fish production and to provide a forage base for piscivorous birds. These areas also could increase habitat values for migrating shorebirds and waterfowl. This approach was not considered because of insufficient project detail to determine feasibility and address agency concerns.

**Pacific Institute Approach**

This approach, which is similar to the Tri-Delta Wetland Project, would expand the area of low salinity water by constructing earthen dikes in the Salton Sea to impound flows from the Whitewater, Alamo, and New rivers. This approach also was not considered because of insufficient detail to determine feasibility and address agency concerns.

**Shared Risk Approach**

This approach outlines a process for sharing the mitigation cost and risks associated with the Salton Sea impacts with the state and federal governments. The approach does not identify a specific mitigation program; instead it caps IID’s and the other water agencies’
obligation at $60 million and places the responsibility for any further mitigation on the government. Consideration of this approach as mitigation was discontinued, but consideration as a means to share costs and risks associated with the mitigation will continue.

3.3.4 Other Salton Sea Mitigation Measures

Although no specific approach for mitigating the impacts to covered piscivorous bird species from reduced fish availability is currently proposed, mitigation was developed for other impacts to covered species using the Salton Sea.

3.3.4.1 Increased Salinity

The acceleration in the salinization of the Salton Sea with implementation of the water conservation and transfer programs has the potential to affect desert pupfish as explained above.

Salton Sea – 1. IID will ensure that an appropriate level of connectivity between pupfish populations within individual drains 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 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 maintained for that 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. 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.

Pupfish have a high salinity tolerance, and have been recorded at a salinity of 90 ppt. Model results suggest that under a water conservation project using only on-farm and system improvements as the means for conservation, the 90 ppt level would not be reached for at least 20 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 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.

3.3.4.2 Water Surface Elevation

Future declines in the water surface elevation of the sea are expected to result in nesting and
roosting islands becoming connected to the mainland and could cause a reduction in the
amount of tamarisk scrub habitat in areas immediately adjacent to the sea. As described in
Section 3.3.2.2, nesting and roosting islands used by covered species would become
connected to the mainland with or without implementation of the water conservation and
transfer project. Thus, any impacts to covered species from changes in the suitability of
nesting and roosting islands would not be attributable to the water conservation and
transfer programs. Nevertheless, IID has agreed to implement measures to ensure that
nesting and roosting islands are available. In addition, measures to address the effects of
reductions in water surface elevation on potential changes in the extent of tamarisk scrub in
areas adjacent to the Salton Sea are identified.

These measures are only applicable if IID implements a Salton Sea option under which the
surface water elevation of the Sea would decline to a greater degree than under the baseline
condition.

**Salton Sea – 2.** If the water conservation and transfer program results in the water surface elevation
declining at a faster rate or greater magnitude than would occur under the baseline condition, IID
will construct nesting islands suitable for gull-billed terns and black skimmers. Nesting islands will
be located so they are not connected to the mainland or otherwise accessible to predators and in areas
with minimal levels of human activity. IID will develop the design and configuration of the islands in
coordination with the HCP IT.

The Salton Sea represents one of only two nesting locations for gull-billed terns in the
United States and one of about 6 nesting locations for black skimmers. As the water surface
elevation of the Salton Sea declines, islands at the Salton Sea currently used by these species
would become connected to the mainland such that they would be accessible to terrestrial
predators and could be subject to human disturbance. To offset the potential reduced
suitability of nesting and roosting areas that could occur with a lowered Sea elevation, IID
will create islands and/or berms to provide nesting and roosting opportunities for
gull-billed terns and black skimmers. These features would be located so they are not
connected to the mainland or otherwise accessible to predators and in areas with minimal
levels of human activity. Black skimmers and gull-billed terns currently use berms and
dikes at the Salton Sea (Molina 1996) and are known to use dredge spoils for nesting (Layne
et al. 1996). Thus, it is reasonable to expect that they would exploit additional created
features.

Salton Sea – 3. If the water conservation and transfer program results in the water surface elevation
decreasing at a faster rate or greater magnitude than would occur under the baseline condition, IID
will conduct the following to address potential changes in tamarisk scrub habitat adjacent to the
Salton Sea. Within 3 years of initiating the water conservation and transfer program, IID will
conduct a baseline survey of the areas designated as 1) “shoreline strand” and 2) “adjacent wetland”
with tamarisk as the primary vegetation as shown in the Salton Sea Digital Atlas (University of
Redlands 1999). The general approach to the baseline survey is described in Chapter 4. Following
issuance of the incidental take permit, IID, in consultation with the HCP IT will develop the specific
survey protocol necessary to verify and quantify net changes in the total amount of tamarisk in
shoreline strand and adjacent wetland areas and submit a study plan for approval by the USFWS and
CDFG. IID will repeat the survey at least every five years for 35 years but may choose to conduct the
surveys more frequently.

If the surveys show a net loss in the acreage of tamarisk related to the water conservation and transfer
project, 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 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. 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 retains ownership of the land, 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)

If IID elects to create habitat, IID will 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

If a Salton Sea Restoration Project is implemented that affects the water surface elevation of the sea, 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.

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. 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 will monitor changes in this community and compensate for measured net losses in the amount of tamarisk. Within three years of issuance of the ITP, IID will conduct a field survey of the 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 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 implementation of water conservation and transfer and the resulting projected decline in the water surface elevation of the Salton Sea. Hydrologic modeling of the water conservation and transfer programs indicates that the water surface elevation would decline over about 30 years and then stabilize. As shown in figure 3.3-4, this stabilization at about 30 years is predicted with conservation through on-farm measures, system-based measures, and/or fallowing.

IID will monitor the tamarisk scrub for 35 years to capture the period over which the sea elevation would decline and several years after the sea has stabilized to identify reductions 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 compensate for measured changes in the amount of tamarisk scrub in the delineated shoreline strand and adjacent wetland areas.

IID will continue to survey the adjacent wetland and shoreline strand areas at least every five years after completion of the baseline survey. 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 data show a net loss of tamarisk scrub, IID will create or acquire and preserve native tree habitat to compensate for any take of covered species resulting from net loss of tamarisk scrub.

IID may compensate for a net loss 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.
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 SSCS, IID would implement one of two approaches 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, potential effects to species associated with tamarisk scrub from changes in tamarisk scrub habitat adjacent to the Salton Sea, potential effects to black skimmers and gull-billed terns from changes in the suitability of nesting/roosting islands. The effects of implementing the HCP on listed species (state and/or federal) associated with the Salton Sea and on other species that regularly use for Salton Sea are evaluated for each individual species below. The effects of implementing the HCP on the remaining covered species which are transient at the Salton Sea are summarized in Table 3.3-8.

3.3.5.1 White Pelican

Approach 1

This approach would benefit white pelicans by maintaining foraging opportunities over the entire 75 year permit term. Under Approach 1, IID would construct and operate a hatchery to maintain tilapia in the Salton Sea as long as the salinity was within the tolerance level of juvenile and adult fish. After this point, IID would create and maintain ponds to produce fish through the end of the permit term. Stocking fish produced at the hatchery would extend the period of time that fish are supported at the Salton Sea beyond that which would occur under the baseline condition.

Under the baseline condition, reproduction of tilapia could be substantially reduced in about 2023 when the salinity of the Salton Sea is projected to exceed 60 ppt. Adults can tolerate higher salinities and could survive beyond this year. However, as these older fish died, the abundance of fish would decline. Use of the Salton Sea by white pelicans would be expected to decline as the abundance of fish declined.

With Approach 1, IID would continue to stock fish as long as the salinity was tolerable. Tilapia have been collected at a salinity as high as 120 ppt. This salinity is predicted to occur in 2052 with implementation of the water conservation and transfer programs. Thus, relative to the baseline condition, this measure could extend the period of time that the full population of white pelicans could be supported at the Salton Sea by 30 years. After this period, creation of ponds would continue to provide foraging opportunities that could support a smaller number of white pelicans until the end of the 75 year permit.

projected to exceed 60 ppt. The potential response of white pelicans to reduced fish availability at the Salton Sea after this salinity is exceeded was described in section 3.3.2.1.
### TABLE 3.3-8
Potential Effects of Salton Sea Habitat Conservation Strategy on Transient Species Covered by the HCP Potentially Using the Salton Sea

<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elegant tern</td>
<td>Accidental during spring</td>
<td>Probably concentrates foraging in shallow, shoreline areas of the Salton Sea.</td>
<td><strong>Approach 1.</strong> Construction and operation of a hatchery and creation of ponds would maintain fish at the Salton Sea as prey for elegant terns for a longer period of time than would occur under the baseline condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Approach 2.</strong> Mitigation water would avoid the temporal reduction in prey availability predicted with implementation of the water conservation transfer project.</td>
</tr>
<tr>
<td>Reddish egret</td>
<td>Very rare visitor in summer and fall</td>
<td>Probably concentrates foraging in shallow, shoreline areas and mudflats of the Salton Sea and adjacent marshes</td>
<td><strong>Approach 1.</strong> Construction and operation of a hatchery and creation of ponds would maintain fish at the Salton Sea as prey for reddish egrets for a longer period of time than under baseline conditions.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Approach 2.</strong> Mitigation water would avoid the potential temporal reduction in prey availability predicted with on-farm or system-based conservation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Other Strategies.</strong> Managed marsh habitat created under the DHCS could provide additional foraging opportunities.</td>
</tr>
<tr>
<td>Merlin</td>
<td>Rare visitor during fall and winter.</td>
<td>Probably concentrates foraging at Salton Sea where shorebirds are abundant. May also prey on shorebirds and songbirds using managed and unmanaged marshes, tamarisk scrub habitat, and agricultural fields.</td>
<td><strong>Both Approaches.</strong> Shorebirds would continue to occur at Salton Sea as mudflat habitat and insects would persist. Merlins would continue to forage for shorebirds at the Salton Sea and elsewhere in the HCP area.</td>
</tr>
<tr>
<td>Black swift</td>
<td>Accidental during spring.</td>
<td>Could use a wide variety of habitats in the HCP area.</td>
<td><strong>Both Approaches.</strong> Insects would continue to be available at the Salton Sea and in other habitats throughout the HCP area, continuing to provide foraging opportunities for black swifts.</td>
</tr>
</tbody>
</table>
### TABLE 3.3-8
Potential Effects of Salton Sea Habitat Conservation Strategy on Transient Species Covered by the HCP Potentially Using the Salton Sea

<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaux’s swift</td>
<td>Common spring migrant; uncommon fall migrant</td>
<td>Known to congregate at north end of the Salton Sea; could use wide variety of habitats in the HCP area</td>
<td>Both Approaches, Insects would continue to be available at the Salton Sea, and in other habitats throughout the HCP area, continuing to provide foraging opportunities for Vaux’s swift.</td>
</tr>
<tr>
<td>Purple martin</td>
<td>Occasional spring and fall migrant</td>
<td>Could use a wide variety of habitat is the HCP area.</td>
<td>Both Approaches, Insects would continue to be available at the Salton Sea, and in other habitats throughout the HCP area, continuing to provide foraging opportunities for purple martins.</td>
</tr>
</tbody>
</table>
Approach 2

With implementation of Approach 2, IID would avoid changes in inflow to the Salton Sea as a result of the water conservation and transfer programs. This approach would 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 approach, fish would be expected to persist until about 2023 when the salinity of the sea is 3.3.5.2 California Brown Pelican

Approach 1
The effects of implementing Approach 2 on brown pelicans would be similar to those described for white pelicans. By operating a hatchery and creating ponds if necessary, IID would extend the period of time that fish would be available at the Salton Sea. This longer period of fish availability would benefit brown pelicans relative to the baseline condition.

Approach 2
Under Approach 2, IID would maintain the prey resource for brown pelicans until that resource would be lost without implementation of the water conservation and transfer program. By maintaining the same inflow level as would have occurred without implementation of the water conservation and transfer programs, IID would 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

Approach 1
As described for white pelicans, implementation of Approach 1 would benefit fish-eating birds by extending the period of time that fish are available at the Salton Sea. Black skimmers would further benefit if IID implemented Approach 1 because IID would also implement Salton Sea – 2. Under this measure, IID would create nesting islands for black skimmers to replace islands exposed by a reduction in the surface water elevation. These islands would be available for a longer period time than currently used islands would remain under the baseline. The provision of nesting/roosting islands for a longer period than under the baseline condition constitutes a benefit of this approach to black skimmers by potentially supporting nesting at the Salton Sea for a longer period.

Approach 2
With implementation of Approach 2, IID would avoid changes in inflow to the Salton Sea as a result of the water conservation and transfer programs. 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 approach, fish would be expected to persist until about 2023 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 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. As a result of these food habits, the potential reduction in tilapia abundance at the Salton Sea would not be expected to affect gull-billed terns.

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 Creek 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. Gull-billed terns could abandon some or all of their current nesting areas. Under Approach 1, IID would create nesting island which would benefit gull-billed terns by maintaining nesting opportunities for a longer period of time than under the baseline. Under Approach 2, the nesting/roosting islands would become connected to the mainland at the same time as under the baseline condition.

### 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 Wildlife Area where they forage. The Finney-Ramer Unit of 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 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 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 U.S. and Canada, even complete loss of cormorants breeding at the Salton Sea would not jeopardize or substantially reduce the U.S. population 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.

**Approach 1**
Under Approach 1, IID would construct and operate a hatchery to maintain tilapia in the Salton Sea as long as the salinity was within the tolerance level of juvenile and adult fish. After this point, IID would create and maintain ponds to produce fish through the end of the permit term. This approach would be beneficial to cormorants relative to the baseline condition. Stocking fish produced at the hatchery could extend the period of time that fish are supported at the Salton Sea beyond that which would occur under the baseline condition. Under the baseline condition, reproduction of tilapia is expected to decline in about 2023 when the salinity of the Salton Sea is projected to exceed 60 ppt. Adults can tolerate higher salinities and could survive beyond this year. However, as these older fish died, the abundance of fish would decline. Use of the Salton Sea by cormorants would be expected to decline as the abundance of fish declined.

Under Approach 1, IID would also continue to stock fish as long as the salinity was tolerable. Tilapia have been collected at a salinity as high as 120 ppt. This salinity is predicted to occur in 2052 with implementation of the water conservation and transfer programs. Thus, relative to the baseline condition, this measure could extend the period of time that the full population of double-crested cormorants could be supported at the Salton Sea by 30 years. After this period, creation of ponds would continue to provide foraging opportunities that could support a smaller number of cormorants until the end of the 75 year permit.

**Approach 2**
Under Approach 2, IID would avoid impacts to fish-eating birds, including double-crested cormorants by avoiding changes in inflow to the Salton Sea. Under this approach, IID would conserve sufficient water and allow this conserved water to flow to the sea to offset the reduction in inflow attributable to water conservation and transfer. By maintaining the same inflow level as would have occurred without implementation of the water conservation and transfer programs, IID would avoid accelerating salinization of the sea and the earlier occurrence of expected declines in fish abundance. Salinity increases would follow the trajectory predicted for the baseline condition. 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 2023. The potential response of double-crested cormorants to reduced fish availability at the Salton Sea was described in section 3.3.2.1.
3.3.5.6 Western Snowy Plover

Western snowy plovers are year-round breeding residents and summer 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 could also forage in agricultural fields in the valley.

Use of the Salton Sea by western snowy plovers is not expected to change 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. None of the alternative approaches to addressing changes in fish abundance would not affect snowy plovers positively or negatively.

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. Under the SSCS, IID would implement measures to maintain fish at the Salton Sea on which osprey could prey 1) until that resource would be lost without implementation of the water conservation and transfer program (Approach 2) or for the entire 75 year permit term (Approach 1). Regardless of the approach implemented, foraging opportunities would continue to be available at other locations in the HCP area. As only a small number of osprey currently use the HCP area, these other foraging locations would be adequate to support the existing level of use of the HCP area by osprey.

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).

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.

Under the Salton Sea Conservation Strategy (SSCS), IID would implement measures to maintain fish at the Salton Sea 1) until that resource would be lost without implementation of the water conservation and transfer program (Approach 2) or for the entire 75 year permit term (Approach 1). Regardless of the approach implemented, because black terns eat a wide variety of prey, foraging opportunities would continue to be available in agricultural fields and managed marsh on the state and federal refuges. Creation of managed marsh habitat under the Drain Habitat Conservation Strategy (DHCS) would increase foraging opportunities for black terns. Thus, black terns would not be expected to be affected under the various approaches under consideration.

### 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.

Use of the HCP area by laughing gulls would probably not change substantially from the pre-HCP condition. Laughing gulls exploit a variety of food resources (e.g., garbage dumps), although their diet primarily consists of crustaceans, insects and fish. Insects would remain abundant at the Salton Sea and in marsh habitats and agricultural fields near the Sea. Creation of marsh habitat under the DHCS would further increase foraging opportunities. These food resources would remain available to laughing gulls and continue to support use of the area. To the extent that laughing gulls prey on fish, the SSCS would maintain this prey resource for laughing gulls until that resource would be lost without implementation of the water conservation and transfer program (Approach 2) or for the entire 75 year permit term (Approach 1).

### 3.3.5.10 Wood Stork

Wood storks have a limited distribution in the United States, breeding only in Florida. After breeding, wood storks wander within their breeding range but also outside the breeding range to areas in Texas, Louisiana, and the Salton Sea. 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). The decline in the level of use of the Salton Sea by wood storks has coincided with an overall decline in the breeding population in Florida. Loss of habitat in Florida is believed responsible for the declines in this species.

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. 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. Under the SSCS, IID would implement measures to maintain fish at the Salton Sea 1) until that resource would be lost without implementation of the water conservation and transfer program (Approach 2) or for the entire 75 year permit term (Approach 1). Managed marsh created under the DHCS would increase foraging opportunities for wood storks by supporting a variety of vertebrate and invertebrate prey species. As food resources would persist in the HCP area, wood storks would be expected to continue to use the sea as a post-breeding visitor as long as breeding populations were supported in Florida.

3.3.5.11 Long-billed Curlew

The long billed curlew is a common, year round resident at the Salton Sea with large flocks of as many as 1,000 birds observed during the winter. Summer numbers are lower. Recent counts found 2,100 long-billed curlews at the Salton Sea in August, with smaller numbers in the winter (December- 250 birds) and spring (April – 50 birds). The highest count of long-billed curlews in the HCP area was 7,500 birds in August 1995 (Shuford et al. 1999). It is not known to breed in the HCP area (Shuford et al. 1999).

Long-billed curlews primarily 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 also commonly forage in agricultural fields.

The covered activities, including implementation of the water conservation and transfer project are not expected to 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. Agricultural fields that long-billed curlews frequent for foraging also would remain abundant. No change in the level of use of the HCP area by long-billed curlews would be expected because of implementation of the SSCS.

3.3.5.12 California Least Tern

The California least tern occurs at the Salton Sea only accidentally. Less 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. Similarly, implementation of the Salton Sea Habitat Conservation Strategy would not be expected to affect California least tern positively or negatively.

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. Under the SSCS, IID would implement measures to maintain fish at the Salton Sea 1) until that resource would be lost without implementation of the water conservation and transfer program (Approach 2) or for the entire 75 year permit term (Approach 1). With the abundance of alternate prey (i.e.,
waterfowl) and low level of use of the HCP area by bald eagles, changes in fish abundance occurring under the three approaches would have little effect on use of the HCP area by bald eagles.

### 3.3.5.14 Peregrine Falcon

Peregrine falcons are rare visitors to the HCP area. No cliffs or tall buildings that could provide nesting sites for peregrine falcons occur in the project area; thus, use of the project area by peregrine falcons is limited to foraging. They have been observed foraging at managed marsh habitats of the Salton Sea NWR where they prey on wintering and migrating waterfowl. Both the Imperial Valley and Salton Sea are heavily used by wintering and migrating waterfowl. Use of the Salton Sea by waterfowl would continue under the HCP and peregrine falcons would be expected to continue to exploit this resource at the Salton Sea and managed marsh habitat adjacent to the Salton Sea and within the Imperial Valley. While not target species of the HCP, the created marsh habitat would attract migrating and wintering waterfowl and provide additional foraging opportunities for peregrine falcons, thereby benefiting the species.

### 3.3.5.15 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.

### 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, 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>
<thead>
<tr>
<th>Location</th>
<th>Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>New River</td>
<td>2,568</td>
</tr>
<tr>
<td>Alamo River</td>
<td>962</td>
</tr>
<tr>
<td>Shoreline strand</td>
<td>293</td>
</tr>
<tr>
<td>Adjacent to Salton Sea</td>
<td>2,349</td>
</tr>
<tr>
<td>Drains</td>
<td>215</td>
</tr>
<tr>
<td>AAC Seepage area</td>
<td>755</td>
</tr>
<tr>
<td>East Highline Canal seepage areas</td>
<td>412</td>
</tr>
<tr>
<td>Other patches</td>
<td>Unquantified</td>
</tr>
<tr>
<td><strong>Total Quantified</strong></td>
<td><strong>7,554</strong></td>
</tr>
</tbody>
</table>

### 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 are 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 close proximity to tamarisk scrub inhabited by covered species.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Use and Conservation</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated with Tamarisk Scrub Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined effects of on-farm and system-based water conservation</td>
<td>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.</td>
</tr>
<tr>
<td>Installation of on-farm water conservation features</td>
<td>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.</td>
</tr>
<tr>
<td>Installation of System-Based Water Conservation Features</td>
<td></td>
</tr>
<tr>
<td>Canal lining and piping</td>
<td>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.</td>
</tr>
<tr>
<td>Construction of new canals</td>
<td>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 effects to tamarisk scrub habitat would only occur if the new canal crossed a drain in an area supporting tamarisk.</td>
</tr>
<tr>
<td>Lateral interceptors</td>
<td>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.</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>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.</td>
</tr>
<tr>
<td>Seepage Recovery Systems</td>
<td>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 DHCS.</td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>Conveyance system operation is limited to moving water through the canals to meet customer needs and to address maintenance.</td>
</tr>
</tbody>
</table>
### TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated with Tamarisk Scrub Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drainage System Operation</strong></td>
<td><strong>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.</strong></td>
</tr>
<tr>
<td>Rerouting or constructing new drains</td>
<td>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.</td>
</tr>
<tr>
<td>Piping drains</td>
<td>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.</td>
</tr>
<tr>
<td>Inspection activities</td>
<td>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.</td>
</tr>
<tr>
<td>Canal lining maintenance</td>
<td>Canal lining maintenance consists of repairing the concrete lining of canals only. Activities required for canal lining maintenance are limited to 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.</td>
</tr>
<tr>
<td>Right-of-way maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Embankment maintenance</td>
<td>Along canals, these activities consist of grading and grooming canal embankments and maintaining the right-of-way free of vegetation. Vegetation typically consists of <em>Atriplex</em> 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.</td>
</tr>
<tr>
<td>Erosion maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Seepage maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Structure maintenance</td>
<td>IID estimates that about 300 structures will be replaced each year. About 100 of these structures would be drainage structures with the remaining...</td>
</tr>
</tbody>
</table>
### TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated with Tamarisk Scrub Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>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 DHCS.</td>
<td></td>
</tr>
<tr>
<td>Installation of new drain crossings could result in the permanent loss of drain vegetation. IID estimates that six 40-feet-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 DHCS.</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
<tr>
<td>Pipeline maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Reservoir maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Sediment removal</td>
<td>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.</td>
</tr>
<tr>
<td>Vegetation control</td>
<td>Vegetation impacts in the drains are addressed and mitigated by the Drain Strategy.</td>
</tr>
<tr>
<td>New and Alamo River maintenance</td>
<td>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.</td>
</tr>
</tbody>
</table>
### TABLE 3.4-2
Potential Effects of Covered Activities on Covered Species Associated with Tamarisk Scrub Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>become established and develop enough to provide habitat for covered species.</td>
<td></td>
</tr>
<tr>
<td>Salton Sea dike maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Gravel and rock quarrying</td>
<td>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.</td>
</tr>
<tr>
<td>Fish hatchery operation and maintenance</td>
<td>The fish hatchery is a developed facility and does not support habitat for covered species associated with tamarisk scrub habitat.</td>
</tr>
<tr>
<td>Recreational facilities</td>
<td>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 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.</td>
</tr>
<tr>
<td>HCP/EIS/EIR mitigation</td>
<td>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.</td>
</tr>
</tbody>
</table>

### 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. 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, structure maintenance and wetland creation projects. 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 miles) 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 DHCS.

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 acres could be tamarisk. This potential loss of vegetation in the drains is addressed through the DHCS.

### 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 DHCS.

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 DHCS.

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 acres of vegetation of which about 0.2 acres could be tamarisk. This potential impact is addressed through the DHCS.

### 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 DHCS. Of the 65.6 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 DHCS. 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).
### TABLE 3.4-3
Potential Impacts to Tamarisk Scrub Habitat in the Imperial Valley

<table>
<thead>
<tr>
<th>Covered Activity</th>
<th>Acreage</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral interceptors</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Subsurface recovery systems</td>
<td>43</td>
<td>Covered by DHCS</td>
</tr>
<tr>
<td>Piping drains</td>
<td>7</td>
<td>Covered by DHCS</td>
</tr>
<tr>
<td>Structure maintenance</td>
<td>0.5</td>
<td>Covered by DHCS</td>
</tr>
<tr>
<td>Total permanent loss</td>
<td>65.5</td>
<td>7.5 acres are covered by the DHCS</td>
</tr>
<tr>
<td>Temporary Loss</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation control/sediment removal</td>
<td>43</td>
<td>Covered by DHCS</td>
</tr>
<tr>
<td>Structure maintenance</td>
<td>0.2</td>
<td>Covered by DHCS</td>
</tr>
<tr>
<td>Total temporary loss</td>
<td>43.2</td>
<td>Covered by DHCS</td>
</tr>
</tbody>
</table>

### 3.4.3 Approach and Biological Goals

The biological goal of the Tamarisk Scrub Habitat Conservation Strategy is to maintain the species composition, relative abundance, and life history functions of covered species using tamarisk scrub habitat within 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 tamarisk scrub habitat, and
- 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 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), 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.
After completion of the construction activities, IID will restore native tree vegetation temporarily impacted by the construction. IID will submit to USFWS and CDFG a vegetation restoration plan for approval. The vegetation restoration plan will describe 1) the amount and species composition of the vegetation that would be impacted, 2) the actions that IID will take to restore the area to pre-disturbance conditions, 3) the criteria for assessing the success of the restoration, 4) monitoring and reporting requirements, and 5) the actions that will be undertaken if the success criteria are not achieved. Restoration is not required for temporarily impacted areas consisting of tamarisk.

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.
- 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 for the term of the permit. 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 retains ownership of the land, 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)
  - 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
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>
<thead>
<tr>
<th>Structure Type</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>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.</td>
</tr>
<tr>
<td>II</td>
<td>Overstory is greater than 15 feet tall and constitutes greater than 50 percent of the trees with little or no intermediate class present.</td>
</tr>
<tr>
<td>III</td>
<td>Largest proportion of trees is between 10 and 20 feet in height with few trees above 20 feet or below 5 feet in height.</td>
</tr>
</tbody>
</table>
| IV             | Few trees above 15 feet present. 50 percent of the vegetation is 5 to 15 feet tall with the
TABLE 3.4-4  
Structural Characteristics of Riparian Vegetation According to Anderson and Ohmart (1984) Classification System

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>other</td>
<td>50 percent between 1 to 2 feet in height.</td>
</tr>
<tr>
<td>V</td>
<td>60 to 70 percent of the vegetation present is between 0 to 2 feet tall, with the remainder in the 5- to 15-foot class.</td>
</tr>
<tr>
<td>VI</td>
<td>75 to 100 percent of the vegetation from 0 to 2 feet in height.</td>
</tr>
</tbody>
</table>

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 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.

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

<table>
<thead>
<tr>
<th>Community/Structure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottonwood/Willow</td>
<td></td>
</tr>
<tr>
<td>Type I</td>
<td>17</td>
</tr>
<tr>
<td>Type II</td>
<td>23</td>
</tr>
<tr>
<td>Type III</td>
<td>26</td>
</tr>
<tr>
<td>Type IV</td>
<td>19</td>
</tr>
<tr>
<td>Type V</td>
<td>5</td>
</tr>
<tr>
<td>Type VI</td>
<td>6</td>
</tr>
<tr>
<td>Honey Mesquite</td>
<td></td>
</tr>
<tr>
<td>Type III</td>
<td>20</td>
</tr>
<tr>
<td>Type IV</td>
<td>21</td>
</tr>
<tr>
<td>Type V</td>
<td>10</td>
</tr>
<tr>
<td>Type VI</td>
<td>9</td>
</tr>
</tbody>
</table>
### TABLE 3.4-5
Wildlife Habitat Value Rating for Tamarisk and Cottonwood/Willow Habitats

<table>
<thead>
<tr>
<th>Community/Structure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tamarisk</strong></td>
<td></td>
</tr>
<tr>
<td>Type I</td>
<td>4</td>
</tr>
<tr>
<td>Type II</td>
<td>8</td>
</tr>
<tr>
<td>Type III</td>
<td>5</td>
</tr>
<tr>
<td>Type IV</td>
<td>3</td>
</tr>
<tr>
<td>Type V</td>
<td>5</td>
</tr>
<tr>
<td>Type VI</td>
<td>7</td>
</tr>
<tr>
<td><strong>Mixed Communities</strong></td>
<td></td>
</tr>
<tr>
<td>Saltcedar/palms V</td>
<td>10</td>
</tr>
<tr>
<td>Saltcedar/honey mesquite IV</td>
<td>8</td>
</tr>
<tr>
<td>Saltcedar/honey mesquite V</td>
<td>7.5</td>
</tr>
<tr>
<td>Saltcedar/honey mesquite/palms V</td>
<td>12.5</td>
</tr>
<tr>
<td>Screwbean mesquite/palms IV</td>
<td>14</td>
</tr>
<tr>
<td>Screwbean mesquite/palms V</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: Anderson and Ohmart (1984, presented in Reclamation and IID 1994) unless noted

aUSFWS (1993)

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 and creating native tree habitat at a 0.25:1 ratio prior to removal of tamarisk would ensure that there would be no 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 for the term of the permit. 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 retains ownership of the land, 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)
- If IID elects to create habitat, IID will 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 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, non-native 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 non-native 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 ratio (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 non-native 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. Thirty-two riparian-dependent bird species have been identified in the Southwestern U.S. (Anderson and Ohmart 1984, Kelly and Finch 1999). Twenty-six of these species require 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 listed species (state and/or federal) are evaluated for each individual species below. In addition, the effects on
unlisted species that regularly occur in the HCP area are individually evaluated. The effects of implementing the HCP on the covered species potentially using tamarisk that are transient in the HCP area are summarized in Table 3.4-6.

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. Because they only occur in the HCP area during migration, the potential for take of willow flycatchers as a result of covered activities such as drain maintenance is low.

The minor reduction in the amount of tamarisk scrub habitat in the HCP area as a result of the covered activities in the Imperial Valley probably would have negligible effects on willow flycatchers. Tamarisk is generally considered poor quality habitat, even though willow flycatchers are known to use tamarisk for nesting in other portions of its range. Further, tamarisk is abundant in the HCP area as well as regionally. As such, it is unlikely that a reduction in the amount of tamarisk scrub would substantially affect or result in take of willow flycatchers.

Implementation of the Tamarisk Scrub Habitat Conservation Strategy would be expected to maintain or improve habitat conditions for willow flycatchers. 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. As part of the Salton Sea Habitat Conservation Strategy, native tree habitat also could be created or acquired, and preserved if a net loss of tamarisk scrub habitat occurs within the shoreline strand or adjacent wetlands as a result of the water conservation and transfer programs. Consisting of native plant species, the created or acquired habitat would be expected to provide better habitat for willow flycatchers than tamarisk.
### TABLE 3.4-6
Potential Effects of Tamarisk Scrub Habitat Conservation Strategy on Covered Species Associated with Tamarisk Scrub Habitat

<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large-billed savannah sparrow</td>
<td>Rare to uncommon post breeding and winter visitor.</td>
<td>Known to use tamarisk scrub habitat on river deltas. Could use tamarisk scrub habitat throughout the HCP area.</td>
<td>The HCP not expected to affect this species positively or negatively because of abundance of tamarisk scrub habitat in the HCP area.</td>
</tr>
<tr>
<td>Sharp-shinned hawk</td>
<td>Regular migrant and winter visitor.</td>
<td>Known to use drain habitat; potentially visits tamarisk scrub throughout the HCP area.</td>
<td>To the extent that sharp-shinned hawks use tamarisk scrub, created or acquired native tree habitat would at least offset any loss of habitat value resulting from removal of tamarisk. Native tree habitat could provide higher quality foraging habitat than tamarisk by attracting songbirds.</td>
</tr>
<tr>
<td>Merlin</td>
<td>Rare visitor during fall and winter.</td>
<td>Probably concentrates foraging at Salton Sea where shorebirds are abundant. Could also prey on shorebirds and songbirds using managed and unmanaged marshes, tamarisk scrub habitat, and agricultural fields.</td>
<td>To the extent that merlin use tamarisk scrub, created or acquired native tree habitat would at least offset any loss of habitat value resulting from removal of tamarisk. Native tree habitat could provide higher quality foraging habitat than tamarisk by attracting songbirds.</td>
</tr>
<tr>
<td>Black swift</td>
<td>Accidental during spring.</td>
<td>Could use a wide variety of habitats in the HCP area.</td>
<td>To the extent that black swifts use tamarisk scrub, created or acquired native tree habitat would at least offset any loss of habitat value resulting from removal of tamarisk. Native tree habitat could provide higher quality foraging habitat by supporting a more diverse and abundant insect community.</td>
</tr>
<tr>
<td>Vaux’s swift</td>
<td>Common spring migrant; uncommon fall migrant.</td>
<td>Known to congregate at north end of the Salton Sea during migration; could use wide variety of habitats in the HCP area.</td>
<td>To the extent that Vaux’s swift use tamarisk scrub, created or acquired native tree habitat would at least offset any loss of habitat value resulting from removal of tamarisk. Native tree habitat could increase the availability and quality of foraging habitat and potentially enhance survival of migrating birds by supporting a more diverse and abundance insect community.</td>
</tr>
<tr>
<td>Cooper’s hawk</td>
<td>Regular migrant and winter visitor.</td>
<td>Known to use drain habitat; potentially uses tamarisk scrub throughout the HCP area.</td>
<td>To the extent that Cooper’s hawks use tamarisk scrub, created or acquired native tree habitat would at least offset any loss of habitat value resulting from removal of tamarisk. Native tree habitat could provide higher quality foraging habitat than tamarisk by attracting songbirds and providing perch sites for roosting and foraging.</td>
</tr>
</tbody>
</table>
### TABLE 3.4-6
Potential Effects of Tamarisk Scrub Habitat Conservation Strategy on Covered Species Associated with Tamarisk Scrub Habitat

<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-eared owl</td>
<td>Occasional winter visitor.</td>
<td>Could use tamarisk scrub habitat throughout the HCP area</td>
<td>To the extent that long-eared owls use tamarisk scrub, created or acquired native tree habitat would at least offset any loss of habitat value resulting from removal of tamarisk.</td>
</tr>
<tr>
<td>Purple martin</td>
<td>Occasional spring and fall migrant.</td>
<td>Could use a wide variety of habitat is the HCP area.</td>
<td>To the extent that purple martin use tamarisk scrub, created or acquired native tree habitat would offset any loss of habitat value resulting from removal of tamarisk. Native tree habitat could increase the availability and quality of foraging habitat and potentially enhance survival of migrating birds by supporting a more diverse and abundant insect community</td>
</tr>
</tbody>
</table>
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. The minor potential changes in the amount of tamarisk as a result the covered activities would not be expected to influence future use of the HCP area or reduce survival of vireos migrating through the HCP area. Implementation of the HCP would not have any adverse effects on least Bell’s vireo and could have a minor beneficial effect through the creation or acquisition of higher quality native tree habitat for migratory stopovers.

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. Given the low level of use of the HCP area, it is unlikely that the covered activities would result in take of any Arizona Bell’s vireo. Similarly, implementation of the Tamarisk Scrub Habitat Conservation Strategy would not be expected to affect Arizona Bell’s vireo positively or negatively in the short term. Over the term of the permit, the vireo’s range could expand to include the Imperial Valley. In this event, the creation or acquisition of native tree habitats could be beneficial in providing habitat for this species.

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 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 minor reduction in tamarisk.

Under the Tamarisk Scrub Habitat Conservation Strategy, native tree habitat would be created or 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.

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 are also 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). Based on this 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 Imperial Valley, Gila woodpeckers only are known to occur in association with trees in urban areas or agricultural operations (e.g., ranch yards). They are not known to use tamarisk. Therefore, Gila woodpeckers are unlikely to be affected by the minor reduction in tamarisk expected in the Imperial Valley.

The potential for Gila woodpeckers to be disturbed or injured as a result of the covered activities is also 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. The Tamarisk Scrub Habitat Conservation Strategy includes measures to minimize injury or disturbance to Gila woodpeckers if construction activities would affect trees. 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 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. 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 or long-term preservation of native tree habitat would contribute to maintaining or increasing the availability of suitable nest trees 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 rapidly 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.

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.

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.

The Tamarisk Scrub Habitat Conservation Strategy would mitigate impacts to gilded flickers in
the event that they occur in the HCP area. 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. These measures will minimize and mitigate any take of gilded flickers as a
result of construction activities. The creation or long-term preservation of native tree habitat
also 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. However, overall, gilded flickers are unlikely to be positively or
negatively affected by implementation of the HCP because of their low level of use of the HCP
area.

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. Riparian areas have
been invaded by tamarisk, which yellow-billed cuckoos are not known to use in the western
portion of their distribution. Because of the low level of use of the HCP area by yellow-billed
cuckoos, the potential for take is very low.

Because the level of use of the HCP area by cuckoos is very low, implementation of the
Tamarisk Scrub Habitat Conservation Strategy would probably have little effect on
yellow-billed cuckoos at least in the short term. The creation or long-term protection of higher
quality native tree habitat could enhance survival of cuckoos that accidentally stray into the
HCP area. Implementation of the HCP would not have any adverse effects on yellow-billed
cuckoos and could have minor beneficial effects.

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. As such, the minor potential reduction in the amount of tamarisk scrub in the Imperial
Valley, would not be expected to adversely affect white-tailed kites. However, 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. 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.

In addition, the Tamarisk Scrub Habitat Conservation Strategy includes measures to minimize injury or disturbance to white-tailed kites if construction activities would affect trees that kites could 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 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. These measures will minimize and mitigate any take of white-tailed kites as a result of construction activities.

### 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.

Tamarisk is considered poor quality habitat for summer tanagers, even though they have been reported to use it in some areas. Tamarisk is abundant in the HCP area as well as regionally. Because of the poor quality of tamarisk as habitat for summer tanagers, the abundance of tamarisk, and the apparent low level of use of the HCP area by summer tanagers, it is unlikely that the minor reduction in the amount of tamarisk scrub expected in the Imperial Valley would substantially affect or result in take of summer tanagers.

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. 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. The current level of use of the HCP area by summer tanagers would be expected to continue and potentially increase, particularly if breeding pairs were attracted to native tree habitat created or acquired and preserved under the Tamarisk Scrub Habitat Conservation Strategy.

In addition, the Tamarisk Scrub Habitat Conservation Strategy 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. These measures will minimize and mitigate any take of summer tanagers as a result of construction activities.

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 are currently known. Historically, vermilion flycatchers were associated with native riparian plant communities. However, unlike some other riparian habitat associates, vermilion flycatchers have come to exploit non-native habitats such as common reed and tamarisk supported in agricultural drains. Thus, they could be disturbed by drain O&M activities. The minor potential loss of tamarisk scrub habitat in the Imperial Valley is unlikely to adversely affect vermilion flycatcher because of its low quality and abundance in the HCP area.

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. Although 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 drain. Thus, the drains would continue to support habitat for vermilion flycatchers at a level similar to existing conditions.

The Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy include creation or acquisition of native tree habitat. This created habitat would have a similar species composition and structure as the native riparian habitat historically used by vermilion flycatchers. The created native tree habitat would provide higher quality habitat that could be used instead of or in addition to the vegetation supported by the drains.

Under the Tamarisk Scrub Habitat Conservation Strategy, construction in potential breeding areas would be avoided during the breeding season and any loss of breeding habitat caused by construction activities would be mitigated through creation of native tree habitat. This component of the Tamarisk Scrub Habitat Conservation Strategy would minimize the potential for take of vermilion flycatchers. Overall, implementation of the HCP would not have adverse effects on vermilion flycatchers and could have beneficial effects.

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 (Olneya tesota); 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.

Harris’ hawks are not known to use tamarisk, thus they would not be affected by changes in the amount of tamarisk scrub potentially resulting from the covered activities. They could,
however, benefit from the Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy under which native tree habitat would be created or acquired, and preserved. The native habitat would include native tree species such as cottonwoods and mesquite, that Harris’ hawks are known to use for nesting. Harris hawks could use these trees for nesting in the future.

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, construction in habitat potentially used by Harris’ hawks for breeding would be avoided during the breeding season and any loss of breeding habitat caused by construction activities would be mitigated through creation of native tree habitat. This component of the Tamarisk Scrub Habitat Conservation Strategy would minimize the potential for take 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.

Changes in the amount of tamarisk are not likely to adversely affect crissal thrasher because of the abundance of this vegetation locally and regionally as well as its relatively poor quality as habitat. IID has and will continue to conduct O&M activities of the drains. Tamarisk is currently supported in the drains despite maintenance activities and a similar amount of tamarisk would be expected to persist in drains under the HCP. Thus, the drains would continue to support habitat for crissal thrashers at a level similar to existing conditions. In addition to the persistence of tamarisk expected in the drains, IID would create or acquire, and preserve native tree habitat under the Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy to offset lost habitat value resulting from construction activities. Created habitat would increase the amount of habitat for crissal thrashers while habitat acquisition would provide greater certainty that the habitat would be available over the term of the permit.

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.
Crissal thrasher also could occur in seepage communities adjacent to the East Highline Canal. O&M activities would have little affect on the availability of tamarisk in seepage areas, but construction activities could impact tamarisk in these areas and affect crissal thrashers. The Tamarisk Scrub Habitat Conservation Strategy requires surveys and avoidance of occupied habitat during the breeding season and also compensation for any affected habitat. With this measure, the potential for take of individuals would be minimized and any effects related to a reduction in habitat would be offset.

3.4.6.13 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.

The seepage community along the AAC between Drops 3 and 4 is the most likely place where elf owls would occur in the HCP area given its 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.

Under the Tamarisk Scrub Habitat Conservation Strategy, any habitat affected by construction would be replaced by creation of additional native tree habitat. Construction during the breeding season also would be avoided thereby minimizing the potential for take of elf owls. Overall, implementation of the HCP is not likely to affect elf owls.

3.4.6.14 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.

Brown-crested flycatchers do not breed in tamarisk; thus their potential to be adversely affected by drain O&M activities is relatively low. In addition, because of the abundance of tamarisk, potential reductions in the amount of tamarisk in the HCP area as a result of the project is not likely to adversely affect brown-crested flycatchers. Rather, the occurrence of this flycatcher in the HCP area is probably limited by the number of trees suitable for woodpeckers.

Under the Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy, native tree habitat will be created or acquired, and preserved. This native habitat would include native trees such as cottonwoods or mesquite that woodpeckers can use for nesting. This habitat could contribute to maintaining or potentially increase the abundance and distribution of this species. In addition, before construction activities, IID will
survey to determine if breeding habitat for brown-crested flycatchers would be affected by construction activities. Construction would be avoided during the breeding season if flycatchers are found to be breeding in the affected habitat. This component of the Tamarisk Scrub Habitat Conservation Strategy constitutes a minimization aspect of the strategy.

### 3.4.6.15 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. Because they will use tamarisk scrub, they are vulnerable to drain O&M activities, but a potential reduction in the amount of tamarisk scrub habitat is not likely to adversely affect this species, because it is poor quality habitat and is abundant in the HCP area.

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.

Under the Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy, native tree habitat would be created or acquired, and preserved. Consisting of cottonwoods, willows, mesquite, and other native riparian plant species, this habitat would provide greater habitat quality than tamarisk for yellow-breasted chats. Use of the HCP area by yellow-breasted chats is expected to remain at existing levels or increase with implementation of the HCP. In addition, before construction activities, IID will survey to determine if breeding habitat for yellow-breasted chats would be affected by construction activities. Construction would be avoided during the breeding season if chats are found to be breeding in the affected habitat. This component of the Tamarisk Scrub Habitat Conservation Strategy constitutes a minimization aspect of the strategy.

### 3.4.6.16 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 is not known to breed in the HCP area. 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. Thus, they are vulnerable to drain O&M activities.

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.

Under the Tamarisk Scrub Habitat Conservation Strategy and potentially the Salton Sea Habitat Conservation Strategy, native tree habitat would be created or acquired, and preserved. This habitat would have a similar species composition and structure as the native riparian habitat typically used by yellow warblers. The created native tree habitat would provide higher quality habitat that could be used instead of or in addition to the vegetation supported by the drains. Habitat also would persist in the drains and yellow warblers would be expected to continue to use this habitat. Use of the HCP area by yellow warblers is expected to remain at existing levels or increase with implementation of the HCP.

3.5 DHCS

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, non-native 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. 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>
<thead>
<tr>
<th>Location</th>
<th>Acreage</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drains</td>
<td>652</td>
<td>63 acres of cattail vegetation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>589 acres of tamarisk, common reed and other plant species</td>
</tr>
<tr>
<td>AAC Seepage Areas</td>
<td>111</td>
<td>Primarily cattails</td>
</tr>
</tbody>
</table>

### 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 (ppb) in drain water at specific locations (nodes)\(^1\) in the drainage system over a 12-year time 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)

---

\(^1\) 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.
- Conservation of 300 KAFY consisting of 230 KAFY from on-farm measures and 70 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/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 (130KAFY 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:

<table>
<thead>
<tr>
<th>Concentration Range</th>
<th>Miles of Drain</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 ppb</td>
<td>5-6 ppb</td>
</tr>
<tr>
<td>6-7 ppb</td>
<td>7-8 ppb</td>
</tr>
<tr>
<td>8-9 ppb</td>
<td>9-10 ppb</td>
</tr>
<tr>
<td>10-11 ppb</td>
<td>11-12 ppb</td>
</tr>
<tr>
<td>12-13 ppb</td>
<td>&gt;13 ppb</td>
</tr>
</tbody>
</table>

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.

\[
\text{#acres} = \frac{(#\text{miles} \times 5,280 \times 14)}{43,560}
\]

**Conversion of Waterborne Selenium to Egg Selenium Concentration**

Based on samples of eggs from 18 different pond systems and 3 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):

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

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).
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>
<thead>
<tr>
<th>Maximum Water Se conc. (µg/g)</th>
<th>Egg Se conc. (µg/g)</th>
<th>Probability of &gt;1 inviable eggs in clutch</th>
<th>Acres of Additional Drain Habitat Needed to Offset Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>130 KAFY on-farm</td>
</tr>
</tbody>
</table>

P(>1 inviable egg) = \( \text{EXP}(-2.327 + 0.0503[\text{selenium conc.}]) / \{1 + \text{EXP}(-2.327 + 0.0503[\text{selenium conc.}])\} \)
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>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Use and Conservation</td>
<td></td>
</tr>
</tbody>
</table>
### TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated with Drain Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined effects of on-farm and system-based water conservation</td>
<td>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.</td>
</tr>
<tr>
<td>Installation of on-farm water conservation features</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Installation of System-Based Water Conservation Features</strong></td>
<td></td>
</tr>
<tr>
<td>Canal lining and piping</td>
<td>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.</td>
</tr>
<tr>
<td>Construction of new canals</td>
<td>New canals would be constructed through agricultural fields and would lie 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.</td>
</tr>
<tr>
<td>Lateral interceptors</td>
<td>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.</td>
</tr>
<tr>
<td>Reservoirs</td>
<td>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.</td>
</tr>
<tr>
<td>Seepage Recovery Systems</td>
<td>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.</td>
</tr>
<tr>
<td><strong>Operation and Maintenance</strong></td>
<td></td>
</tr>
<tr>
<td>Conveyance system operation</td>
<td>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.</td>
</tr>
</tbody>
</table>
### TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated with Drain Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drainage System Operation</strong></td>
<td></td>
</tr>
<tr>
<td>Rerouting or constructing new drains</td>
<td>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 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.</td>
</tr>
<tr>
<td>Piping drains</td>
<td>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 piping. About 22 acres of drain vegetation could be lost over the term of the permit from piping drains.</td>
</tr>
<tr>
<td>Inspection activities</td>
<td>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.</td>
</tr>
<tr>
<td>Canal lining maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Right-of-way maintenance</td>
<td></td>
</tr>
<tr>
<td>Embankment maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Erosion maintenance</td>
<td></td>
</tr>
<tr>
<td>Seepage maintenance</td>
<td>Seepage maintenance is conducted only along the canal system. Therefore, seepage maintenance would not likely affect drain habitat or covered species using drain habitat.</td>
</tr>
<tr>
<td><strong>Structure maintenance</strong></td>
<td></td>
</tr>
<tr>
<td>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)</td>
<td></td>
</tr>
<tr>
<td>Installation of new drain crossings could result in the permanent loss of drain vegetation. IID estimates that six 40-feet-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)</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 3.5-3  
Potential Effects of Covered Activities on Covered Species Associated with Drain Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipeline maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Reservoir maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Sediment removal</td>
<td>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.</td>
</tr>
<tr>
<td>Vegetation control</td>
<td>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.</td>
</tr>
<tr>
<td>New and Alamo River Maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Salton Sea dike maintenance</td>
<td>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.</td>
</tr>
<tr>
<td>Gravel and Rock Quarrying</td>
<td>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.</td>
</tr>
<tr>
<td>Fish Hatchery Operation and</td>
<td>The fish hatchery is a developed facility and does not support habitat for covered species associated with drain habitat.</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
</tr>
<tr>
<td>Recreational facilities</td>
<td>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</td>
</tr>
</tbody>
</table>
TABLE 3.5-3
Potential Effects of Covered Activities on Covered Species Associated with Drain Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCP does not cover take of covered species by recreationists.</td>
<td></td>
</tr>
</tbody>
</table>

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 miles) 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 acres 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 DHCS is to maintain the species composition, relative abundance, and life history functions of covered species using drain habitat within the HCP area. This goal is to be achieved through focusing on the Yuma clapper rail as a “flagship” species for Drain Habitat. Thus, the specific objective of the strategy is to create managed marsh habitat with characteristics (e.g., plant species composition, plant density, water depth) that support Yuma clapper rails.

The DHCS 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)
• 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 DHCS. 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 DHCS 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. IID will manage the created marsh habitat in the same manner as the USFWS manages emergent freshwater marsh units of the Sonny Bono Salton Sea NWR. IID will coordinate with refuge staff to ensure that the managed marsh habitat is managed similarly to refuge.

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. The managed marsh habitat will be created and managed in the same manner as the USFWS manages emergent freshwater marsh units on the Sonny Bono Salton Sea NWR. Based on the USFWS 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, and
• 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.

| 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 deltas of the New and Alamo rivers every year 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.

### 3.5.5 Effects on Habitat

The approach to the DHCS is to create managed marsh habitat of greater value than habitats actually affected by the covered activities. Under the DHCS, 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 DHCS would more than double the acreage of habitat for drain-associated species. Comprised 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 as 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 DHCS 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 DHCS will approximately double the amount of habitat.

The effects of the DHCS on listed species (state and/or federal) are evaluated for each individual species below. In addition, the effects on species that breed in the HCP area are individually evaluated. The effects of implementing the HCP on the remaining species are summarized in Table 3.5-4. These species are transients or occur in the HCP area for short periods of time (e.g., overwintering) but do not breed in the HCP area.

#### 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 two drains (Holtville Main and Trifolium No. 1).
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 combination, these factors suggest limited use of the drains by clapper rails.
### TABLE 3.5-4
Potential Effects of DHCS on Drain–Associated Species Covered by the HCP

<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-eared owl</td>
<td>Rare winter visitors; more common in fall.</td>
<td>Primarily agricultural fields and marshes on state and federal refuges; occasional use of drain habitat. Also observed along Alamo River.</td>
<td>Created marsh habitat would increase suitable habitat availability and potentially benefit the species.</td>
</tr>
<tr>
<td>Northern harrier</td>
<td>Common fall and winter residents. Could breed in area, but breeding has not been confirmed.</td>
<td>Primarily agricultural fields and marshes on state and federal refuges; some use of drain habitat.</td>
<td>Created marsh habitat would increase availability of high-quality habitat and potentially benefit the species.</td>
</tr>
<tr>
<td>Golden eagle</td>
<td>Accidental during spring and winter.</td>
<td>Probably visits agricultural fields and managed marshes on the state and federal refuges to prey on wintering and migrating waterfowl.</td>
<td>Created marsh habitat could increase foraging opportunities by attracting migrating and wintering waterfowl.</td>
</tr>
<tr>
<td>Merlin</td>
<td>Rare visitor during fall and winter.</td>
<td>Probably concentrates foraging at Salton Sea where shorebirds are abundant. May also prey on shorebirds and songbirds using managed and unmanaged wetlands and tamarisk scrub habitat.</td>
<td>Created marsh habitat could increase foraging opportunities by attracting shorebirds and songbirds.</td>
</tr>
<tr>
<td>Black swift</td>
<td>Accidental during spring.</td>
<td>Could use a wide variety of habitats in the HCP area.</td>
<td>Created marsh habitat would increase the availability and quality of foraging habitat.</td>
</tr>
<tr>
<td>Vaux’s swift</td>
<td>Common spring migrant; uncommon fall migrant.</td>
<td>Known to congregate at north end of the Salton Sea; could use wide variety of habitats in the HCP area.</td>
<td>Created marsh habitat would increase the availability and quality of foraging habitat and potentially enhance survival of migrating birds.</td>
</tr>
<tr>
<td>Purple martin</td>
<td>Occasional spring and fall migrant.</td>
<td>Could use a wide variety of habitat in the HCP area.</td>
<td>Created marsh habitat would increase the availability and quality of foraging habitat.</td>
</tr>
<tr>
<td>Tricolored blackbird</td>
<td>Rare in spring and winter. Not known to breed in HCP area.</td>
<td>Drain habitat and marshes on the state and federal refuges provide potential habitat.</td>
<td>Created marsh habitat would increase availability and quality of foraging habitat.</td>
</tr>
</tbody>
</table>
Potential effects of the covered activities on clapper rails consist of disturbance, temporary 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 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. 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.

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 also 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 will be managed in the same manner as clapper rail units are managed on the refuge. The units on the refuges support the majority of the clapper rail population in the Imperial Valley. Thus, the created marsh habitat is expected to support a larger population of Yuma clapper rails than currently is supported in the drains.

Estimates of rail densities vary widely, ranging from 0.06 to 1.26 rails/acre (Table 3.5-5). Based on these estimates, the number of rails supported by 190 acres of created marsh could range from 11 to 239 rails if all of the habitat was designed for Yuma clapper rails. Probably, a smaller number of clapper rails would be supported because a portion of the managed 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.

<table>
<thead>
<tr>
<th>Location</th>
<th>Density Rails/Acre</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCR</td>
<td>0.10</td>
<td>Anderson and Ohmart (1985)</td>
</tr>
<tr>
<td>Cienega de Santa Clara</td>
<td>0.36</td>
<td>Piest and Campoy (1998)</td>
</tr>
<tr>
<td>Cienega de Santa Clara</td>
<td>0.60^b</td>
<td>Piest and Campoy (1998)</td>
</tr>
<tr>
<td>Topock Marsh</td>
<td>0.06</td>
<td>Smith (1975, reported in Piest and Campoy)</td>
</tr>
<tr>
<td>Mittry Lake Wildlife Area</td>
<td>0.39</td>
<td>Todd (1980, reported in Piest and Campoy)</td>
</tr>
<tr>
<td>Hall Island</td>
<td>1.26</td>
<td>Todd (1980, reported in Piest and Campoy)</td>
</tr>
</tbody>
</table>

^a acres of cattail habitat

^b Estimated density taking into account non-responding birds
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 deltas during the breeding season by not dredging the deltas of the New or Alamo rivers after mid-February.

### 3.5.6.2 California Black Rail

California black rails occur in the HCP area in small numbers. In the only systematic survey for the species at the Salton Sea and surrounding areas in 1989, 23 birds were recorded. Thirteen were located 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. Because of the limited occurrence and distribution of black rails in the HCP area, particularly in the drains, the potential for black rails to be adversely affected by the covered activities and the number of rails potentially affected is low.

By creating at least 190 acres of high-quality marsh habitat and up to 652 acres, IID will increase habitat availability for California black rails. This 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.

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 rails/acre. At this density, the 190 acres of marsh habitat created under the HCP could support up to 114 black rails depending on the design and management of the managed marsh. Considering that current estimates of black rails in the HCP area are less than 100, the created habitat could benefit black rails considerably.

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.
3.5.6.3 Greater Sandhill Crane

Small numbers (about 200 to 300) of greater sandhill cranes regularly winter in the Imperial Valley. The origin of these birds has not been determined, but they likely are part of the LCR Valley population, as the Central Valley population of sandhill cranes is reported to overwinter only as far south as Tulare County. The LCR Valley population numbers is about 1,500 birds and is believed to be increasing. The entire population of greater sandhill cranes totals more than 30,000 birds and regional populations are stable or increasing.

Throughout their range, sandhill cranes commonly exploit agricultural fields for foraging, particularly grain fields. To a lesser degree, marshes are used for foraging, but are required for breeding. Wetlands and areas of open shallow water are preferred habitats for night roosts. The primary attraction for wintering sandhill cranes in the Imperial Valley is probably the abundance of agricultural fields, particularly wheat and Sudan grass fields, that provide abundant foraging opportunities. However, the availability of habitat suitable for night roosting is also important for maintaining use of the HCP area by greater sandhill cranes.

Under the DHCS at least 190 acres and up to 652 acres of marsh habitat will be created. Cranes are not known to use the drains, and therefore, are unlikely to be affected by activities occurring in the drains. They would, however, benefit from creation of marsh habitat that would increase roosting opportunities. They currently are known to use shallow ponds on duck clubs in the Imperial Valley as roost sites, and therefore could be expected to use the created managed marsh habitats as well. Cranes also could use the created marsh habitat for foraging, although with the abundance of grain fields in the HCP area and their preference for foraging in this habitat type, their use of the created marsh habitat for foraging would likely be limited.

3.5.6.4 Aleutian Canada Goose

Aleutian Canada geese occur in the HCP area in small numbers as fall migrants and winter residents where they forage in the wetland areas around the Salton Sea and in the agricultural fields throughout the Imperial Valley. Aleutian Canada geese use open habitats such as marshes and agricultural fields and are not known to use vegetation in the confines of a drain. As such, their use of marsh habitats in the HCP area is restricted to the state and federal refuges and private duck clubs. The habitat quality of these areas would not change under the HCP. Because they are not known or expected to use drains, Aleutian Canada Geese are not likely to be adversely affected by the covered activities.

Implementation of the DHCS would benefit Aleutian Canada geese. Under this strategy, at least 190 acres and up to 652 acres of high-quality marsh habitat would be created. This habitat would consist of one or more large blocks of marsh vegetation interspersed with open water areas. Aleutian Canada geese would be expected to exploit this habitat because similar habitats are used on the state and federal refuges. Thus, implementation of the HCP would increase habitat availability for Aleutian Canada geese.

3.5.6.5 Bald Eagle

A few bald eagles (3 or fewer) are regularly observed at the Salton Sea during winter. The principal potential effects of the covered activities on bald eagles are a potential decline in
the availability of fish in the Salton Sea. Thus, potential effects of implementing the HCP on bald eagles are also addressed under the Salton Sea Habitat Conservation Strategy. 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 DHCS. Although fish are the primary prey of bald eagles, they also prey on waterfowl. Under the DHCS, 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.

3.5.6.6 Peregrine Falcon

Peregrine falcons are rare visitors to the HCP area. No cliffs or tall buildings that could provide nesting sites for peregrine falcons occur in the project area, thus use of the project area by peregrine falcons is limited to foraging. They have been observed foraging at managed marsh habitats of the Salton Sea NWR where they prey on wintering and migrating waterfowl. With the abundance of waterfowl at the Salton Sea and adjacent refuges, the drains do not constitute essential foraging habitat for peregrine falcons. Thus, no adverse effects to these falcons would be expected from covered activities operating in the drainage system.

Peregrine falcons could benefit from the DHCS. Under the DHCS, 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 peregrine falcons, thereby benefiting the species.

3.5.6.7 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. Under the DHCS, at least 190 acres and up to 652 acres of marsh habitat would be created. The created marsh habitat could benefit bank swallows by increasing foraging opportunities.

3.5.6.8 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, nor would covered activities occurring in the drains be expected to disturb or injure an ibis. White-faced ibis are known to forage in the drains (Hurlbert et al. 1997) and some could be exposed to increased selenium levels. However, white-faced ibis appear to predominantly forage in agricultural fields. 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. A minimization aspect of the DHCS is that dredging would not occur between February 15 and August 31, except as necessary to prevent flooding during storm events. This restriction will avoid disturbance of white-faced ibis during their breeding season.

Under the HCP, IID would create at least 190 acres and up to 652 acres of marsh habitat. 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.

3.5.6.9 Least Bittern

Least bitterns typically are associated with extensive cattail and bulrush marshes. In the HCP area, least bitterns nest in managed and unmanaged 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 have not been reported in the drains, and the drains probably provide poor habitat for bitterns such that the potential for least bitterns to be adversely affected by covered activities is low.

Under the HCP, IID would create at least 190 acres and up to 652 acres of marsh habitat. The new habitat could be created in large blocks, creating the extensive, undisturbed marsh habitat preferred by least bitterns. Riparian trees and shrubs would 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 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.
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 birds/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. Considering that the potential for the covered activities to adversely affect bitterns is low, this increase in habitat constitutes a substantial benefit.

3.5.6.11 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 U.S., 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 a limited amount of foraging habitat for fulvous whistling-ducks, but are unlikely to be used for nesting because of their small size. The covered activities are not likely to substantially affect fulvous whistling-ducks because the ducks are not expected to use drain habitat for nesting.

IID will also create at least 190 and up to 652 acres of high-quality marsh habitat. Fulvous whistling ducks are not likely to use drain habitat but would benefit from the creation of managed marsh habitat. The managed marsh habitat would increase the availability of suitable habitat for fulvous whistling-ducks and could contribute to increasing the number of breeding pairs in the Imperial Valley/Salton Sea area. Such an increase would benefit the species.

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.

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, off-road vehicle use is common in the vicinity of the AAC and has contributed to habitat degradation.

### TABLE 3.6-1
Miles of Canals Adjacent to Desert Habitat

<table>
<thead>
<tr>
<th>Canal</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>All American</td>
<td>60</td>
</tr>
<tr>
<td>Westside Main</td>
<td>6</td>
</tr>
<tr>
<td>East Highline</td>
<td>40</td>
</tr>
<tr>
<td>Thistle</td>
<td>5</td>
</tr>
<tr>
<td>Trifolium Extension</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>121</strong></td>
</tr>
</tbody>
</table>

#### 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.

### TABLE 3.6-2
Covered activities that Would Not Affect Covered Species Associated with Desert Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Reason for No Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-farm water use and conservation</td>
<td>On-farm water use and conservation activities would be only conducted on lands used for agricultural production. No on-farm conservation measures would be implemented on desert habitat.</td>
</tr>
<tr>
<td>System-based water conservation</td>
<td>System-based water conservation measures include canal lining, installation of lateral interceptors, installation of reservoirs, and seepage recovery systems. No canal lining is proposed as part of the water conservation and transfer programs for the AAC, East Highline, Westside Main, Thistle, or Trifolium extension canals. Canal sections proposed for lining are in agricultural areas of the Imperial Valley removed from desert habitat (Figure 1.7-3). Proposed locations for lateral interceptors are within agricultural areas, removed from areas supporting desert habitat (Figure 1.7-4). Reservoirs would be constructed in agricultural areas, removed from areas supporting desert habitat. Seepage recovery systems are proposed along the East Highline Canal. However, all construction required to install these systems would be conducted on the west side of the canal, and desert habitat is limited to the east side of the canal.</td>
</tr>
</tbody>
</table>
TABLE 3.6-2
Covered activities that Would Not Affect Covered Species Associated with Desert Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Reason for No Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage system operation</td>
<td>Drainage system operation is limited to moving water through the drains. No physical effects are encompassed by drainage system operation.</td>
</tr>
<tr>
<td>Seepage maintenance</td>
<td>Any actions to correct seepage problems that would occur along the AAC, East Highline, Westside Main, Thistle or Trifolium Extension canals would be conducted on the agricultural side of the canal and therefore, would not affect covered species associated with desert habitat.</td>
</tr>
<tr>
<td>Pipeline maintenance</td>
<td>Because no pipelines occur on the desert side of canals, pipeline maintenance would not affect covered species associated with desert habitat.</td>
</tr>
<tr>
<td>Reservoir maintenance</td>
<td>No reservoirs occur along the AAC or adjacent to desert habitat on the other canals. Therefore, reservoir maintenance would not affect covered species associated with desert habitat.</td>
</tr>
<tr>
<td>New and Alamo River maintenance</td>
<td>The AAC, East Highline, Westside Main, Thistle and Trifolium Extension canals and their rights-of-way do not intersect the New or Alamo rivers in areas supporting desert habitat.</td>
</tr>
<tr>
<td>Salton Sea dike maintenance</td>
<td>The AAC, East Highline, Westside Main, Thistle and Trifolium Extension canals and their rights-of-way do not intersect the dikes at the Salton Sea.</td>
</tr>
<tr>
<td>Gravel and Rock Quarrying</td>
<td>No gravel or rock quarries occur in the rights-of-way of the AAC, East Highline, Westside Main, Thistle or Trifolium Extension canals.</td>
</tr>
<tr>
<td>Fish Hatchery Operation and Maintenance</td>
<td>The fish hatchery is not located in the rights-of-way of the AAC, East Highline, Westside Main, Thistle or Trifolium Extension canals.</td>
</tr>
<tr>
<td>Recreational facilities</td>
<td>Although IID permits fishing in the AAC, East Highline and Westside Main canals, IID has not developed nor anticipates developing recreational facilities along any of these facilities. The HCP does not cover take of covered species by recreationists.</td>
</tr>
</tbody>
</table>

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 are 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 each 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.

Conveyance system operation consists of moving water through the canals to meet customer and maintenance needs. These activities consists of filling, draining and moving water through the canals and therefore does not entail activities that could impact desert habitat. Potential effects to covered species from conveyance system operation are limited to the potential for individuals to be struck by vehicles as workers travel along the conveyance system. To ensure proper water deliveries, workers travel portions of the canal system on a daily and repetitive basis. Along all of the canals, vehicular travel is on the established road adjacent to the canal and along the East Highline, Westside Main, Thistle and Trifolium Extension, most travel is on the agricultural side of the canals. As a result, the potential for a covered species to be struck by a vehicle while conducting conveyance system operations is low.

Inspection activities consist of workers visiting structures to ensure they are working properly and make minor repairs or adjustments. Potential effects of this activity on covered species is limited to individuals being struck by a vehicle as the worker travels to structures. Inspections activities are conducted about once a month. As explained for conveyance system operations, vehicle travel occurs on established roads. Further, along the East Highline, Westside Main, Thistle, and Trifolium Extension canals, most travel is on the agricultural side of the canals the delivery and drainage are structures. Thus, the potential for a covered species to be struck by a vehicle while conducting inspection activities is low.

Canal maintenance consists of maintaining the seepage recovery systems adjacent to the AAC, managing the abandoned section of the AAC as an emergency channel, and maintaining the canal lining of the future AAC parallel canal. IID operates three seepage recovery systems along the AAC (one at Drop 3 and two at Drop 4). These systems are open seepage recovery systems. About once every 5 years IID removes vegetation from these systems. Because vegetation consists of plant species typical of drain habitat and not desert plants, desert habitat would not be affected. Potential impacts consist of a minor potential for disturbance if covered species occur in adjacent areas. Because excavators move very slowly when removing vegetation (stop and go cycle), active individuals of the covered species likely would be able to avoid being struck by the excavator. However, some of the covered species (e.g., flat-tailed horned lizards, Colorado Desert fringed toed lizards) could be vulnerable during inactive periods or because they become motionless when threatened (e.g., flat-tailed horned lizards). While tracking to the job site, excavators move at a very low speed (<5 mph).

After completion of the AAC Lining Project, IID anticipates managing abandoned canal section as an emergency channel. Management is expected to consist of mechanical and chemical vegetation control and sediment removal. These actions would be conducted at least annually. Vegetation control of the abandoned section would not result in a loss of habitat because desert habitat does not currently exist as the canal is still in use. Vegetation control and sediment removal would maintain the canal free of vegetation discouraging colonization by covered species. Even if some covered species ventured into the abandoned section, the potential for take of a covered species is minor because sediment removal and vegetation control activities would be conducted infrequently (about once a year) and the equipment used to conduct these activities is very slow moving.
The future parallel canal along the AAC will be a concrete-lined channel whereas the existing canal is earthen. Future canal maintenance activities will include repairing and replacing concrete lining. These activities are conducted in and immediately adjacent to the canal and are entirely within disturbed areas of IID’s right-of-way. No effects to habitat would occur and potential effects to covered species would be limited to a minor potential for disturbance if covered species occurred in areas adjacent to the construction work.

Right-of-way maintenance along canals adjacent to desert habitat is focused on the roads along the canals and the canal embankments. Roadways are regularly graded and watered. One grader and water truck is assigned full time to the AAC. Grading is continual along the portion of the AAC within the Imperial Valley with all of the valley portion of the AAC covered in three months. With the exception of the portion of the AAC that traverses the Algodones Dunes, for the portions of the AAC outside of the Imperial Valley, the roadway is graded about once a year. Occasionally, IID must recreate a portion of the road because of blowing sand. Roadways of the East Highline, Westside Main, Thistle, and Trifolium are graded and watered several times a year.

Along the portion of the AAC that traverses the Algodones Dunes, IID annually knocks down portions of the sand dunes, creating a flatter slope that allows sand to blow across the canal. In conducting this flattening, a dozer drags and I-beam back and forth across the peaks of the dunes to level them. The area where this activity is conducted begins at the Coachella Turnout (Sta. 1907+20) and extends to about Sidewinder Road at Pilot Knob (Sta. 1243+65), a distance of 12.56 miles. The area actually disturbed is about 50 to 75 feet wide yielding a total acreage disturbed of 76 to 114 acres. This operation begins in July every year and lasts about 6 weeks. In conjunction with flattening the dunes, the roadways along the AAC are cleared of accumulated sand. After the roads are opened up, they are immediately treated with herbicides for vegetation control. IID has been conducting these activities since the construction of the AAC in about 1945.

Grading and watering roads does not remove any habitat for covered species such that potential effects to covered species are limited to being struck by moving vehicles. However, because the equipment (graders, water trucks, dozers) used to conduct right-of-way maintenance is slow moving, the potential for a covered species to be struck is low. Along the East Highline, Westside Main, thistle, and Trifolium the likelihood of this impact is less because the roads along these canals are on the agricultural field side. Reconstructing and clearing the road, and flattening the dunes along the Algodones Dunes portion of the AAC could result in the removal of a covered plant species, if any covered plants colonized the area.

Right-of-way maintenance also includes embankment maintenance. At times material from the canal embankment washes down the embankment. A dozer is used to reshape the outside of the canal embankments. The East Highline, Westside Main, Thistle and Trifolium Extension canals do not have embankments such that the activity is limited to the AAC. Along the AAC, the need for embankment maintenance is very spotty and irregular. About once every 10 years, an area requires reshaping.

Structure maintenance on canals consists of servicing, repairing and replacing structures required to deliver water to customers as well as controlling vegetation around the structures to maintain access. Table 3.6-3 summarizes the type and number of structures on
the AAC, East Highline, Westside Main, Thistle, and Trifolium Extensions. Because only a portion of the Westside Main, Thistle, and Trifolium Extension canals are adjacent to desert habitat, only a portion of the structures listed in Table 3.6-3 occur in areas where the canal is adjacent to desert.

**TABLE 3.6-3**
Structures on the AAC, East Highline, Westside Main, Thistle and Trifolium Extension canals.

<table>
<thead>
<tr>
<th>Structure</th>
<th>AAC</th>
<th>EHL</th>
<th>WSM</th>
<th>Thistle</th>
<th>TriExt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges</td>
<td>0</td>
<td>15</td>
<td>12</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Check</td>
<td>7</td>
<td>25</td>
<td>49</td>
<td>60</td>
<td>29</td>
</tr>
<tr>
<td>Control structure</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Crossing (road, rail, drain, delivery)</td>
<td>11</td>
<td>2</td>
<td>49</td>
<td>39</td>
<td>31</td>
</tr>
<tr>
<td>Drop structure</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Flume</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gate</td>
<td>28</td>
<td>68</td>
<td>148</td>
<td>101</td>
<td>57</td>
</tr>
<tr>
<td>Heading</td>
<td>28</td>
<td>76</td>
<td>55</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hydropower facility</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Overpass</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pump</td>
<td>4</td>
<td>14</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Reservoir inlet</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Siphon</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Spill gate</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>93</td>
<td>204</td>
<td>333</td>
<td>207</td>
<td>132</td>
</tr>
</tbody>
</table>

*aAAC = All American Canal; EHL = East Highline Canal; WSM = Westside Main Canal; TriExt = Trifolium Extension*

Routine activities associated with structure maintenance consist of making minor repairs and adjustments and maintaining the area around the structure free of vegetation. Vegetation is tightly controlled around structures such that habitat never develops for covered species. The routine maintenance activities are conducted in close proximity to the structures and within the area maintained clear of vegetation such covered species are very unlikely to occur in the area. Traveling to the structure to conduct maintenance activities has a minor potential to take a covered species as explained for conveyance system operations and inspection activities.

Over the 75-year permit term, IID anticipates replacing all of the structures along the canals at least once. For major structures such as hydropower generation facilities, an area up to 20 acres in size can be disturbed by the construction. However, the area disturbed in replacing a facility would be the same as when the facility was originally installed and all construction would be within IID’s right-of-way. Thus, removal of previously undisturbed desert vegetation is not anticipated. Replacement of large facilities could disturb covered...
species if they inhabit areas adjacent to the construction area or covered species could be injured if they entered the construction area.

Vegetation control along these canals consists of chaining within the prism of the canal. In chaining, a tractor traveling along the road adjacent to the canal drags a chain on the inside of the canal prism. Because the tractor remains on an established road and all work is conducted within the canal prism, there are no effects to desert vegetation. Potential effects to covered species associated with desert habitat are limited to being struck by the vehicle. However, the potential for this effect is low because the tractor moves very slowly such that individuals would be able to avoid the vehicle. The outer embankments of the AAC are maintained free of vegetation through regular grading as described under right-of-way maintenance. No vegetation control is conducted on the desert side of the East Highline, Westside Main, Thistle, or Trifolium Extension canals.

Hydroelectric power plant maintenance consists of controlling vegetation around the hydroelectric facility. Potential effects of this activity are the same as described for structure maintenance.

3.6.3 Approach and Biological Goals

In the HCP area, desert habitat only occurs in the right-of-way of the AAC, adjacent to the East Highline Canal and adjacent to sections of the Westside Main Canal, Thistle and Trifolium Extension. The primary covered activities with the potential to affect species associated with desert habitat are the O&M activities associated with the canals and to a more limited degree the hydroelectric facilities on the AAC. As briefly summarized above, covered activities have the potential to affect covered species by directly killing or injuring an individual (primarily resulting from motor vehicles) or from disturbance. IID also could conduct construction activities to replace or rehabilitate facilities or install new facilities. Construction could kill, injure, or disturb individuals of covered species, or indirectly affect covered species through changes in habitat quality or quantity.

The approach to the Desert Habitat Conservation Strategy is to implement a program to minimize the potential for take of covered species during O&M activities. If construction activities are required within the rights-of-way during the term of the permit, additional measures would be implemented to minimize the potential for take and to compensate for any decrease in habitat quality or availability. The biological goal of the Desert Habitat Conservation Strategy is to maintain viable populations of covered species that occupy desert habitats in the HCP area. This goal will be achieved by avoiding and minimizing the potential for death or physical injury of individuals of the covered species, and improving habitat contiguity and persistence to compensate for changes in habitat quality or quantity caused by construction activities.

3.6.4 Desert 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 Desert Habitat Conservation Strategy. The key elements of the conservation strategy are as follows:

- Implement a worker education program
• Implement interim measures to avoid and minimize the potential for take of covered species during O&M and construction activities
• Refine avoidance and minimization measures based on species surveys and adaptive management program
• Conduct surveys to determine the occurrence of covered species in the right-of-way
• Protect habitat outside of the right-of-way when construction activities reduce the quality or availability of habitat

Desert Habitat - 1. IID will implement a worker education program. Workers conducting O&M activities along the AAC, East Highline, Westside Main, Thistle or Trifolium Extension canals will be required to attend a worker education program to ensure proper implementation of the HCP measures addressing desert habitat. Workers will be instructed on the requirements of the HCP within six months of issuance of the incidental take permit. The worker education program will be conducted at least annually to ensure instruction of new employees and as a refresher. For new workers, IID will ensure that they are informed of and understand the requirements of the HCP prior to conducting O&M activities either individually or through the annual education program.

The worker education program will instruct workers on the identification and habitat association of covered species using desert habitat. Pictures of the different habitat types will be included in the manual with a list of covered species potentially occurring in each habitat type. Activities with the potential to affect covered species inhabiting desert habitat and the practices to follow to minimize potential adverse effects to these species will be explained (see Desert Habitat - 2). Workers will be instructed on procedures approved by the HCP IT for moving covered species in the event that a covered species is found during O&M activities and is in imminent danger from covered activities. Workers will be required to report any observations of dead or injured individuals of the covered species or when they relocate an individual (see Desert Habitat - 2 and 3).

A worker education manual will be prepared by IID with the concurrence of USFWS and CDFG. The manual will be distributed to each person conducting O&M activities along the AAC, East Highline, Westside Main, Thistle and Trifolium canals. The manual will include a photograph/drawing of each covered species associated with desert habitat and brief information on its identification. As information of the occurrence and distribution of covered species along the AAC, East Highline, Westside Main, Thistle and Trifolium Extension canals becomes available through the survey program (see Desert Habitat - 4), it will be added to the manual. The manual will also summarize the HCP’s requirements for O&M activities for easy reference. The HCP IT will review the manual annually and update it as appropriate.

The primary concern for covered species using desert habitat relates to O&M activities. The effectiveness of avoidance and minimization measures (Desert Habitat - 2) will depend on workers being familiar with the covered species and understanding the requirements of the HCP with respect to these species. A worker education program is critical to ensuring that measures are implemented properly.
Desert Habitat - 2. IID will conduct O&M activities in accordance with the following measures.

- Workers will be instructed to be alert to the occurrence of covered species in roadways while driving and to avoid hitting individuals at all times.

- Prior to moving a parked vehicle, workers will check around and underneath the vehicle for covered species. If a covered species is found in harm’s way and is moving, it will be allowed to move away from the vehicle on its own accord before the vehicle is moved. If the individual is not moving, the worker will relocate the individual to a nearby safe location following procedures outlined in the worker education program.

- Workers will be familiarized with covered plants species and instructed to avoid injuring or uprooting plants.

- Workers will properly dispose of garbage in closed containers to minimize raven attraction.

- Workers will not be permitted to bring pets to the work site.

- IID will restrict O&M activities to previously disturbed areas within the right-of-way along the existing AAC, the future parallel canal, East Highline and portions of the Westside Main, Thistle and Trifolium Extension canals where the canals are adjacent to native desert habitat.

- O&M will include periodic removal of vegetation from the maintenance roads and canal embankments to prevent establishment of vegetation that could attract covered species.

These practices are interim measures and may be modified over the term of the permit based on survey results and through the adaptive management and monitoring program (see Desert Habitat - 4 and Chapter 4). The HCP IT will review these measures at least every 5 years and may adjust the measures as long as the adjustments do not increase the total cost of implementing the HCP.

For covered species of reptiles, a primary concern for O&M activities is the potential for motor vehicle traffic to strike individuals as they are crossing the road or basking on the road surface. Reptiles also will seek out the shade created by parked vehicles. Because of these behaviors, reptiles are vulnerable to being killed or injured from motor vehicles. Covered mammalian and amphibian species also are at risk of being struck by motor vehicles. Through the first two measures, the potential for covered species to be impacted by motor vehicles will be reduced.

Garbage that is not properly disposed of can attract avian and mammalian predators (e.g., ravens and coyotes) and increase the local abundance of predators. These predators could prey on covered species and could become a substantial mortality agent for some species. For example, predation by ravens on eggs and young is a considerable concern for desert tortoise populations. By properly disposing of garbage, IID will avoid attracting predators and increasing predator populations that could result in detrimental levels of predation on covered species along and adjacent to the AAC, East Highline and Westside Main canals.

Previously disturbed areas in the rights-of-way along the AAC, East Highline, Westside Main Canal, Thistle, and Trifolium Extension canals provide poor habitat quality for the covered species. Plants are not likely to become established in areas continuously disturbed. Covered plants would not be expected to occur in these routinely disturbed areas and covered animals would not be expected to occur because habitat would not develop. By restricting activities to disturbed areas, IID will further reduce the potential to directly injure...
a covered species. In addition, impacts to desert habitat would be avoided and no changes in habitat availability or quality for the covered species would occur.

**Desert Habitat - 3.** IID will implement the following measures while conducting scheduled construction activities within its rights-of-way along the AAC, East Highline, and portions of the Westside Main, Thistle, and Trifolium Extension canals containing native desert habitat. Examples of scheduled construction activities are canal lining, installation of new major canal structures, canal relocations, canal additions, and embankment rehabilitations.

- Where practicable, IID will limit construction activities, including vehicle travel, in the rights-of-way of the AAC and future parallel canal, the East Highline Canal, and the Westside Main Canal to previously disturbed areas.
- Staging areas will be situated on the agricultural side of the canal except where the canal is not bordered by agricultural areas.
- Prior to initiating construction activities, the HCP Implementation Biologist will conduct a habitat survey of the construction area and adjacent areas. Based on the habitat conditions and species survey information, the biologist will determine which covered species are likely to occur in or immediately adjacent to the construction area. IID will implement the species-specific minimization and avoidance measures contained in Appendix C for the species identified by the biologist.
- A biological monitor will be on-site during construction activities or exclusion fencing will be erected to keep covered species out of the construction area.
- If a covered animal species occur on the project site during construction, construction activities adjacent to the individual’s location will be halted and the individual allowed to move away from the construction area on its own accord. If the individual is not moving, the biological monitor or other trained worker will relocate it to a nearby safe location outside of the construction area.
- The construction area will be clearly flagged prior to the start of construction activities and all construction activities will be confined to the demarcated area. To the extent practicable, the construction area will be situated and demarcated to avoid habitat for covered species.
- After completion of the construction activities, IID will restore any native vegetation temporarily impacted by the construction. If native desert vegetation would be temporarily impacted by construction, prior to the start of construction activities, IID will develop a vegetation restoration plan in conference with the HCP IT. The vegetation restoration plan will (1) describe the amount and species composition of the vegetation that would be impacted, (2) the actions that IID will take to restore the disturbed area, (3) the criteria for assessing the success of the restoration, and (4) the actions that will be undertaken if the success criteria are not achieved. For native desert vegetation permanently lost, IID will mitigate in accordance with Desert Habitat - 5.
- A speed limit of 20 miles/hour will be maintained on the construction site, staging areas, and storage areas.
- No pets will be permitted on the construction site.
- Prior to moving a parked vehicle, the ground around and under the vehicle will be inspected for covered species. If an individual of a covered species is found and is moving, it will be allowed to move away from the vehicle on its own accord. If it is not moving, it may be removed and
relocated to a nearby safe location following the procedures outlined in the worker education program.

For a particular construction project, IID may implement alternative measures or modify the standard or species-specific avoidance and minimization practices if agreed to by the USFWS and CDFG. In addition, the standard and species-specific avoidance and minimization practices may be modified over the term of the permit based on survey results and through the adaptive management and monitoring program (see Desert Habitat – 4, Desert Habitat – 5, and Chapter 4). The HCP IT will review these measures at least every 5 years and may adjust the measures as long as the adjustments do not increase the cost of implementation.

IID may undertake various construction activities along the AAC, East Highline Canal, and portions of the Westside Main, Thistle and Trifolium Extension canals adjacent to native desert habitat during the term of permit. The specific location of this construction is not currently known and the specific effects on species associated with desert habitat cannot be determined. With this measure, IID commits to determine the effects of a construction project on habitat for covered species and to take actions to avoid and/or mitigate potential effects to covered species as a result of construction activities.

Covered species could be injured or disturbed by construction activities. The actions that IID will implement under Desert Habitat – 3 are typical practices required by CDFG and USFWS to avoid and minimize impacts to listed species during construction projects. The measures are designed to minimize the potential for death or injury of covered species during construction and to compensate for any reduction in the quality or quantity of habitat for covered species.

**Desert Habitat – 4.** Within 1 year of the issuance of the incidental take permit, IID will initiate a baseline survey its rights-of-way on the AAC, the East Highline Canal and the portions of the Westside Main, Thistle and Trifolium Extension canals adjacent to desert habitat to determine the occurrence and location of covered species. The baseline surveys will be conducted for three consecutive years. The worker education manual (see Desert Habitat – 1) will be revised to include a habitat map and map(s) of known locations of each of the covered species within the rights-of-way of these canals. The surveys will be repeated at least every 5 years and the worker education manual updated as necessary to accurately portray the occurrence and distribution of covered species within IID’s right-of-way. The interval for repeating the surveys and updating the manual may be lengthened if agreed to by IID, USFWS, and CDFG. The HCP IT will develop the specific survey protocols.

Most of the covered activities that will occur in the rights-of-way of the AAC, East Highline, Westside Main, Thistle and Trifolium Extension canals are O&M activities. These O&M activities are focused on maintaining access roads to the canal and associated facilities clear of vegetation and accessible by equipment, and maintaining the structural integrity and capacity of canals and reservoirs. O&M activities generally do not involve disturbance of native desert habitat and are concentrated in previously disturbed areas. Because most of the covered activities occurring in the right-of-way would not affect habitat quality or quantity, the primary concern for covered species is the potential for covered species to be injured by equipment operation.

By knowing where covered species occur along the canals adjacent to native desert habitat, IID can better educate its workforce to avoid and minimize the potential to injure a covered species.
animal species during O&M activities. Further, IID will be able to design and schedule construction activities to avoid and minimize impacts to covered animal species.

The greatest threat to covered plant species is the potential for the plants to be injured or uprooted by equipment. By surveying the rights-of-way and educating the workforce on procedures to follow in areas supporting covered plants, the potential for covered plants to be impacted will be minimized or avoided. Information on the location of covered plant species will also be used to design and carry out construction activities in a manner that avoids or minimizes direct impacts to covered plant species. By repeating the surveys over the term of the permit and educating workers to recognize covered plant species, plants that colonize new locations will be similarly protected.

The baseline surveys described in Chapter 4 will fulfill the obligation to survey for covered species within three years. The same survey protocol and methods will be followed in conducting the subsequent recurring surveys.

**Desert Habitat – 5.** If desert habitat used by covered species would be permanently lost as a result of O&M or construction activities, IID will determine the amount of habitat lost and acquire, or grant a conservation easement on land at a 1:1 ratio for the acreage impacted within 1 year of the removal of the habitat. IID will not permanently remove more than 100 acres of native desert habitat over the term of the permit.

- Land to be acquired or subject to the conservation easement will have (1) known use by covered species that use the impacted areas or (2) be situated adjacent to areas of occupied habitat and support suitable habitat for the covered species that use the impacted habitat, and (3) is deemed to have long term viability as habitat for covered species based on its patch size, connectivity or location to other conserved habitat. IID will work with the HCP IT to identify a property to acquire or cover with a conservation easement. IID will place a conservation easement on this acquired land or otherwise provide for the protection of the property for the term of the permit. 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 land for the term of the permit.

- If IID retains ownership of the land, IID will prepare and submit to the USFWS and CDFG a management plan for the property that describes how the property will be managed to maintain its suitability for the covered species. 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)

If habitat used by covered species will be permanently lost, IID will acquire and preserve other desert habitat and ensure that it is managed for desert habitat values for the term of
3.6.5 Effects on Habitat

Desert habitat only occurs in the HCP area adjacent to the AAC, along the eastern edge of the East Highline Canal and along the western edge of portions of the Westside Main, Thistle and Trifolium Extension canals. The covered activities that would occur in the rights-of-way of these canals primarily consist of O&M activities. Under the Desert Habitat Conservation Strategy, IID would limit these activities to previously disturbed areas. Thus, the amount and quality of desert habitat in the HCP area would not be expected to change. The Desert Habitat Conservation Strategy also includes provisions to preserve desert habitat off site in the event that covered activities do result in the loss or degradation of desert habitat. Off-site compensation areas would be identified in coordination with the USFWS and CDFG, ensuring that any acquired areas would benefit the covered species.

3.6.6 Effects on Covered Species

Most of the covered activities occurring in the right-of-way would not affect habitat quality or quantity, and the primary concern is the potential for covered species to be injured by equipment used for O&M activities. As a result, the Desert Habitat Conservation Strategy focuses on minimizing the potential for covered species to be injured by activities along canals adjacent to desert habitat. However, the strategy also includes provisions to protect habitat if IID’s activities remove native desert vegetation. Because little or no change in the quality or availability of habitat, and few incidences of take of covered species are expected as a result of the covered activities, no adverse effects to covered species associated with desert habitat would be expected. Rather, by minimizing the potential for take of covered species and ensuring that any habitat lost or degraded by the covered activities is compensated for, implementation of the Desert Habitat Conservation Strategy would provide an overall benefit to the covered species associated with desert habitat. The effects of implementing the Desert Habitat Conservation Strategy on each of the covered species associated with desert habitat is provided below. The effects of implementing the HCP on transient species are summarized in Table 3.6-4.

3.6.6.1 Desert tortoise

Potential habitat for the desert tortoise within the HCP area occurs in creosote bush scrub within the rights-of-way of several of IID’s canals. However, this habitat is marginal for the species because it is below the optimal elevation, the diversity and abundance of perennial and annual grasses upon which it feeds is relatively low, and the area is subject to ongoing disturbance associated with canal maintenance activities and off-road recreational vehicle use. While it is unlikely that desert tortoise use the HCP area, specific measures have been developed to avoid and minimize the potential for take resulting from construction and
maintenance activities within the canal rights-of-way that contain desert habitat. For several of the covered reptiles, a primary concern for O&M activities is the potential for vehicle traffic to strike individuals as they are moving or basking on the road surface, or seeking shade created by parked vehicles. In addition to standard avoidance measures, species-specific measures would be implemented for tortoise, including conducting pre-construction surveys for occupied burrows, fencing excavation areas, relocating tortoises from burrows that cannot be avoided, halting construction if the species is present, and relocating individual’s outside of the construction area if necessary.

Through implementation of these measures, the potential for take of desert tortoise through direct injury would be minimized. Permanent loss of creosote bush scrub will be compensated through the acquisition or granting of easement of in-kind habitat at a 1:1 replacement ratio.

3.6.6.2 Colorado Desert Fringe-toed Lizard

Suitable habitat for the species in the HCP area occurs where the AAC traverses the Sand Hills and Algodones Dunes. About 100 Colorado desert fringe-toed lizards were found during surveys in the Sand Hills along a 600-foot-wide transect immediately adjacent to the north side of the AAC (Reclamation and IID 1994; 1996b). However, the likelihood of encountering the species within portions of the right-of-way where IID conducts activities is low given the marginal quality of habitat due to substrate compaction from vehicular use and ongoing disturbances related to canal maintenance. Nevertheless, IID will implement measures to further reduce the potential for take of this species. These measures include implementing a worker education program, requiring practices to avoid or minimize striking individuals with vehicles (e.g., checking under parked vehicles) and practices to avoid degrading habitat (e.g., restricting activities to previously disturbed areas) during O&M and construction activities. In addition to these general avoidance measures, species-specific measures would be implemented, including conducting pre-construction surveys, hourly biological monitoring of the construction area when surface temperatures exceed 30 degrees Celsius, cessation of work if lizards are observed, and re-location of individuals if necessary.

3.6.6.3 Western Chuckwalla

Western chuckwallas are associated with the Sonoran Creosote Bush Scrub plant community, but within this community it is restricted to areas with large rocks, boulders, or rocky outcrops, usually on slopes. Within the HCP area, creosote bush scrub is found within the rights-of-way of the AAC and several other canals in the Imperial Valley. However, the habitat is of marginal quality for western chuckwallas because it consists of mostly sandy substrates and generally lacks rocky features. Thus, the likelihood of encountering the species within IID’s canal rights-of-way is low with a concomitant low likelihood of impacts to this species.
### TABLE 3.6-4
Potential Effects to Transient Covered Species Associated with Desert Habitat

<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prairie falcon</td>
<td>Rare migrants throughout the year</td>
<td>Probably visits agricultural field and Salton Sea shoreline to prey on shorebirds; also could occur in desert habitat</td>
<td>No effects expected because of 1) small number of birds and limited time period that prairie falcons occur in the HCP area, 2) the minimal effects expected to occur to desert habitat, and 3) implementation of compensation measures compensate if habitat is impacted.</td>
</tr>
<tr>
<td>Golden eagle</td>
<td>Accidental during spring and winter.</td>
<td>Probably visits agricultural fields and managed marshes on the state and federal refuges to prey on wintering and migrating waterfowl. Also could occur in desert areas.</td>
<td>No effects expected because of 1) small number of birds and limited time period that golden eagles occur in the HCP area, 2) the minimal effects on expected to occur to desert habitat, and 3) implementation of compensation measures compensate if habitat is impacted.</td>
</tr>
</tbody>
</table>
Although the potential for impacts to western chuckwallas is low, IID will implement measures to further avoid and minimize the potential impacts. These measures include implementing a worker education program, requiring practices to avoid or minimize striking individuals with vehicles (e.g., checking under parked vehicles) and practices to avoid degrading habitat (e.g., restricting activities to previously disturbed areas) during O&M and construction activities. In addition to these standard avoidance measures, IID will implement species-specific measures to minimize the potential for take of chuckwallas, including conducting pre-construction surveys, hourly biological monitoring of the construction area when surface temperatures exceed 30 degrees Celsius, cessation of work if chuckwallas are observed, and relocation of individuals if necessary.

3.6.6.4 Couch’s Spadefoot Toad

No records of Couch’s spadefoot toad exist for the HCP area, but it is within the species’ range. It is uncertain if suitable habitat conditions are present in the HCP area. Couch’s spadefoot toads could use native desert habitats within the right-of-way of the AAC and use seepage communities associated with the AAC or East Highline Canal for breeding. Surveys conducted under the Desert Habitat Conservation Strategy will provide information on the presence of suitable habitat and this species in the HCP area.

This species rarely occurs above ground. Up to 10 month out of the year it remains within burrows located in friable soil associated with desert plants. Because the ground is compacted and plant cover is minimal, these toads are not likely to burrow in portions of the rights-of-way where IID conducts its activities. Thus, potential impacts of IID’s activities consist of striking toads with vehicles during the brief periods when it rains and the toads are above ground, and if construction activities eliminated breeding ponds. Installation of seepage recovery systems on the East Highline Canal are not expected to impact Couch’s spadefoot toads because the recovery systems are proposed for the west side of the canal and desert habitat occurs on the east side of the canal. Seepage communities on the east side of the East Highline Canal which are adjacent to desert habitat would not be affected by the proposed seepage recovery systems.

IID would implement a suite of measures to minimize direct injury and mortality to covered species associated with desert habitat. The worker education program and implementation of these measures would act to further reduce the potential for take of Couch’s spadefoot toads. Potential breeding ponds would be identified as part of the baseline habitat surveys. If IID conducts construction activities in the vicinity of breeding ponds, actions would be taken to avoid impacts or compensate for impacts to this important habitat.

3.6.6.5 Flat-tailed Horned Lizard

Flat-tailed horned lizards are known to occur within the HCP area and suitable habitat for the species exists along the AAC and along the western side of the Westside Main Canal in the West Mesa. Extensive habitat for this species also occurs to the east of the East Highline Canal (BLM 1990). The species is well distributed along the AAC, although this area has not been identified as a key area for the species. Flat-tailed horned lizards typically occupy sandy, desert flatlands with sparse vegetation and low plant diversity. Optimal habitat is found in the desert scrub community which is also occupied by the fringe-toed lizard. The O&M activities of primary concern for this species are associated with motor vehicle traffic striking individuals as
they are crossing roads or basking on road surfaces. Individuals that have sought cover and shade under parked vehicles also could be harmed when the vehicle is moved.

This species is likely to occur within the AAC right-of-way. Under the Desert Habitat Conservation Strategy, IID will implement specific measures to avoid and minimize the potential for take of the flat-tailed horned lizard. These measures include implementing a worker education program, requiring practices to avoid or minimize striking individuals with vehicles (e.g., checking under parked vehicles) and practices to avoid degrading habitat (e.g., restricting activities to previously disturbed areas) during O&M and construction activities. In addition to these general avoidance measures, species-specific measures include conducting pre-construction surveys, hourly biological monitoring of the construction area when surface temperatures exceed 30 degrees Celsius, cessation of work if lizards are observed, and relocation of individuals if necessary.

3.6.6.6 Harris' hawk
Cottonwood and mesquite trees that could provide potential nesting habitat for Harris' hawks occur in a few isolated seepage areas along the AAC, principally between Drops 3 and 4. Because of the limited amount of potential habitat for this species in the HCP area, its occurrence in the HCP area is very low. As such, the potential for IID's activities to impact this species is very low.

To further reduce the potential for its activities to impact Harris' hawk, IID will implement measures to identify and protect active nest sites from potential impacts of O&M and construction activities. Measures include restricting activities to previously disturbed areas such that vegetation that could be used for nesting is avoided, surveying for the species in potential nesting habitat in and near construction sites, establishing a buffer around nests, and prohibiting construction during the breeding season until after young have fledged. Any permanent removal of vegetation that could be used as habitat for the species will be compensated through the acquisition or granting of easement of in-kind habitat.

3.6.6.7 Loggerhead shrike
In the HCP area, habitat for loggerhead shrikes consists mainly of agricultural fields, although the species could also use desert habitats within rights-of-way of several canals for nesting and foraging. Under the Desert Habitat Conservation Strategy, IID will limit activities to previously disturbed areas. With this restriction, IID will avoid reducing habitat for loggerhead shrikes and minimize the potential for disturbance or injury of individuals. In addition to these measures, IID will implement species-specific measures to further minimize potential impacts to loggerhead shrike such as surveying for potential nesting habitat in and near the construction site, establishing buffers around nests, and prohibiting construction between February 1 through July 31, or until young have fledged (see Appendix C for a full listing of measures). Any permanent loss of vegetation that could be used as habitat for the species will be done outside of the breeding season and compensated through the acquisition or granting of easement of in-kind habitat at a 1:1 replacement ratio.
3.6.6.8 Le Conte's thrasher

The creosote bush scrub community in the AAC right-of-way and adjacent to the East Highline, Westside Main, Thistle and Trifolium Extension canals provides potential habitat for the LeConte's thrasher. The species is reported as an extirpated breeder at the Salton Sea Nation Wildlife Refuge (USFWS 1997), but breeding pairs have been observed in desert scrub habitat east of the Coachella Canal, suggesting the potential for it to occur in desert scrub habitat within the AAC right-of-way. The primary reason for species decline is habitat loss attributable to degradation, fragmentation, agricultural conversion, irrigation, urbanization, oil and gas development, fire, and over-grazing.

Under the Desert Habitat Conservation Strategy, IID would implement measures to avoid and minimize adverse effects to Le Conte's thrasher, including implementing a worker education program and requiring practices to avoid degrading habitat (e.g., restricting activities to previously disturbed areas) during O&M and construction activities. In addition to general avoidance measures, specific measures have been developed to avoid impacts to this species, such as surveys for potential nesting habitat in and near the construction site, establishing buffers around nests, and prohibiting construction between January 15 through June 15, or until young have fledged (see Appendix C for a full listing of measures). Any unavoidable and permanent removal of vegetation that could be used as habitat for the species will be done outside of the breeding season and compensated through the acquisition or granting of easement of in-kind habitat at a 1:1 replacement ratio.

3.6.6.9 Crissal Thrasher

The crissal thrasher occupies dense thickets of shrubs or low trees in desert riparian and desert wash habitats. Limited stands of mesquite, willow, and cottonwoods found in seepage areas of the AAC or adjacent to the East Highline could provide habitat for the species. The species is resident to Imperial, Coachella, and Borrego Valleys. Breeding pairs have been observed along the Alamo River and near the towns of Niland and Brawley (USGS Breeding Bird Surveys), and across from the mission wash flume 3 miles north-northeast of Bard and in areas around the Laguna Dam. Removal of mesquite brushland for agricultural production and introduction of tamarisk are the primary causes of population reductions, followed by habitat degradation and disturbance from off-road vehicle activity.

Under the Desert Habitat Conservation Strategy, IID would implement measures to avoid and minimize adverse effects to crissal thrasher, including implementing a worker education program and requiring practices to avoid degrading habitat (e.g., restricting activities to previously disturbed areas) during O&M and construction activities. In addition to general avoidance measures, specific measures have been developed to avoid impacts to this species, such as surveys for potential nesting habitat in and near the construction site, establishing buffers around nests, and prohibiting construction between January 15 through June 15, or until young have fledged (see Appendix C for a full listing of measures). Any unavoidable and permanent removal of vegetation that could be used as habitat for the species will be done outside of the breeding season and compensated through the acquisition or granting of easement of in-kind habitat at a 1:1 replacement ratio.
3.6.6.10 Nelson’s bighorn sheep

Bighorn sheep are known to use desert scrub habitat, however, their occurrence in the HCP area is unlikely given the lack of adjacent mountainous regions for use as escape and breeding habitat, and high level of human activity in the project area. The closest known population of Nelson’s bighorn sheep are in the Chocolate Mountains, where 120 individuals have been observed (CDFG 1999b).

Impacts to the species would be avoided through implementation of the Desert Habitat Conservation Strategy, and any unavoidable impacts to desert vegetation would be compensated through the acquisition or granting of easement of in-kind habitat at a 1:1 replacement ratio. By removing the potential for injury to the species from the covered activities, and by replacing lost habitat through the protection of higher quality desert habitat if necessary, the Nelson’s bighorn sheep would not be adversely affected by the HCP. Under the HCP, implementation of the Desert Habitat Conservation Strategy is expected to have no effect on this population.

3.6.6.11 Peirson’s Milk-vetch

Potential habitat for this species occurs within the creosote scrub and dune habitats within the AAC right-of-way. About 25 percent of the known populations are within the North Algodones Dunes Wilderness. Results of a 1993 survey by IID and Reclamation documented more than 1,300 individuals within a 1-mile reach of the proposed AAC parallel canal in the high dunes area (USFWS 1996b).

Under the Desert Habitat Conservation Strategy, avoidance measures, both general and plant-specific, have been developed in order to avoid and minimize impacts from O&M and construction activities. Specific measures include pre-construction surveys, prohibiting surface disturbance within a prescribed radius of the species if it is found within the project area, and transplanting individuals if impacts are unavoidable and transplanting is deemed appropriate by USFWS and CDFG (see Appendix C for a full listing of measures). General measures include familiarizing workers with covered plant species they are likely to encounter within the right-of-way and instructing them to avoid injuring or uprooting plants. IID also will restore any native vegetation temporarily impacted by construction and compensate for unavoidable and permanent impacts to vegetation by acquiring or granting a conservation easement on land at a 1:1 ratio for the acreage impacted.

3.6.6.12 Algodones Dunes Sunflower

Potential habitat for this subspecies occurs where the AAC traverses the Sand Hills and Algodones Dunes. This subspecies is naturally limited throughout its range by the availability of suitable dune habitat and is considered to be rare throughout its range. The main distribution of populations is within the Algodones Dunes system and, secondarily, in the Yuma dunes in Arizona. These stands are not large in numbers of individuals, but they are significant in maintaining genetic flow between populations in California and Arizona. During 1984 surveys, 885 plants were found evenly distributed along the survey area between Interstate 8 and Drop 1 along the north side of the AAC.
Under the Desert Habitat Conservation Strategy, avoidance measures, both general and plant-specific, have been developed in order to avoid and minimize impacts from O&M and construction activities. Plant-specific measures include pre-construction surveys, prohibiting surface disturbance within a prescribed radius of the species if it is found within the project area, and transplanting individuals if impacts are unavoidable and transplanting is deemed appropriate by USFWS and CDFG (see Appendix C for a full listing of measures). General measures include familiarizing workers on covered plant species likely to be encountered within the right-of-way and instructing them to avoid injuring or uprooting plants. IID also will restore any native vegetation temporarily impacted by construction and compensate for unavoidable and permanent impacts to vegetation by acquiring or granting a conservation easement on land at a 1:1 ratio for the acreage impacted.

3.6.6.13 Wiggin’s Croton

Potential habitat for Wiggin’s croton occurs in the creosote scrub and dune habitats in the Algodones Dunes within the AAC right-of-way. Several populations of the species have been found in and near the AAC right-of-way; and results of a 1993 survey by IID and Reclamation indicated occurrences of this species within the high dunes system as well as isolated populations in the smaller dunes. During surveys of the dunes system, 338 individuals were observed within the canal right-of-way.

Avoidance measures, general and plant-specific, have been developed in order to avoid and minimize impacts from O&M activities. Plant-specific measures include pre-construction surveys, prohibiting surface disturbance within a prescribed radius of the species if it is found within the project area, and transplanting individuals if impacts are unavoidable and transplanting is deemed appropriate by USFWS and CDFG (see Appendix C for a full listing of measures). General measures include familiarizing workers on covered plant species likely to be encountered within the right-of-way and instructing them to avoid injuring or uprooting plants. IID also will restore any native vegetation temporarily impacted by construction and compensate for unavoidable and permanent impacts to vegetation by acquiring or granting a conservation easement on land at a 1:1 ratio for the acreage impacted.

3.6.6.14 Giant Spanish Needle

In California, this species is restricted to southeastern Imperial County, where it is primarily found in the Algodones Dunes System. Potential habitat for the species occurs where the AAC traverses the Sand Hills and the Algodones Dunes. In 1994, Reclamation and IID conducted special-status plant surveys, and identified 2,908 individuals in the corridor to the west of Interstate 8, and 787 individuals in the area east of Interstate 8. The giant Spanish needle is not considered to be endangered, but the species is under potential threat from military activities; off-road vehicle use; habitat degradation; and direct impacts resulting from infrastructure improvements (highways and utilities), and quarry and stockpile operations.

As with the other plant species covered under the Desert Habitat Conservation Strategy, avoidance measures, both general and plant-specific, have been developed in order to avoid and minimize impacts from O&M activities (see Appendix C for a full listing of measures). Under the HCP, the giant Spanish needle would be protected through a combination of measures. Plant-specific measures include pre-construction surveys, prohibiting surface
disturbance within a prescribed radius of the species if it is found within the project area, and transplanting individuals if impacts are unavoidable and transplanting is deemed appropriate by USFWS and CDFG (see Appendix C for a full listing of measures). General measures include familiarizing workers on covered plant species likely to be encountered within the right-of-way and instructing them to avoid injuring or uprooting plants. IID also will restore any native vegetation temporarily impacted by construction and compensate for unavoidable and permanent impacts to vegetation by acquiring or granting a conservation easement on land at a 1:1 ratio for the acreage impacted.

3.6.6.15 Sand Food
The sand food is a perennial root parasite that occurs on sand dunes or in sandy areas in association with creosote scrub below 650 feet. Potential habitat for the species occurs in the creosote scrub and dune habitats along the AAC right-of-way, and populations of the sand food are found within the Algodones Dunes system. The species was observed near the proposed AAC parallel canal during 1994 surveys; 208 individuals were found in the corridor to the west of Interstate 8, and 363 individuals were found east of Interstate 8. This species is considered rare throughout its range, and is limited by the availability of suitable habitat and host plants, both of which have been reduced in extent or degraded by various land uses, including military and recreational vehicular activities, bulldozing and clearing of native dune vegetation, agriculture, and invasion of dunes by nondune species.

Under the HCP, the sand food would be protected through a combination of general and plant-specific avoidance measures. Plant-specific measures include pre-construction surveys, prohibiting surface disturbance within a prescribed radius of the species if it is found within the project area, and transplanting individuals if impacts are unavoidable and transplanting is deemed appropriate by USFWS and CDFG (see Appendix C for a full listing of measures). General measures include familiarizing workers on covered plant species likely to be encountered within the right-of-way and instructing them to avoid injuring or uprooting plants. IID also will restore any native vegetation temporarily impacted by construction and compensate for unavoidable and permanent impacts to vegetation by acquiring or granting a conservation easement on land at a 1:1 ratio for the acreage impacted.

3.7 Species-specific Conservation Strategies

3.7.1 Burrowing Owls
Burrowing owls commonly inhabit the earthen banks of agricultural canals and drains in the HCP area. Drain and canal maintenance activities have the potential to affect burrowing owls. These routine activities can trap owls in their burrows or injure individuals. Construction activities such as reservoir construction and canal structure projects can adversely affect burrowing owls in similar ways. If concentrated near an occupied burrow, construction activities also can disturb owls and potentially lead to nest abandonment.

Although individual owls can be at risk to injury or disturbance, maintenance activities are ultimately beneficial to owls. Burrowing owls require sparsely vegetated areas with friable soil suitable for burrowing by burrowing mammals. Drain and canal maintenance activities create
these conditions as vegetation is removed and friable soils are maintained. The high availability of suitable burrow locations provided by the drains and canals, adjacent to foraging habitat provided by the agricultural fields contributes to the maintenance of a high population of owls in the Imperial Valley. As such, the BOCS focuses on continuing the activities that provide suitable habitat conditions for burrowing owls, while minimizing the potential to take individuals. The overall biological goal of the BOCS is to maintain a self-sustaining population of burrowing owls across the current range of the owl encompassed by the HCP area. The specific objective is to maintain adequate burrow availability and community parameters (e.g., burrowing mammals, foraging habitat), to the extent that IID can influence these parameters, at levels to support the initial distribution and relative abundance of owls on lands covered by the HCP and affected by the covered activities. The specific actions that IID will undertake to achieve this objective are detailed below. These measures apply throughout the HCP area, including the rights-of-way of the AAC, East Highline and Westside Main Canals.

**Owl – 1.** IID will implement a worker education program. Workers responsible for drain cleaning or conveyance system maintenance will be required to attend a worker education program to ensure proper implementation of the HCP measures addressing burrowing owls. Workers will be instructed on the requirements of the HCP within six months of issuance of the incidental take permit. The worker education program will be conducted at least annually to ensure instruction of new employees and as a refresher. For new workers, IID will ensure that they are informed of and understand the HCP requirements prior to conducting drain cleaning or conveyance system maintenance activities either individually or through the annual education program.

- The worker education program will instruct workers on the identification and habitat use of burrowing owls. Workers will be instructed to exercise care when operating in areas inhabited by burrowing owls so as to avoid injuring owls. Workers will be required to report any observations of dead or injured burrowing owls.

- The worker education program also will provide instruction on drain cleaning procedures required by the HCP (see Owl – 2 and Owl – 3) and procedures for conducting conveyance system maintenance (see Owl – 4 and Owl – 5). A worker education manual will be prepared and distributed to each person conducting drain cleaning or conveyance system maintenance activities. The manual will include a photograph/drawing of a burrowing owl and brief information on its identification. The manual also will summarize the HCP’s requirements for drain cleaning and conveyance system maintenance for easy reference. Concurrence of the manual will be gained from the USFWS and CDFG. The manual will be reviewed annually and updated as appropriate.

The primary concern for burrowing owls relates to O&M activities. The effectiveness of avoidance and minimization measures (Owl – 2, Owl – 3, Owl – 4, and Owl – 5) will depend on workers being able to recognize burrowing owls and understand the requirements of the HCP with respect to burrowing owls. A worker education program is critical to ensuring that measures are implemented properly and the benefits to burrowing owls are realized.

**Owl – 2.** Immediately prior to initiating drain or canal cleaning operations, the equipment operator will make a visual inspection of banks to identify burrows in the section to be cleaned. The equipment operator will look for burrows from the side of the drain/canal opposite the side where the equipment will be operated. The location of burrows will be indicated with paint or other temporary method for reference.
during drain cleaning. All burrows of suitable size for burrowing owls will be identified and avoidance measures followed regardless of use by burrowing owls. In conducting drain/canal cleaning,

- The operator will avoid collapsing or filling burrows.
- The operator will exercise care in removing sediment from the drain/canal and depositing spoils on the bank so as to avoid moving the excavator bucket directly over a burrow.

The HCP Implementation Biologist and maintenance workers will work together to develop standard operating procedures for drain and canal cleaning. The standard operating procedures will be developed within one year of issuance of the incidental take permit and refined and updated based on monitoring results (see Chapter 4). Workers will be instructed in the standard operating procedures through the worker education program (Owl - 1).

To minimize the potential for drain and canal cleaning activities to impact individual owls, the workers conducting this maintenance will inspect areas to be cleaned and avoid burrows during their cleaning operations. The primary concern for drain and canal cleaning activities is the potential for an occupied burrow to be filled or collapsed resulting in entrapment of owls in the burrow. Drain and canal cleaning activities have the potential to fill or collapse burrows if vegetation and soil are removed in the immediate vicinity of the burrow or if sediment falls from the bucket as the excavator operator swings the bucket from the drain bottom to the drain bank. Under this measure, these potential effects will be avoided or minimized. All burrows, regardless of occupancy by owls, will be treated in this manner, thus avoiding impacts to owls inhabiting the burrows at the time of drain or canal cleaning and maintaining the availability of burrows for future use.

As part of the worker education program (Owl - 1), workers will be instructed on the identification of owls and their burrows as well as standard operating procedures for drain and canal cleaning developed under Owl - 2. The worker education program will ensure that workers can identify burrows suitable for burrowing owls, understand the requirements under Owl-2, and know the proper techniques for cleaning drains and canals in areas supporting burrowing owls.

**Owl - 3.** When grading spoils from drain or canal cleaning, the soil to be graded will first be rolled away from the channel and broken up into small clods and slowly rolled back towards the channel. Care will be taken to not roll the soil back down the slope.

When drains and canals are cleaned, the spoils are deposited on the roadway adjacent to the drain or canal. After the spoils have dried, they are graded to a level surface. Owls inhabiting burrows in the drain bank can be trapped in their burrow if the spoils are allowed to roll down the drain bank and block the burrow entrances. This measure reduces the potential for this impact to occur. Workers conducting the drain or canal cleaning will be instructed (Owl - 1) in the appropriate techniques for grading spoils as part of the worker education program.

**Owl - 4.** Burrows in drain and canal banks will be left undisturbed where they do not compromise the integrity of the channel embankment or channel lining. When burrows must be filled to maintain the integrity of the channel, the corrective actions will be conducted during October through February. Prior to filling a burrow, the HCP Implementation Biologist will ensure that owls are not present in the burrow by using one of the techniques detailed in Appendix D.
In the HCP area, burrowing owls often inhabit burrows in canal banks behind concrete lining on the canals. If burrows become large, they can weaken the concrete lining or the canal embankment and ultimately cause lining failures and leaks in the canal. Similarly, drain embankments can be weakened by burrows. IID fills in burrows to prevent the development of leaks and more costly repairs as part of its O&M activities on the conveyance and drainage system. Under this measure, IID will allow burrows to persist in canal and drain banks as long as they do not jeopardize the integrity of the lining or embankment. As part of the worker education program (Owl – 1), workers will be instructed on the conditions under which a burrow poses a threat to a channel’s integrity and when burrows do not pose a threat and, therefore, are to be left undisturbed. Through this measure, IID will reduce impacts of conveyance and drainage system maintenance activities on owls and burrow availability, and promote persistence of burrowing owls in the HCP area.
Prior to replacing facilities or constructing new facilities, workers will coordinate with the HCP Implementation Biologist. Replacement and construction of facilities consists of installing system-based water conservation measures, rerouting drains and canals, replacing concrete lining on canals, conducting seepage maintenance, and replacing structures. The workers will inform the biologist of the location and type of work required and work with the biologist to schedule the work. The biologist will determine if burrows occupied by burrowing owls would be filled or collapsed by the required work. If occupied burrows would be affected, the work will be scheduled to occur during October through February. Prior to conducting the work, the HCP Implementation Biologist will ensure that owls are not present in the burrow by using one of the techniques detailed in Appendix D. If no occupied burrows are found, the burrows will be made inaccessible to owls and work can proceed at any time.

In the HCP area, burrowing owls often inhabit burrows in canal embankments or in association with structures required to convey irrigation and drainage water. Sections of concrete lining need to be replaced to prevent or repair leaks and to maintain the smooth flow of water. When leaks occur, embankments need to be cored and new material added to repair the embankment. Structures need to be replaced periodically to maintain proper functioning of the conveyance and drainage systems. Burrows can be filled in conducting these actions and owls occupying burrows in these areas can be killed or injured.

Other covered activities that could fill or collapse burrows and impact owls are:

- Installation of canal lining
- Installation of lateral interceptors and reservoirs
- Installation of seepage recovery systems
- Canal rerouting
- Drain rerouting

As explained below, these activities are expected to have only minor effects on burrowing owls.

About 537 miles of IID’s canal system are currently unlined. IID could pursue lining the unlined portions of the conveyance system during the permit term. Although lining the remaining unlined portions of the canal system could displace many owls, only 1.74 miles of canals currently have been identified for lining under the water conservation and transfer program. Rosenberg and Haley (2001) estimated the density of burrowing owls in Imperial Valley at 4.7 pairs/mile. Based on this estimate, lining 1.74 miles of canal could displace 16 owls (8 pairs) and temporarily reduce burrow availability. After the lining is completed, burrowing mammals would be expected to create new burrows along the newly lined canal and replace any burrows impacted during the lining process.

Lateral interceptors and reservoirs would be installed in agricultural fields (see Figure 1.7-5). Burrows used by burrowing owls are located along drains and canals, rather than within an agricultural field. Because the new interceptors and canals would be located in agricultural fields, the potential for impacts to burrowing owls is low. Construction of these new features could increase nesting opportunities for burrowing owls because additional canals (i.e., the lateral interceptors) would be constructed. Construction of the entire lateral interceptor system identified (see Table 1.7-3) would result in about 72 additional miles of canals. As burrows are created by burrowing mammals in the new canals, burrow availability for owls would increase.
Seepage recovery systems are contemplated along the East Highline Canal. Areas where seepage recovery systems would be installed probably provide poor habitat conditions for burrowing owls. The areas proposed for seepage recovery systems contain moist soils because of the seepage and most support dense vegetation (see Figure 2.3-6). These characteristics are not conducive to burrowing owls and no owls were observed in May 2001 when the proposed locations where visited. Thus, impacts to burrowing owls from installation of seepage recovery systems are expected to be low.

On average, IID reroutes about 0.25 miles of canal and about 0.2 miles of drains every year. In rerouting a canal or drain, the existing drain or canal is abandoned and a new drain or canal constructed. Abandonment of a canal or drain could result in the loss of burrows for owls. Assuming a density of 4.7 pairs/ miles (Rosenberg and Haley 2001), about four owls (2 pairs) could be displaced by drain and canal rerouting each year. Drain and canal rerouting would not result in a permanent loss of habitat for owls. The newly constructed drain or canal sections would replace the habitat lost from abandoning canal or drain sections.

Under this measure, the HCP Implementation Biologist and workers will work closely to ensure that owls are removed from the work area prior to the start of activities and repairs are scheduled to avoid the owl’s breeding period. Thus, through this measure, IID will minimize the potential for take of owls by these activities.

---

**Owl – 6.** IID will not change its current drain and canal maintenance techniques to techniques that are not compatible with burrowing owls. IID will not implement any drain and canal maintenance techniques that may affect burrowing owl habitat beyond those currently employed without receiving concurrence from USFWS and CDFG that the new techniques are compatible with the maintenance of burrowing owl habitat.

Currently, IID’s drain and canal maintenance activities create suitable habitat conditions for burrowing owls. Burrowing owls require sparsely vegetated areas with friable soil suitable for burrowing. Drain and canal maintenance activities create ideal locations for burrows because vegetation is removed and friable soils are maintained through embankment maintenance. As long as IID continues to follow existing practices for maintaining the drains and canals, these features will continue to provide suitable habitat conditions for burrowing mammals that create burrows for owls. However, during the 75-year permit term, new technologies or practices for drain and canal maintenance could be developed that are not compatible with burrowing mammals or burrowing owls. Incompatible practices include those that would eliminate friable soil or sparsely vegetated conditions along the canals or drains. By committing not to employ techniques that would reduce the availability or suitability of drains and canals for burrowing mammals, IID will perpetuate the conditions that make the HCP area favorable for burrowing owls. In the event that alternative drain and canal maintenance techniques or technologies become available during the term of the permit, IID will seek concurrence from USFWS and CDFG that the new techniques are compatible with maintaining habitat for burrowing mammals and burrowing owls. This will give IID the opportunity to take advantage of more efficient techniques and technologies in the future and provide USFWS and CDFG with the ability to ensure that maintenance techniques remain compatible with the biological objectives for burrowing owls.
CHAPTER 3: HABITAT CONSERVATION PLAN COMPONENTS AND EFFECTS ON COVERED SPECIES

Owl – 7. IID will conduct a demographic study of burrowing owls in the HCP area. The demographic study will be initiated after relative abundance and distribution surveys have been completed for the entire HCP area (see Chapter 4) and will continue for 12 to 15 years. The HCP Implementation Team will develop the study design and duration for the demographic study in consultation with a statistician.

IID has been delivering water to farmers in the Imperial Valley and maintaining its drainage and conveyance system for over 75 years. The Imperial Valley supports one of the highest densities of burrowing owls and supports much higher densities than in nearby native desert habitat (Rosenberg and Haley 2001). These observations suggest that the high density of burrowing owls is a consequence of agriculture in combination with IID’s drainage and conveyance system operation and maintenance. The burrowing owl population has persisted in the Imperial Valley for many years. Agriculture and IID’s activities have made positive contributions to this persistence.

With this measure, IID will conduct a demographic study to assess the status of the burrowing owl population in the HCP area. Under the demographic study, several areas within the HCP area will be intensively studied. The specific areas will be identified following results of the first complete relative abundance and distribution survey (see Chapter 4). The HCP Implementation Team will develop the final study design to develop a life table and annual growth rate ($\lambda$). The results of the demographic study will be used in the monitoring and adaptive management program (see Chapter 4).

Owl – 8. For activities that would permanently eliminate burrows suitable for burrowing owls as determined by the HCP Implementation Biologist, IID will determine if owls are currently using burrows that would be impacted. If owls are not using burrows that would be impacted, the burrows will be made inaccessible to owls and the activity may proceed at any time. If owls are using burrows that would be impacted, IID will conduct the activity during October through February and prior to the start of the activity, the HCP Implementation Biologist will ensure that owls are not present in the burrows using one of the methods described in Appendix D. For every impacted burrow regardless of whether owls are currently using the burrows, IID will install two replacement burrows in areas deemed appropriate by the HCP IT.

Covered activities with the potential to permanently eliminate burrows include:

- Converting an open drain into a pipeline drain
- Constructing control houses as part of facility automation
- Developing facilities to support fishing, wildlife viewing, picnicking, and related activities at IID facilities

Most of IID’s drainage system consists of open drains. Burrowing owls commonly inhabit the inside banks of the drain. At a farmer’s request, IID will install a pipeline to carry drain water thereby allowing the farmer to use the land occupied by the drain. Installing a pipeline to carry drain water eliminates existing burrows in the drain banks and prohibits the development of burrows in the future. Very little of the drainage system is in pipes, and minimal additional piping of drains is anticipated over the term of the permit.

As part of its system improvements, IID will automate operation of various structures. Automation includes construction of a control house and a surrounding gravel access and parking area. Less than a 1-acre area is disturbed for construction of these facilities. If burrows
occur in the footprint of the control house and access/parking areas, they would be permanently lost as burrowing mammals could not recreate burrows within the footprint. In this event, the loss of burrows would be mitigated according to Owl – 8. However, construction of control houses is not anticipated to eliminate burrows or to impact burrowing owls because 1) IID will have flexibility in the exact location of the facilities and therefore will be able to avoid areas inhabited by owls, and 2) the facilities will be located outside of the embankments of the canals and drains and thereby avoid where most of the owl burrows occur.

Construction of recreational facilities also could result in the permanent loss of burrows. IID does not currently plan to construct additional recreational facilities but could do so over the term of the HCP. Potential new recreational facilities would be associated with IID’s facilities and would consist of very small structures such as picnic tables, information kiosks, and restroom facilities. Furthermore, IID would have flexibility in locating new facilities or projects and would locate and design recreational facilities so as to avoid impacts to owls. If new recreational facilities cannot be situated to avoid owl burrows, the loss of burrows would be mitigated according to Owl – 8.

Under this measure, IID commits to taking actions to avoid, minimize and compensate the potential effects to burrowing owls from activities that could reduce the availability of burrows. If occupied burrows will be impacted, IID will conduct the activities outside of the breeding season and remove owls from the burrows that would be impacted prior to initiating the activities. IID also will create two replacement burrows for every impacted burrow as recommended in the CDFG Staff Report on Burrowing Owl Mitigation (CDFG 1995). The availability of suitable burrows is generally believed to be a limiting factor for burrowing owls although burrow availability as a limiting factor has not been investigated in the Imperial Valley. By replacing burrows that would be impacted, IID will provide alternate habitat for displaced owls. Burrowing owls are known to use artificial nest burrows at the Salton Sea NWR (Gervais et al. 2000), and therefore owls would be expected to colonize replacement burrows created by IID.

Owl – 9. IID will implement a farmer and public education program on burrowing owls. Periodically, IID will include information on burrowing owls in water bills to farmers. The materials will provide information on the ecology and habitat use of burrowing owls, the benefits to farmers of burrowing owls in controlling agricultural pests, and farm management practices that are beneficial and detrimental to burrowing owls. IID also will make materials on burrowing owls available to the public and will take advantage of opportunities to conduct public outreach programs on burrowing owls. These materials will be prepared and distribution initiated within 1 year of issuance of the incidental take permit.

In addition to the canals and drains maintained by IID, burrowing owls inhabit burrows along delivery ditches on private agricultural lands and use agricultural fields for foraging. By educating farmers on the benefits of burrowing owls in controlling agricultural pests and of farm management practices that are beneficial to owls, IID will contribute to the overall maintenance of burrowing owls in the HCP area. Educating the public also will contribute to maintenance of burrowing owls. For example, in Florida, Milsap and Bear (2000) found a decrease in nest failures due to harassment following implementation of a burrowing owl education program in the public schools.
3.7.1.1 Effects on Burrowing Owls

Haug et al. (1993) reported that burrowing owls have declined in abundance throughout most of their range. In the western states, 54 percent of 24 jurisdictions reported burrowing owl populations decreasing, and there were no reported increases. More recent analyses suggest that burrowing owl populations in western and midwestern portions of North America have been increasing (Sheffield 1997). Based on breeding bird survey data, the burrowing owl population in the midwestern and western portion of the U.S. has increased about 2 percent during 1980 to 1994. During the same period, the western states showed a 4.2 percent increase, with the population in California increasing by 6.3 percent.

The trend in burrowing owl populations in California estimated from breeding bird surveys contrasts with findings of DeSante and Ruhlen (1995). They reported the results of surveys for burrowing owls conducted throughout California except for the Great Basin and desert areas during 1991 to 1993. The surveys indicated a 37 to 60 percent decrease in the number of breeding groups since the early 1980s with the burrowing owl being extirpated from several counties (i.e., Marin, San Francisco, Santa Cruz, Napa Ventura, and coastal San Luis Obispo) and nearly extirpated from several additional counties (i.e., Sonoma, Orange, and coastal Monterey). Development is believed to have been the primary cause of the extirpation and decline of burrowing owls in these counties. However, they also found a non-significant increase in the number of pairs of burrowing owls of 3.1 percent between 1991 and 1992 and a significant increase in the number of pairs of 19 percent between 1992 and 1993. DeSante and Ruhlen (1995) attributed their results to losses of small breeding groups, but increases in the size of large breeding groups.

Burrowing owls occur at a very high density in the Imperial Valley. The density of burrowing owls in Imperial County surpasses that of any other single county (Reclamation and SSA 2000). A high density of burrowing owls also was noted in the late 1960s (Coulombe 1971). An estimated 6,429 pairs of burrowing owls inhabit the Imperial Valley representing 69 percent of the estimated total population in California (Shuford et al. 1999). This population level translates into a density of about 236 pairs per 60 square miles (DeSante and Ruhlen 1995). For comparison, the average density of burrowing owls in other lowland areas in California was estimated at 11.9 pairs per 60 square miles (DeSante and Ruhlen 1995).

The reasons for the very high density of burrowing owls in the Imperial Valley have not been determined. In the Imperial Valley, insects are the primary prey of burrowing owls (Coulombe 1971; Rosenberg et al. 2000) and Rosenberg et al. (2000) suggested that the year-round agriculture in Imperial Valley could result in the area providing a consistently high biomass of insects. IID’s extensive drain and canal system also could play a role in maintaining a high burrowing owl density in the Imperial Valley. Burrowing owls are dependent on burrows created by other agents. Rosenberg and Haley (2001) identified water seepage, muskrats and gophers as the primary agents creating burrows used by burrowing owls in the Imperial Valley. Some burrows used by burrowing owls were formed by round-tailed ground squirrels. The banks of the canals and drains are maintained clear of vegetation, creating suitable conditions for burrow construction by burrowing mammals and owls commonly inhabit canal and drain banks. Hurlbert (1997) found the greatest number of burrowing owls along drains with the least amount of vegetation, although burrowing owls were present along all of the drains surveyed.
Drain and canal maintenance activities can pose a risk to burrowing owls, such as trapping owls in their burrows. In conducting mechanical vegetation control in drains, an excavator, operated from the drain bank, is used to scrape vegetation from the side and bottom of the drain in the channel bottom. Canal embankments are maintained free of vegetation by chaining, discing, side scraping, and use of Roundup®, Rodeo®, and Direx®.

Under the HCP, IID will implement a worker education program and commit to precautions to reduce the potential for owls to be injured during maintenance operations. Although individuals could be affected by drain and canal embankment maintenance activities, the population in the Imperial Valley is expected to remain at its currently high density for several reasons. First, burrowing owls occur at high densities in the Imperial Valley concurrently with drain and canal maintenance activities and the Imperial Valley has supported a high density of burrowing owls for several decades (Coulombe 1971; DeSante and Ruhlen 1995). Second, Hurlbert (1997) found a greater number of owls along drains with little vegetation suggesting that drain maintenance activities that clear vegetation could overall be beneficial to burrowing owls. Drain banks and canal embankments free of vegetation are favorable to burrowing owls because they provide suitable burrowing locations as well as potentially reduce predation risk by eliminating cover for predators and edges where predators often concentrated foraging activities (Warnock and James 1997). Third, IID only cleans about one-fifth of its drain system a year and drain maintenance is focused in areas with accumulations of vegetation or sediment, areas less likely to support large numbers of burrowing owls than bare banks. Thus, in any given year, most burrowing owls would be unaffected by drain maintenance activities. All of these factors suggest that existing drain maintenance practices are consistent with the persistence of burrowing owls in the Imperial Valley.

IID currently maintains canal and drain embankments free of vegetation through a combination of mechanical and chemical methods. These methods create barren banks that attract burrowing mammals that subsequently create burrows that burrowing owls use. While it is currently anticipated that IID will continue to use these methods for drain and canal maintenance, new technology or techniques could be developed in the future. Under the HCP, IID will commit to not changing drain and canal maintenance practices in a manner that would render canal and drain embankments unsuitable for burrowing mammals and burrowing owls. By not employing drain or canal maintenance practices that are incompatible with burrowing owls, IID will ensure that suitable conditions for burrows persist in the HCP area for the term of the permit.

3.7.2 Desert Pupfish

Desert pupfish have become established in many of the drains constructed and maintained by IID that discharge directly via gravity into the Salton Sea. Although IID routinely maintains adequate drainage in these channels by removing vegetation and sediment, these drains provide the habitat conditions (e.g., water quality, food source, and aquatic vegetation) necessary to support pupfish. IID’s maintenance activities, while likely necessary to maintain the habitat characteristics necessary to support pupfish, have the potential to result in the incidental take of pupfish. In addition, implementation of water conservation projects has the potential to change water quality in the drains occupied by pupfish and to adversely affect pupfish.
The biological goals of the desert pupfish conservation strategy are to maintain viable populations of desert pupfish in the HCP area. This will be accomplished by maintaining or increasing pupfish habitat in IID’s drains relative to the current levels (i.e., no net loss) and to minimizing the potential for IID’s drain maintenance and construction activities, and the water conservation program to result in the incidental take of desert pupfish. As previously described, these goals are augmented and supported by the Salton Sea measures designed to maintain connectivity among drain populations of pupfish and to promote recovery by establishing additional population refugia. The specific goals of the desert pupfish strategy will be achieved by implementing measures that:

- Ensure that IID will operate and maintain its drainage system in a manner that will maintain current levels of pupfish drain habitat
- Minimize the effects of potential increases in the concentration of selenium and possible other contaminants in the drainage system resulting from water conservation
- Enhance the potential for increasing the amount of pupfish habitat in areas exposed as the Salton Sea recedes
- Examine the efficacy of modifying drain maintenance activities to reduce the potential for take of pupfish and adjust maintenance activities based on the findings
- Avoid or minimize the potential for take of pupfish by IID construction activities

**Pupfish - 1.** IID will operate and maintain its existing drainage system in a manner that will maintain the amount of pupfish drain habitat currently available (i.e., no net loss of pupfish drain habitat). Currently available pupfish habitat will be defined as the portion of all IID drains and their tributaries that discharge directly to the sea from downstream from the first check. IID will continue to maintain at least that amount of pupfish habitat for the duration of the term of the ITPs. IID’s obligation for maintaining current levels of pupfish habitat may be reduced if the HCP IT determines that portions of the defined drain sections do not contain suitable pupfish habitat.

Various surveys conducted by CDFG and others have recorded the presence of desert pupfish in many of IID’s drains that discharge directly to the Salton Sea and their tributaries (Sutton 1999). Although not native habitat, the drains provide aquatic habitat that supports pupfish and contributes to the persistence of pupfish populations in the Imperial Valley. Desert pupfish use of habitat within the drains that discharge into the Salton Sea likely is influenced by flow, water quality, vegetation, and possibly the disturbance regime established by IID’s drain maintenance activities. Pupfish populations also are influenced by interactions with exotic species. Implementation of the water conservation program has the potential to influence these factors and to adversely affect the quality of pupfish habitat in the drains.

Under this measure, IID will help ensure that the amount of drain habitat currently available to pupfish will remain unchanged relative to current conditions. IID will accomplish this by operating and maintaining its drainage system in a manner that will encourage continued use of the drains by pupfish. Although the presence of pupfish in and among these drains is sporadic and variable, all drain segments extending upstream from their direct connection with Salton Sea to the first check (Figure 3.7-1) were considered potential habitat for the purpose of
this measure. Based on this definition, IID’s drainage system supports 13.8 miles of drain potentially used by desert pupfish.
CHAPTER 3: HABITAT CONSERVATION PLAN COMPONENTS AND EFFECTS ON COVERED SPECIES

Insert Figure 3.7-1
Figure 3.7-1 backpage
Pupfish - 2. IID will operate and maintain its drain channels in a manner that minimizes the effects of water conservation on water quality. Based on the findings of studies to determine the effects of selenium on pupfish conducted by the USFWS or others, IID will work with the HCP Implementation Team to determine the best means for managing its drain channels to minimize potential selenium effects on pupfish. Measures to be adopted by IID may include: splitting combined drain channels (drain/operational water) to improve water quality, providing limited biological treatment, including use of discharge from managed marsh mitigation habitat, and consolidating channels and blending flows.

Selenium is a naturally occurring constituent of Colorado River water that is concentrated in drain water by evaporation and transpiration in the Imperial Valley prior to discharge into the Salton Sea. Implementation of the water conservation project has the potential to influence the concentration of selenium and other contaminants in the drains occupied by desert pupfish. Under an option where fallowing is used as the mechanism for conserving water, selenium concentrations are projected to decrease on average in the pupfish drains from a baseline concentration of 4.8 ppb to 4.61 ppb (see Water Quality section of the IID Water Conservation and Transfer Project Draft EIR/EIS). However, water conservation options that incorporate only on-farm conservation and system improvements are projected to increase the annual average concentration of selenium from 4.8 ppb up to 6.69 ppb.

- The effects of elevated selenium concentrations on pupfish reproduction and survival have not been directly assessed, and the USFWS currently is funding a study to evaluate the effects of selenium on desert pupfish. Other future studies might also evaluate the potential effects of selenium on pupfish and identify important concentration thresholds. This measure is intended to avoid or minimize the potential for increased selenium concentrations in the drains induced by water conservation to result in the incidental take of desert pupfish.

Upon determination (as a result of the USFWS selenium study or other studies) of the effects of selenium on desert pupfish reproduction and survival, IID will work with the HCP IT to develop and implement practices to minimize the potential for incidental take of pupfish. IID has several options for reducing the selenium concentration in the drains. These practices could include splitting combined drain channels (drain/operational water) to improve water quality (Figure 3.7-2), providing limited biological treatment, including use of discharge from managed marsh mitigation habitat, and consolidating channels and blending flows. Fallowing also could be used to minimize potential increases in selenium resulting from water conservation measures.

Pupfish - 3. IID will increase the amount of pupfish drain habitat (expressed as linear channel distance) over the term of the HCP. This will be accomplished as the Sea recedes by extending or modifying existing IID drains, creating additional drain channels, connecting pumped drains directly to the Sea, or by maintaining the suitability of naturally created drain channels. IID's financial obligation for creating and managing additional pupfish habitat will be based on the anticipated costs necessary to double the amount of pupfish habitat in the IID drains. The design, configuration, and management of these areas will be developed jointly by the HCP Implementation Team and IID, and will be developed in consideration of the specific physical characteristics of pupfish habitat (e.g., water depth and velocity, and channel width) and water quality (e.g., turbidity and selenium concentration). IID will continue to maintain created pupfish habitats for the duration of the term of the ITPs, except where maintenance is in conflict with the
IID’s commitment to maintain (no net loss) pupfish drain habitat in the Imperial Valley (Pupfish—1) is intended to help ensure the persistence of pupfish populations in the Imperial Valley over the term of the HCP. The requirements of Pupfish—3 focus on maintaining current habitat in those drains that discharge directly to the Salton Sea. Under various water conservation scenarios, including no action, the surface elevation of the Salton Sea is expected to decline. As the Sea recedes, land that is currently inundated will become exposed. IID’s drainage system is dependent upon gravity flow to the sea, and as the sea recedes, additional channels will be created or developed to convey drain water to the sea.

IID will take advantage of the opportunity to augment the availability of pupfish habitat as the Salton Sea recedes and drains are extended. As presently projected, reductions in water surface elevation at the Sea will expose areas over which drain water will flow to the sea. Under this measure, IID will work with the HCP IT to determine the best means for facilitating and managing these drain extensions. Options for managing these channel extensions could include allowing drain water flowing from the current discharge locations to create natural channels to the sea or designing and actively creating channels. Channels allowed to extend naturally likely would meander over the exposed seabed, and should support conditions favorable for occupation by pupfish. However, some level of maintenance (e.g., vegetation control) likely would be required to retain the suitability of the habitat. Designed and constructed channels might be preferred or used in combination with unmanaged created channels.

In addition to the extension of drains that currently discharge to the Sea via gravity flow, a reduction of Sea elevation will allow IID to link directly to the Sea several large drains that are currently pumped (e.g., Vail Cut-Off and Pumice drains). These drains currently do not allow for movement of pupfish into the drain from the Sea. Connecting these drains directly to the Sea would provide pupfish with access to those pumped drains. Since gravity drains require less cleaning than pumped drains, more vegetative re-growth would be allowed to occur in these drains after they are opened to the Salton Sea. In addition, connection to the Sea would help prevent isolation of population segments.

IID’s commitment to work with the HCP IT to actively increase pupfish habitat in areas exposed by a receding Sea will be limited by the total HCP budget. IID’s financial obligation for creating and managing additional pupfish habitat will be based on the anticipated costs necessary to double the amount of pupfish habitat that currently exists in the IID drains. The HCP IT will have discretion over how the creation of additional pupfish habitat will be designed and managed. The HCP IT also will be allowed to allocate portions of the pupfish habitat budget to conducting studies to better define appropriate means for creating and managing pupfish habitat.
Insert Figure 3.7-2
Figure 3.7-2 backpage
Pupfish - 4. IID will implement a study to evaluate the potential effect of routine drain maintenance on pupfish occupying the drains and to determine the efficacy of modifying maintenance practices to avoid or minimize potential take. The specific requirements of the studies will be developed by the HCP Implementation Team. In the event that the HCP Implementation Team can determine, based on the findings of the evaluation, that modification of the maintenance practices would minimize impacts to pupfish, IID will modify its maintenance practices, if practicable. Modifications in drain maintenance practices could include the timing of sediment and vegetation removal, the direction in which the drains are cleaned (i.e., upstream or downstream), and the manner in which sediment is removed from the channel (e.g., one side only).

Desert pupfish use of habitat within the drains that discharge into the Salton Sea is influenced by flow, water quality, vegetation, and possibly the disturbance regime established by IID’s drain maintenance activities. Pupfish populations also are influenced by interactions with exotic species. IID’s ongoing maintenance activities and implementation of the water conservation program have the potential to influence these factors and to adversely affect the quality of pupfish habitat in the drains. While the continued long-term persistence of pupfish in IID’s drains suggests that IID’s drain maintenance practices (see Chapter 1 description of covered activities) are compatible with pupfish, it is possible that modification of these practices could reduce the potential for maintenance activities to take pupfish. Under this measure, IID will initiate a program to examine the effects of current drain maintenance practices on pupfish and adjust its practices based on the results of the study and the recommendations of the HCP IT. Potential modifications in drain maintenance practices could include the timing of sediment and vegetation removal, the direction in which the drains are cleaned (i.e., upstream or downstream), and the manner in which sediment is removed from the channel (e.g., one side only).

Pupfish - 5. For construction activities (i.e., in-channel modifications) that directly affect pupfish drains, IID will gradually dewater the affected drain segment in a manner that will encourage the downstream movement of pupfish out of the affected area before construction. IID will ensure that a person qualified to capture and handle pupfish and that meets the approval of the USFWS and CDFG will be present during the dewatering process to salvage and transport any pupfish stranded in the affected portion of the drain. Prior to conducting construction activities that could result in the stranding of pupfish, IID will work with the HCP IT to develop guidelines for relocating fish. Salvaged fish will be transported to a safe location downstream of the construction site or to a location determined by the HCP Implementation Team.

Over the term of the HCP, IID anticipates that various construction activities (e.g., reservoir construction, wetland project construction, and mitigation habitat creation) might be located in areas adjacent to drains that support desert pupfish. Although it is likely that IID will have sufficient flexibility in the siting of these construction projects to avoid impacts to desert pupfish in most situations, it is reasonable to assume that it may become necessary for IID to engage in construction activities that could affect pupfish during the term of the HCP. This measure provides a process to help ensure that potential take of desert pupfish associated with these activities is minimized.

Construction activities that require the dewatering and/or removal of drain sections have the potential to strand pupfish if access to downstream habitat is blocked or if pupfish are not given
adequate time to move out of the affected site. To avoid this potential, IID will dewater the affected portion of the drain channel in a manner that allows for the downstream movement of fish out of the construction site. IID will have a person qualified to capture and handle pupfish at the construction site during the dewatering of the drain to salvage any pupfish that do not move downstream. Salvaged pupfish will be transported and released immediately downstream of the construction site or to an alternative location specified by the HCP Implementation Team.

3.7.2.1 Effects on Desert Pupfish
Implementation of the desert pupfish conservation strategy would provide an overall benefit to desert pupfish occupying drains in the HCP area. Under the conservation strategy, the amount of habitat relative to current conditions would be maintained (Pupfish—1) or increased (Pupfish—3), and the potential for adverse effects on desert pupfish resulting from the water conservation project would be avoided or minimized (Pupfish – 2). The results of the studies that will be carried out under measure Pupfish-4 are expected to further benefit pupfish by providing the information necessary for IID to manage its drainage system in a manner that reduces the potential for incidental take and that encourages the continued persistence of pupfish in the Imperial Valley. Moreover, the possible reconfiguration of existing drains and creation of additional habitat is expected to significantly augment existing pupfish habitat in the Imperial Valley.

3.7.3 Razorback Sucker
Razorback suckers are known to occur in the All American and East Highline Canal systems. This species has also been found in an IID reservoir near Niland. The population in Imperial County is believed to be comprised of old members of a dwindling, non-reproductive, remnant stock (Tyus 1991; Minckley et al. 1991). No recruitment of wild-spawned fish occurs.

Razorback suckers in the HCP area are isolated from the main razorback sucker population in the Colorado River and its tributaries. Because they are isolated from the main population and are not known to be reproducing, razorback suckers in the HCP area are not contributing to the overall razorback sucker population. As a result, loss of these individuals would have no effect on the razorback sucker population. Although take of individual razorback suckers in the IID canals system would not impact the species’ population, IID will implement measures to minimize mortality of suckers as a result of canal dewatering.

**Razorback Suckers - 1.** IID will ensure that a person qualified to capture and handle razorback suckers and that meets the approval of the USFWS and CDFG will be present during the dewatering of canals to salvage and transport any razorback suckers stranded in the affected portion of the canal. Salvaged fish will be transported to the Colorado River. The HCP IT will develop a procedure for salvaging and returning fish to the Colorado River consistent with other procedures for handling razorback suckers.

This measure was derived from measures for razorback suckers required by the USFWS in the Biological Opinion for the AAC Lining Project (USFWS 1996). By salvaging any razorback suckers found in the canal system when canals are dewatered and returning these fish to the LCR, loss of these could be avoided. If left in the canal system when the canal is dewatered, any
suckers in the canal would certainly be lost. Under this measure, fish will be salvaged and returned to the LCR where they could contribute to the overall population.

3.8 Agricultural Field Habitat

3.8.1 Amount and Quality of Habitat in the HCP Area

Irrigated agricultural land is the dominant land cover type in the Imperial Valley, and comprises most of the HCP area. Foraging is the predominant use of agricultural fields by covered species although they are also used as resting habitats (Shuford et al. 2000). IID’s Service Area encompasses approximately 500,000 acres of irrigated agriculture. The amount and types of crops grown in the HCP area varies from year-to-year and different species use different crop types. Despite this variability, a few crop types appear to be preferred by the covered species. These crops are

- Alfalfa
- Sudan grass
- Bermuda grass, and
- Wheat

Historically, alfalfa has been a predominant crop in the Imperial Valley, comprising about 27 to 43 percent of the agricultural acreage (Figure 3.8-1). In contrast, the amount of Sudan grass and Bermuda grass only recently has become a significant crop in the HCP area (Figures 3.8-1 and 3.8-2). In the 1970s both of these crops comprised less than 1 percent of the agricultural acreage in the Imperial Valley, but in recent years, both have exceeded 10 percent of the agricultural acreage in the valley.

3.8.2 Effects of the Covered Activities

Over the term of the permit, covered species using agricultural fields in the Imperial Valley could be directly affected by some of the covered activities. Many of the activities covered by the HCP consist of activities conducted by IID to maintain and operate its conveyance and drainage systems. These O&M activities are limited to IID’s rights-of-way that are adjacent to but not within agricultural fields. As such they have very limited potential to impact a covered species. The primary activities covered by the HCP with a potential to affect species using agricultural fields are:

- Conversion of land owned by IID that is currently in agricultural production to other covered activities (e.g., creation of managed marsh habitat).
CHAPTER 3: HABITAT CONSERVATION PLAN COMPONENTS AND EFFECTS ON COVERED SPECIES

3-132 DRAFT HABITAT CONSERVATION PLAN

Alfalfa

- 50,000
- 100,000
- 150,000
- 200,000
- 250,000


Year

Acres

Sudan Grass

- 10,000
- 20,000
- 30,000
- 40,000
- 50,000
- 60,000
- 70,000
- 80,000
- 90,000


Year

Acres

FIGURE 3.8-1
Historic Acreages of Alfalfa and Bermuda Grass in the Imperial Valley
FIGURE 3.8-2
Historic Acreages of Sudan Grass and Wheat in the Imperial Valley.
• Various construction activities that could occur in or adjacent to agricultural fields.
• Water conservation measures implemented on farms, including fallowing.

In addition to these activities, depending on the Salton Sea approach followed, changes in the amount of agricultural field habitat could result from implementation of the HCP as well. Table 3.8-1 summarizes the potential effects of the covered activities on species associated with agricultural field habitat. Additional discussion of those activities with the potential to affect covered species using agricultural fields is provided in the following table.

**TABLE 3.8-1**
Potential Effects of Covered Activities on Covered Species Associated with Agricultural Field Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Use and Conservation</strong></td>
<td></td>
</tr>
<tr>
<td>Combined effects of on-farm and system-based water conservation</td>
<td>Combined effects relate to changes in the water quantity and quality in the drains, changes in salinity in the Salton Sea and changes in the water surface elevation at the Salton Sea. Agricultural fields would not be affected by these changes.</td>
</tr>
<tr>
<td>Installation of on-farm water conservation features</td>
<td>Installation and operation of on-farm water conservation features could affect covered species using agricultural field habitat through disturbance as features are installed, and reduction in the amount of agricultural field habitat. Installation of tailwater return systems could result in up to 12,500 acres of agricultural land being converted to tailwater ponds. No effects to covered species from long-term changes in irrigation techniques are expected.</td>
</tr>
<tr>
<td>Fallowing</td>
<td>If used for water conservation, fallowing would reduce the amount of land in agricultural production and could change the availability of foraging habitat for covered species.</td>
</tr>
<tr>
<td><strong>Installation of System-Based Water Conservation Features</strong></td>
<td></td>
</tr>
<tr>
<td>Canal lining and piping</td>
<td>Because canal lining activities would be performed within IID’s right-of-way, no changes in the amount of agricultural field habitat would occur. Disturbance to most covered species using field adjacent to canals during the lining process would not be expected because lining would be conducted when the adjacent fields are not being irrigated. Thus, covered species would not be expected to be in areas adjacent to the construction.</td>
</tr>
<tr>
<td>Construction of new canals</td>
<td>IID anticipates constructing about 0.25 miles of canal each year. Because new canals would likely cross agricultural fields, about 2 acres of agricultural field habitat could be removed each year.</td>
</tr>
<tr>
<td>Lateral interceptors</td>
<td>IID could install 16 lateral interceptor systems. The canal and reservoirs comprising these systems predominantly would be located in agricultural fields. About 1,480 acres of agricultural field habitat could be lost if all of the systems were constructed.</td>
</tr>
</tbody>
</table>
### TABLE 3.8-1
Potential Effects of Covered Activities on Covered Species Associated with Agricultural Field Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoirs</td>
<td>IID currently does not have any reservoirs in design, but anticipates constructing up to 100 reservoirs during the 75-year permit term. These reservoirs would be 1 to 10 acres in size, with a capacity ranging from about 5 to 30 AF. It is anticipated that most of these reservoirs would be located in agricultural fields. Up to 1,000 acres of agricultural field habitat could be lost from reservoir construction. In addition to reservoirs constructed and operated by IID, farmers could construct small regulating reservoirs to facilitate the conservation of water. These 1 to 2-acre reservoirs would be constructed to better regulate irrigation water applied to fields and to settle suspended solids prior to introduction into drip irrigation systems. IID anticipates that these reservoirs could be used on up to 50 percent of the agricultural land in its service area. A single reservoir services about 80 acres of land. About 3,000 of these reservoirs could be constructed, potentially resulting in the loss of about 6,000 acres of agricultural land.</td>
</tr>
<tr>
<td>Seepage Recovery Systems</td>
<td>Seepage recovery systems would be installed adjacent to but not within agricultural fields. Thus, no change in the amount of agricultural field habitat would occur. There would be a minor potential for disturbance of covered species using adjacent agricultural fields during construction activities.</td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td></td>
</tr>
<tr>
<td>Conveyance system operation</td>
<td>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.</td>
</tr>
<tr>
<td>Drainage System Operation</td>
<td></td>
</tr>
<tr>
<td>Rerouting or constructing new drains</td>
<td>IID reroutes or constructs about 2 miles of drains every 10 years. With a standard drain right-of-way, of about 80 feet, about 19 acres of agricultural field habitat could be impacted every 10 years.</td>
</tr>
<tr>
<td>Piping drains</td>
<td>Over the 75-year term IID anticipates that about 50 miles of open drains would be pipelined. If the land formerly occupied by the open drain is farmed, an additional 485 acres of agricultural habitat could be supported as drains are piped.</td>
</tr>
<tr>
<td>Inspection activities</td>
<td>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.</td>
</tr>
<tr>
<td>Canal lining maintenance</td>
<td>These activities are limited to IID’s rights-of-way along the canals and drains and around reservoirs. Because they do not extend into adjacent agricultural fields, they would not result in changes in the amount of agricultural field habitat. Effects are limited to a minor potential to disturb covered species using agricultural fields adjacent to the drain, canal or reservoir where the maintenance is being conducted.</td>
</tr>
<tr>
<td>Right-of-way maintenance</td>
<td></td>
</tr>
<tr>
<td>Embankment maintenance</td>
<td></td>
</tr>
<tr>
<td>Erosion maintenance</td>
<td></td>
</tr>
<tr>
<td>Seepage maintenance</td>
<td></td>
</tr>
<tr>
<td>Structure maintenance</td>
<td></td>
</tr>
<tr>
<td>Pipeline maintenance</td>
<td></td>
</tr>
<tr>
<td>Reservoir maintenance</td>
<td></td>
</tr>
<tr>
<td>Sediment removal</td>
<td></td>
</tr>
<tr>
<td>Vegetation control</td>
<td></td>
</tr>
<tr>
<td>New and Alamo River Maintenance</td>
<td>River maintenance activities occur in and immediately adjacent to the river channels. Because river maintenance activities do not extend into adjacent agricultural fields, they would not result in changes in the</td>
</tr>
</tbody>
</table>
TABLE 3.8-1
Potential Effects of Covered Activities on Covered Species Associated with Agricultural Field Habitat

<table>
<thead>
<tr>
<th>Activity</th>
<th>Potential Effects (Positive and Negative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salton Sea dike maintenance</td>
<td>Salton Sea dike maintenance activities consist of replacing riprap, grooming embankments and repairing damaged sections of the dikes. Because the maintenance activities would occur on the sea side of the dikes, no change in habitat would occur with these activities and no disturbance of covered species would be expected.</td>
</tr>
<tr>
<td>Gravel and Rock Quarrying</td>
<td>Quarries are not located in or immediately adjacent to agricultural fields. Therefore, no impacts to covered species using agricultural fields would occur from quarrying.</td>
</tr>
<tr>
<td>Fish Hatchery Operation and</td>
<td>The fish hatchery is a developed facility and does not contain habitat for covered species associated with agricultural fields.</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
</tr>
<tr>
<td>Recreational facilities</td>
<td>New recreational facilities would be developed within IID's rights-of-way and therefore would not affect agricultural field habitat. Effects to covered species are limited to a minor potential to disturb covered species using agricultural fields adjacent to the rights-of-way. The HCP does not cover take of covered species by recreationists.</td>
</tr>
<tr>
<td>HCP/EIS/EIR Mitigation</td>
<td>Th DHCS includes construction of managed marsh. If located on agricultural lands, up to 652 acres of agricultural fields would be converted to managed marsh.</td>
</tr>
<tr>
<td></td>
<td>Approach 1 of the SSCS consists of constructing and operating a hatchery and constructing 5,000 acres of ponds. Construction of the habitat would require about 50 acres and would probably be located on agricultural land. The 5,000 acres of ponds also would be constructed on agricultural fields.</td>
</tr>
<tr>
<td></td>
<td>Approach 2 of the SSCS includes the option of conserving additional water (beyond that required for the water conservation and transfer program) to use to avoid changes in inflow to the sea. Fallowing could be used to generate this additional water which would reduce the amount of agricultural field habitat.</td>
</tr>
<tr>
<td>Land use changes</td>
<td>IID leases out about 1,169 acres of land for agricultural production. IID could convert this land to another use (e.g., managed marsh) resulting in a reduction in the amount of agricultural land.</td>
</tr>
</tbody>
</table>

The HCP covers conversion of land owned by IID from agricultural production to other covered uses (e.g., creation of managed marsh habitat). It does not cover other landowners that convert their lands to non-agricultural uses. Fallowing is considered an agricultural land use and fallowing by landowners in the IID service area is covered by this HCP. IID owns about 6,600 acres of land in the irrigated portion of the Imperial Valley and about 6,100 acres of land adjacent to the Salton Sea. About 1,167 acres of land leased from IID is in agricultural production (see Table 1.7-5). This land represents about 0.2 percent of the irrigated lands in the HCP area. Thus, even if all of IID land in agricultural production was converted to another use, agricultural field habitat would remain abundant in the HCP area.
System improvements that could eliminate some agricultural field habitat are construction of new canals, installation of lateral interceptors, and construction of new reservoirs. These activities could remove about 8,630 acres of agricultural field habitat over the term of the permit. Relative to the entire irrigated area of Imperial Valley that covers about 500,000 acres, this potential loss constitutes about 1.7 percent of the agricultural land. Because construction would not occur in agricultural fields under active production, the potential for disturbance of covered species using this habitat would be minor.

Farmers in the IID service area could implement a variety of measures to conserve water, including the following:

- Installing tailwater return systems
- Dividing fields into level basins
- Installing drip irrigation systems
- Shortening furrows/ border strips
- Narrowing border strips
- Implementing cutback irrigation
- Laser leveling fields
- Changing field slopes to improve water distribution uniformity
- Employing cascading tailwater systems

Installation of tailwater return systems could result in a small amount of land being taken out of production to accommodate a tailwater pond. Tailwater ponds typically have about a 3-4 AF-capacity and cover 1 to 2 acres. Assuming an average farm size of 80 acres, a 2 acre tailwater return pond could eliminate about 2.5 percent of the area from agricultural production. If all farms installed tailwater systems, a 2.5 percent reduction in farmed area throughout the Imperial Valley would amount to about 12,500 acres. Farmers typically locate tailwater return ponds in the least productive portions of their fields particularly areas that are farmed irregularly such that the actual loss in agricultural field habitat likely would be less than 12,500 acres in the extreme case that all farms installed tailwater return systems. Tailwater return systems are installed when no crops are being produced, typically during the summer. Because they would be installed when no crops were being grown on the field, the potential for disturbance to covered species would be limited.

Operation of a tailwater return system requires pumping water from the tailwater pond back up to the field head. In the Imperial Valley, farmers usually use diesel-powered pumps because they are less expensive to operate. However, some farmers could use electric pumps, requiring IID to erect additional power lines to provide power to the pumps. Although the additional power lines would be short, up to 0.5 mile, and distributed throughout the valley, they could result in take, if covered bird species fly into the power lines.

Installing drip irrigation systems would require a minor amount of temporary ground disturbance, resulting in a minor potential for disturbance of covered species. Installations of drip systems would occur between crops, therefore, no temporary or permanent changes in the amount of agricultural field habitat would occur.

The remaining water conservation techniques require reconstruction/ recontouring of an agricultural field. Covered species using agricultural field habitat could be disturbed during the
reconstruction/recontouring. However, because reconstruction/recontouring would be conducted when no crops are being grown on the field, the potential for disturbance to covered species is limited. No change in the amount of agricultural field habitat would occur as a result of reconstruction/recontouring of agricultural fields to achieve water conservation.

While farmers would implement various water conservation practices, these practices are not expected to change irrigation practices in a manner that would reduce habitat suitability for covered species. A given crop consumes a certain amount of water. This consumptive use would not change with water conservation and a given crop would need to be irrigated at the same frequency as under existing irrigation practices. The water conservation techniques would reduce the amount of tailwater (i.e., surface water that runs off the field), not the amount of water consumed by the crops. Also, with the exception of drip irrigation systems, the water conservation techniques improve the efficiency of a surface irrigation practice, rather than change how the crop is irrigated. For example, tailwater return systems collect and store water from a flood irrigated field for use in subsequent flood irrigations. The improved efficiencies would be manifested as a reduction in the amount of water leaving the field as tailwater.

In addition to the water conservation measures discussed above, fallowing could be used to conserve water for transfer and in complying with the Inadvertent Overrun Policy. Fallowing could reduce the acreage of irrigated agriculture available in the HCP area at any one time. If only fallowing was used to generate 300 KAF of conserved water, about 50,000 acres of land would be needed. To comply with the IOP, an average of 9,800 acres of land would need to be fallowed. Combined, these acreages represents about 12 percent of the irrigated area within the IID Service Area. Even with this reduction, agricultural field habitat would remain abundant in the IID Service Area, consisting of about 440,000 acres remaining in agricultural production.

The HCP measures for the Salton Sea also could reduce the acreage of agricultural fields in active production depending on the approach selected. Approach 1 of the SSCS includes constructing and operating a hatchery to stock fish in the Salton Sea until the fish can no longer survive and grow. At that point, IID would construct 5,000 acres of ponds to continue to support fish for piscivorous birds. These ponds would be constructed on agricultural land and therefore, this approach would reduce the amount of agricultural land by a small amount.

Approach 2 of the SSCS entails generating mitigation water such there would be no change in inflow to the Salton Sea with implementation of the water conservation and transfer programs. Fallowing could be used for this water conservation. The amount of land that would need to be fallowed would depend on how water for transfer was conserved. If fallowing was used to generate all of the 300 KAFY of water for transfer, then about 25,000 acres of land would need to be fallowed for mitigation water. Under this scenario, a total of 75,000 acres of land would be fallowed. If on-farm and system-based measures were used to conserve 300 KAFY of water for transfer, then about 75,000 acres of lands would be needed for mitigation water.

The acreages presented above of agricultural field habitat potentially affected under the water conservation and transfer programs represent worst-case estimates for each of the covered activities and are not additive. For example, farms that fallowed land to achieve water conservation would not install tailwater return systems. The ultimate amount of agricultural land that could be taken out of production to implement the water conservation and transfer programs is uncertain because it would be influenced by the mix of water conservation
measures that are implemented. Nonetheless, any change in the amount of agricultural land would be within the ranges presented above.

3.8.3 Approach and Biological Goals
The biological goal of the agricultural field conservation strategy is to maintain agriculture as the primary economic enterprise in IID’s Service Area to continue to provide foraging habitat for covered species associated with agricultural field habitat. This goal is to be achieved by implementing the water conservation and transfer programs for the IID/ SDCWA Water Transfer Agreement and the QSA, and this HCP. Species that exploit agricultural habitats would continue to be supported with implementation of water conservation and transfer programs and HCP because successful implementation of these programs would encourage continued agricultural production.

3.8.4 Agricultural Field Habitat Strategy
Agriculture is the primary economic enterprise within IID's service area. Agriculture in the Imperial Valley is dependent upon a secure right to divert and use Colorado River water for irrigation purposes and an efficient system of drainage. IID holds very senior water rights under priorities 3, 6, and 7 of the Seven Party Agreement, which allocates California’s share of Colorado River water among California entitlement holders. For years, however, other California water agencies, including the QSA parties, have challenged the amount and use of Colorado River water diverted by IID under its senior water rights. IID also has been required to develop a conservation program, and specifically to consider water transfers, as a result of SWRCB regulatory proceedings in the 1980s, as set forth in Decision 1600 (1984) and Order 88-20 (1988).

A couple key objectives of the IID/ SDCWA Transfer Agreement include (1) implementation of a water conservation and transfer program without impairing IID's historic senior-priority water rights, in a manner consistent with state and federal law; and (2) to provide a means of financing conservation measures, including environmental and other implementation costs. Thus, the water transfer program is intended to protect and preserve IID’s water rights and the feasibility and economic viability of agriculture production within IID's service area. In addition, the QSA will settle, by consensual agreement, longstanding disputes among the QSA parties regarding the priority and use of Colorado River water by IID, and it will confirm IID’s right to implement the water transfers specified in the QSA. Thus, the QSA will enhance the certainty and reliability of Colorado River water supplies available to IID and will assist IID in meeting demands for water for agricultural use, thus facilitating continued agricultural production.

As explained in Chapter 1, the purpose and need for the HCP stems from IID’s requirement for long-term regulatory certainty in committing to the IID/ SDCWA Transfer Agreement and QSA. Long-term no-surprises assurances regarding ESA compliance measures and costs are needed by IID to commit to the long-term investment obligations of the IID/ SDCWA Transfer Agreement and QSA. Thus, incidental take authorization and unlisted species assurances is integral to implementing the water transfer programs, which in turn are critical to ensuring that agriculture will continue to be the primary land use in the Imperial Valley.
With a few exceptions, the covered species that use agricultural fields in the Imperial Valley would probably not occur in the Imperial Valley in the absence of agriculture. Before the cultivation of the Imperial Valley, desert habitat predominated and supported wildlife species associated with this habitat. With agricultural production, the Imperial Valley attracted wildlife capable of exploiting this new resource and with a tolerance for regular human activity. The continued use of the Imperial Valley by these species depends primarily upon the perpetuation of agricultural production. The regulatory certainty provided by the incidental take authorization and assurances obtained with implementation of the HCP combined with implementation of the water transfer programs would increase the likelihood that agricultural production will remain the predominant land use in the HCP area.

Although the primary concern for covered species associated with agricultural field habitat is the persistence of agriculture in the Imperial Valley, a potential for covered bird species to be killed or injured by powerlines associated with pumps for tailwater return systems was identified. Under the HCP, IID will implement the following measure to minimize this potential impact.

Agriculture - 1. If IID builds additional power lines to provide power to pumps to run tailwater return systems, IID will install markers (e.g., flagging, balls, discs) on the new power lines to alert birds to the presence of the power lines.

### 3.8.5 Effects on Habitat

#### 3.8.5.1 Direct Effects of the Covered Activities

Implementation of the water conservation and transfer programs could result in a reduction in the amount of land in agricultural production at any one time. The amount of agricultural land affected would depend on the mix of water conservation techniques. To conserve water for transfer, fallowing could result in up to 50,000 acres of agricultural land being taken out of active production for one or more seasons. Other conservation techniques would result in a substantially smaller reduction in the acreage of agricultural land. With the exception of the HCP measures for the Salton Sea, other covered activities would have only minor effects on the amount of agricultural land. As described previously, depending on the approach selected for the Salton Sea, up to 75,000 acres of agricultural land could be taken out of production for fallowing for mitigation water or for 5,000 acres of ponds.

#### 3.8.5.2 Changes in Cropping Patterns

The crops grown in the Imperial Valley are based on the decisions of individual farmers. Current and anticipated market prices are an important consideration for the farmers in deciding which crops to grow. As a result, the types and amount of crops grown fluctuate from year-to-year as is illustrated by the types and acreages of crops grown in the IID during 1974 to 2000 (Appendix E).

Historically, IID’s water deliveries to farmers have ranged from about 2.4 MAFY to 3.4 MAFY, a range of 1 MAFY. Under the water conservation and transfer programs, up to 300 KAFY would be conserved. This level of water conservation is within the range of historic variability in IID’s annual deliveries to farmers. Because of weather (hot), soil types (high clay content) and irrigation water quality (salinity), certain crops grow better than others in this environment and
as a result, it is expected that the same crop mix will continue to be grown into the future. Thus, cropping patterns in the future would be expected to be within the range of historic variability.

3.8.6 Effects on Covered Species

Covered species potentially using agricultural field habitats 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. The effects of implementing the HCP on listed species (state and/or federal) associated with agricultural field habitat are evaluated for each individual species below. In addition, the effects on other species that regularly use agricultural fields in the Imperial Valley are individually evaluated. The effects of implementing the HCP on transient species are summarized in Table 3.8-2.

3.8.6.1 Mountain Plover

Mountain plover is a common winter visitor to the Salton Sea Basin. The Imperial Valley has one of the mountain plover's largest wintering populations in the Pacific Flyway. During February 1999 surveys, 2,486 individuals were counted in the valley. This number represents about half of the California population and about one quarter of the North American population.

Installation of water conservation measures in agricultural fields would not be expected to affect mountain plovers. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Mountain plovers only occur in the HCP area during the winter and therefore, would not be in the area when this work was being conducted. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur during the winter when plovers are in the HCP area. These activities could flush birds if the construction occurred in areas used by mountain plovers for foraging.

In the Imperial Valley, mountain plovers are strongly associated with agricultural fields. Recent studies have found mountain plovers to most frequently use grazed alfalfa, and burned Bermuda grass fields. They have also been reported to forage in plowed fields and sprouting grain fields during the winter.
<table>
<thead>
<tr>
<th>Species</th>
<th>Occurrence in HCP Area</th>
<th>Habitat Use in the HCP Area</th>
<th>Potential Effects of HCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prairie falcon</td>
<td>Rare migrants throughout the year</td>
<td>Probably visits agricultural fields and the Salton Sea shoreline to prey on shorebirds; also could occur in desert habitat</td>
<td>No effect expected from installation of conservation measures. Potential reduction in agricultural field habitat would not affect prairie falcons because of the small numbers of birds, the limited time period that they occur in the HCP area, and the abundance of agriculture fields and other habitats that can be used for foraging.</td>
</tr>
<tr>
<td>Golden eagle</td>
<td>Accidental during spring and winter</td>
<td>Probably visits agricultural fields and managed marshes on the state and federal refuges to prey on wintering and migrating waterfowl.</td>
<td>No effect expected from installation of conservation measures. Potential reduction in agricultural field habitat would not affect golden eagles because of the small numbers of birds, the limited time period that they occur in the HCP area, and the abundance of agriculture fields and other habitats that can be used for foraging.</td>
</tr>
<tr>
<td>Merlin</td>
<td>Rare visitor during fall and winter</td>
<td>Probably concentrates foraging at Salton Sea where shorebirds are abundant. Could also prey on shorebirds and songbirds using managed and unmanaged marshes, tamarisk scrub habitat, and agricultural fields.</td>
<td>No effect expected from installation of conservation measures. Potential reduction in agricultural field habitat would not affect merlins because of the small numbers of birds, the limited time period that they occur in the HCP area, and the abundance of agriculture fields and other habitats that can be used for foraging.</td>
</tr>
<tr>
<td>Black swift</td>
<td>Accidental during spring</td>
<td>Could use a wide variety of habitats in the HCP area.</td>
<td>No effect expected from installation of conservation measures. Potential reduction in agricultural field habitat would not affect swifts because of the small numbers of birds, the limited time period that they occur in the HCP area, and the abundance of agriculture fields and other habitats that can be used for foraging.</td>
</tr>
<tr>
<td>Vaux’s swift</td>
<td>Common spring migrant; uncommon fall migrant</td>
<td>Known to congregate at north end of the Salton Sea during migration; could use wide variety of habitats in the HCP area.</td>
<td>No effect expected from installation of conservation measures. Potential reduction in agricultural field habitat would not affect swifts because of limited time period that they occur in the HCP area, and the abundance of agriculture fields and other habitats that can be used for foraging.</td>
</tr>
<tr>
<td>Purple martin</td>
<td>Occasional spring and fall migrant</td>
<td>Could use a wide variety of habitat is the HCP area.</td>
<td>No effect expected from installation of conservation measures. Potential reduction in agricultural field habitat would not affect purple martins because of the small numbers of birds, the limited time period that they occur in the HCP area, and the abundance of agriculture fields and other habitats that can be used for foraging.</td>
</tr>
</tbody>
</table>
Depending on the water conservation measures and Salton Sea approach implemented the amount of agricultural land in production could be reduced by about 15 percent. This potential reduction is not expected to adversely affect mountain plovers for several reasons. Plover abundance in the Imperial Valley does not appear to be related to the availability of preferred crop types. Bermuda grass currently is one of the most commonly used crop types by plovers. The acreage of Bermuda grass was very low in the 1970s but is currently abundant (Figure 3.8-1). During this same period, the relative abundance of mountain plovers showed no discernable trend (Figure 3.8-3). These data suggest that foraging habitat availability is not limiting and that a potential reduction in agricultural acreage would not have any effect on mountain plovers.

Plovers also show an affinity for grazed alfalfa. Sheep graze alfalfa in the Imperial Valley from October through March, approximately the period when mountain plovers are in the valley. As with crops, the number of sheep grazed in the valley (Figure 3.8-4) and hence the acreage of alfalfa grazed varies from year to year. Like Bermuda grass, mountain plover relative abundance appears unrelated to the level of sheep grazing, and hence the acreage of grazed alfalfa. Further, the amount of grazed alfalfa is not expected to change as a result of the water conservation and transfer programs. The Imperial Valley provides important winter range for sheep. As long as there is a demand for winter pasture, sheep grazing will continue in the Imperial Valley. Implementation of the water conservation programs would not change the demand for winter range. Therefore, the current availability of grazed alfalfa would not change because of the water transfer project and no adverse effects to mountain plovers would occur.

Preliminary research also suggests that plovers avoid fields being irrigated with sprinklers; the reasons for this pattern is uncertain. Implementation of the water conservation and transfer programs would not change the level of use of sprinklers for irrigation in the Imperial Valley. Sprinkler systems are primarily used to germinate seed and for cooling of young crops planted in late summer; use of sprinklers for irrigation is limited. The need to use sprinklers for germination and cooling would continue with implementation of the water conservation and transfer programs. Use of sprinklers would not increase because it is not a favorable irrigation method in desert environments due to high evaporative losses.

3.8.6.2 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. In other parts of its range, the Swainson’s hawk frequents alfalfa fields and lightly grazed pasture. Similar types of agricultural fields likely are used in the Imperial Valley.

Installation of water conservation measures in agricultural fields would not be expected to affect Swainson’s hawks. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Swainson’s hawks only occur in the HCP area during the spring and fall and therefore, would not be in the area when this work would be conducted. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur during periods when Swainson’s hawks are in the HCP area. The occurrence of these
CHAPTER 3: HABITAT CONSERVATION PLAN COMPONENTS AND EFFECTS ON COVERED SPECIES

FIGURE 3.8-3
Christmas Bird Count Results for the Salton Sea (South end) for Mountain Plover.

FIGURE 3.8-4
Number of Sheep Grazed in the Imperial Valley
activities in agricultural fields would not affect foraging by Swainson's hawks. These hawks typically forage by spotting prey while flying and then diving to capture the prey. Because they often forage in association with operating farm equipment, they would not be disturbed by construction activities.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Few Swainson's hawks occur in the HCP area and those that do are there for only brief periods during their spring or fall migrations. The USFWS (1997) characterizes them as occasional visitors with normally fewer than five individuals each season (spring and fall) at the Salton Sea NWR. Swainson's hawks commonly use alfalfa fields. In the Imperial Valley, the acreage of alfalfa has varied from about 158,000 to 222,000 (i.e., 27 to 43 percent of the agricultural land in the Imperial Valley). Because of the small numbers of hawks, the limited time period that they occur in the HCP area and the abundance of agriculture fields, Swainson's hawks would not be expected to be affected by the changes in the amount of agricultural land anticipated under this HCP.

3.8.6.3 Greater Sandhill Crane

Installation of on-farm water conservation measures in agricultural fields would not be expected to affect greater sandhill cranes. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Sandhill cranes only occur in the HCP area during the winter and therefore, would not be in the area when this work was being conducted. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur during periods when sandhill cranes are in the HCP area. Construction activities have a potential to flush birds if the construction occurred in or adjacent to areas used by sandhill cranes for foraging.

Small numbers (up to 300 individuals) of greater sandhill cranes winter in the Imperial Valley. Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Wintering birds feed in irrigated croplands and pastures. Grains such as wheat, sorghum, barley, oats are important winter foods. The acreage of wheat in the Imperial Valley has fluctuated from 32,500 to about 175,000 acres. Sorghum, barley and oats are minor commercial crops in the Imperial Valley. Cranes have continued to winter in the Imperial Valley through this wide fluctuation in the amount of wheat. The magnitude of the potential change in the total amount of agricultural land is within the range of variability in wheat and only a portion of fallowed agricultural land, if any, would consist of crops used by cranes. Further, the state and federal refuges plant cereal grains such as wheat, rye and barley that provide foraging opportunities for cranes. Because of the small numbers of cranes, the abundance of agriculture fields, and management of lands on the refuges for grain, greater sandhill cranes would not be expected to be affected by the changes in the amount of agricultural land anticipated under this HCP.

3.8.6.4 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.

3.8.6.5 Short-eared Owl

Short-eared owls are rare winter visitors to the Salton Sea area, but are more common in the fall. Still, the number of owls occurring in the HCP area is small. The USFWS (1997) characterizes them as occasional visitors with normally fewer than five individuals at the Salton Sea NWR.

Short-eared owls are not expected to be affected by installation of water conservation measures in agricultural fields. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Short-eared owls only occur in the HCP area during the fall and winter, and therefore, would not be in the area when this work was being conducted. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur during fall or winter. The occurrence of these activities in agricultural fields are unlikely to affect foraging by short-eared owls because owls primarily hunt at night when construction activities would be occurring.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Only a few short-eared owls use the HCP area as wintering habitat and migrants would only occur in the HCP area for brief periods of time. Short-eared owls commonly forage in alfalfa fields but also use pasture, and marshes, and probably other grass-type crops such as wheat, Sudan grass, and Bermuda grass. In the Imperial Valley, the acreage of alfalfa has varied from about 158,000 to 222,000 (i.e., 27 to 43 percent of the agricultural land in the Imperial Valley). Because of the small numbers of owls and the abundance of agriculture fields, short-eared owls would not be expected to be affected by the changes in the amount of agricultural land anticipated under this HCP.

3.8.6.7 Aleutian Canada Goose

Aleutian Canada geese occur in the HCP area as fall migrants and winter residents where they forage in the wetland areas around the Salton Sea and in the agricultural fields throughout the Imperial Valley. The primary overwintering area for this subspecies is in the San Joaquin Valley of California and use of the HCP area is limited.

Installation of on-farm water conservation measures in agricultural fields would not be expected to affect Aleutian Canada geese. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Canada geese only occur in the HCP area during the fall and winter and therefore, would not be in the area when this work was being conducted. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur during periods when geese are in the HCP area. Construction activities could flush birds if the construction occurred in or adjacent to areas used by Aleutian Canada geese for foraging.
Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Wintering birds are attracted to grain fields. In the Imperial Valley, grains are commercially produced but also are grown on the refuges specifically to provide forage for wintering geese. With management of the refuges for geese and the overall abundance of agricultural fields in the Imperial Valley, Aleutian Canada geese would not be expected to be affected by the changes in the amount of agricultural land anticipated under this HCP.

### 3.8.6.8 Ferruginous Hawk

Ferruginous hawks regularly occur in the Imperial Valley in small numbers during the winter. This species forages in agricultural fields for small mammals such as rabbits, ground squirrels and mice. Ferruginous hawks would be expected to forage in a wide variety of crop types as long as prey were abundant and were accessible.

Installation of water conservation measures in agricultural fields would not be expected to affect ferruginous hawks. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Ferruginous hawks only occur in the HCP area during winter and therefore, would not be in the area when this work would be conducted. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur when ferruginous hawks are in the HCP area. However, the occurrence of these activities in agricultural fields would not affect foraging by ferruginous hawks. In foraging, these hawks soar and then dive from great heights to capture prey and likely would not be disturbed by construction activities.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. This potential reduction in agricultural fields is not likely to affect ferruginous hawks. Even with a 15 percent reduction, the Imperial Valley would support about 425,000 acres of agricultural field habitat. Much of this acreage is expected to consist of crops favorable to foraging by ferruginous hawks (e.g., alfalfa). Given the small number of hawks and large amount of potential habitat, the few ferruginous hawks using the HCP area would have ample foraging opportunities.

### 3.8.6.9 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). 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.

Because snowy plovers predominantly use mudflats and beaches adjacent to the Salton Sea, there is very little potential for activities occurring in agricultural fields to affect them. In the LCR Valley, snowy plovers have been reported to forage in plowed agricultural fields and could do so in the Imperial Valley as well. Even if they do forage in agricultural fields, the potential for the covered activities to affect this species is minimal. Foraging birds could be displaced if construction activities to install on-farm or system-based conservation measures...
or create managed marsh were conducted in fields where the birds were foraging. Because of their apparent preference for foraging at the Salton Sea, a potential reduction in the amount of agricultural field habitat would not be expected to reduce foraging opportunities for snowy plovers.

3.8.6.10 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 irrigated agricultural fields at some times (Shuford et al. (1999).

Installation of water conservation measures in agricultural fields and construction of system-based conservation measures or managed marsh would not be expected to affect black terns. Black terns are attracted to agricultural fields during irrigations when insects are displaced and are easy to capture. Construction activities would not be conducted while the fields were being irrigated and therefore would not affect black terns.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Even with a 15 percent reduction, the Imperial Valley would support about 425,000 acres of agricultural field habitat. Because of the abundance of agricultural field habitat, it is unlikely that the amount of agricultural fields limits the population of black terns in the Imperial Valley. The availability and quality of marshes for breeding both in the Imperial Valley and elsewhere probably is the primary factor affecting the population size (USFWS 1999). Given that it is unlikely that agricultural fields are limiting the level of use of the HCP area, the potential reduction in agriculture would not be expected to affect black terns.

3.8.6.11 Northern Harrier

Northern harriers are common fall and winter residents in the HCP area, but occur only occasionally during the spring and summer. Throughout California, harriers commonly use agricultural fields, particularly alfalfa and pasture, in addition to native habitats such as native grasslands and marshes.

Installation of water conservation measures in agricultural fields would not be expected to affect northern harriers. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. Harriers predominantly occur in the HCP area during fall and winter and therefore, their occurrence in the area when this work would be conducted would be minimal. Construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures could occur when northern harriers are in the HCP area. However, the occurrence of these activities in agricultural fields also would not be expected to affect foraging by northern harriers. In foraging, harriers fly low over vegetation in search of prey and then swoop down to capture prey and likely would not be disturbed by construction activities.
Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Even with a 15 percent reduction, the Imperial Valley would support about 425,000 acres of agricultural field habitat. The abundance of agricultural field habitat is probably not a limiting factor for northern harriers in the Imperial Valley. Rather, the availability of breeding areas and habitat conditions at breeding areas probably have a much greater influence on the number of harriers wintering in the Imperial Valley (see e.g., Remsen 1978). Given that it is unlikely that agricultural fields limit the level of use of the HCP area by northern harriers, the potential reduction in agriculture would not be expected to affect this species.

3.8.6.12 Fulvous Whistling-duck
The Salton Sea area has supported a population as high as about 200 whistling ducks during the spring and summer, with a much smaller breeding population. They forage in marshes and irrigated agricultural field. In the Imperial Valley, alfalfa, corn and grain fields could be used by whistling-ducks for foraging.

Installation of water conservation measures in agricultural fields and construction of system-based conservation measures or managed marsh have a minor potential to disturb fulvous whistling-ducks. These ducks could forage on grain remaining on fields after harvest. If construction occurred in or adjacent to fields where whistling-ducks were foraging, some individuals could be disturbed. The potential for this to occur is considered remote because a relatively small population of whistling ducks inhabits the HCP area and they predominantly occur at the state and federal refuges.

Fulvous whistling-ducks are not expected to be affected by the potential reduction in agricultural field habitat with implementation of the water conservation and transfer programs. As noted above, the HCP area supports a small population. The ducks predominantly use marshes and agricultural fields on the state and federal refuges. Thus, the reduction in agricultural fields potentially occurring with implementation of the water conservation and transfer programs and HCP would not be expected to affect the whistling-duck population. The DHCS actually would increase the amount of managed marsh habitat (see section 3.5).

3.8.6.13 White-tailed Kite
White-tailed kites can occur in the HCP area throughout the year but in small numbers. The highest number of kites reported in one year in the Christmas Bird Count (1940 to 2000) was 10. The USFWS (1997) characterizes them as occasional visitors with normally fewer than five individuals each season (spring, fall, and winter) at the Salton Sea NWR. 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.

Installation of water conservation measures in agricultural fields and construction of system-based conservation measures or managed marsh are unlikely to disturb white-tailed kites. In foraging, white-tailed kites hover in search of prey and then drop down to capture prey. Because they do not forage on the ground, they would not be disturbed by construction activities. While white-tailed kites roost in Bermuda grass fields, construction activities would not be expected to affect roosting kites. Construction would not be
conducted in fields in active agricultural production and therefore kites would not be expected to roost in areas subject to construction.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. A small number of white-tailed kites occur in the HCP area. White-tailed kites forage in alfalfa, Sudan grass and Bermuda grass fields in the Imperial Valley. In the Imperial Valley, the acreage of alfalfa has varied from about 158,000 to 222,000 (i.e., 27 to 43 percent of the agricultural land in the Imperial Valley). Sudan grass and Bermuda grass currently collectively comprise about 25 percent of agricultural land in the valley. Thus, greater than 50 percent of the agricultural area provides potential foraging habitat. Because of the small numbers of kites and the abundance of agriculture fields, white-tailed kites would not be expected to be affected by the changes in the amount of agricultural land anticipated under this HCP.

3.8.6.17 Loggerhead Shrike

In the HCP area, loggerhead shrikes are associated with agricultural fields as well as desert habitat. Shrikes use agricultural fields for foraging. Vegetation along agricultural drains, fence posts, and other natural and manmade structures along the margins of fields provide perch sites from which loggerhead shrikes forage. Drain vegetation could support nesting.

Construction activities to install on-farm or system-based water conservation techniques or managed marsh have a minor potential to affect shrikes. These activities could result in disturbance if shrikes are nesting in vegetation adjacent to construction activities. The potential for this effect is considered very low. The type of equipment used to install the systems (e.g., excavators, graders, dozers) is the same type of equipment that IID uses in conducting its O&M activities. Also, workers are routinely working in and adjacent to the fields. Thus, shrikes nesting adjacent to agricultural fields are probably accustomed to construction equipment and human activity.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Shrikes forage on a wide variety of prey, including insects, small birds, mice, reptiles, and spiders. With this broad diet, food availability is probably not limiting such that the potential loss of some agricultural field habitat would not likely adversely affect loggerhead shrikes.

3.8.6.18 Long-billed Curlew

The long-billed curlew is a common, year-round resident in the HCP area. It is not known to breed in the HCP area (Shuford et al. 1999). The highest count of long-billed curlews in the HCP area was 7,500 birds in August 1995 (Shuford et al. 1999). In the Imperial Valley, long-billed curlews predominantly forage in agricultural fields during irrigations that increase the availability of insects. Curlews also forage on mudflats at the Salton Sea.

Installation of water conservation measures in agricultural fields and construction of system-based conservation measures or managed marsh would not be expected to affect long-billed curlews. Curlews are attracted to agricultural fields during irrigations when insects are displaced and are easy to capture. Construction activities would not be conducted while the fields were being irrigated and therefore would not affect long-billed curlews.
Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Even with a 15 percent reduction, the Imperial Valley would still support about 425,000 acres of agricultural field habitat. Because of the abundance of agricultural field habitat, it is unlikely that the amount of agricultural fields limits the population of long-billed curlews in the Imperial Valley. The availability of and quality of breeding habitat in the species’ breeding range is believed to have been a primary cause of the species’ decline and is still a primary concern for this species. Given that it is unlikely that agricultural fields are limiting the level of use of the HCP area by long-billed curlews, the potential reduction in agriculture would not be expected to affect this species.

3.8.6.19 White-faced Ibis
White-faced ibis occur in the HCP area throughout the year but are most abundant in the winter. The HCP area supports a large wintering population of white-faced ibis. More than 24,000 ibis were recorded at the Salton Sea in 1999, representing about 50 percent of the California population. Agricultural fields are used extensively by ibis for foraging. Alfalfa appears to be the most commonly used crop type, although others such as wheat also are visited.

Installation of on-farm water conservation measures in agricultural fields would not be expected to affect white-faced ibis. On-farm conservation measures would be installed when crops were not being grown, primarily in the summer. The majority of the white-faced ibis using the HCP area occur in the area in the winter, with only a small breeding population. Thus, most of the birds would not be in the area when this work was being conducted. Impacts to ibis present during the summer also would not be expected because ibis forage in agricultural fields during irrigations and on-farm systems would not be installed when fields were being irrigated. For the same reason, construction in agricultural fields required for other covered activities such as creation of managed marsh habitat or system-based conservation measures would not affect ibis.

Depending on the water conservation measures implemented the amount of agricultural land in production could be reduced by about 15 percent. Even with a 15 percent reduction, the Imperial Valley would still support about 425,000 acres of agricultural field habitat. This reduction in agriculture field habitat is not likely to affect white-faced ibis. Loss of marsh habitat and pesticides in breeding areas are believed to be the primary factors contributing to earlier declines in white-faced ibis, rather than conditions on wintering areas (Remsen 1987).

The number of white-faced ibis wintering in the Imperial Valley has increased substantially in the 1990s (Figure 3.8-5). Over the same period, the acreage of alfalfa showed no trend, but rather fluctuated within its historic range (Figure 3.8-1). These findings suggest that the population of white-faced ibis wintering in the Imperial Valley is 1) not limited by the amount of foraging habitat (i.e., alfalfa), and 2) is determined by conditions in the species’ breeding range. Given that the amount of agricultural land is not likely determining the size of the ibis population using the Imperial Valley, the potential reduction in agricultural land would not be expected to affect this species.
3.9 Other Covered Species

Of the 96 species covered by this HCP, the USFWS and CDFG identified 25 species for which existing information on the ecology and distribution in the HCP area is limited or that might not occur in the HCP area. These species are listed in Table 3.9-1. The approach to covering these species is to implement a research program to better understand the presence, distribution, and ecological requirements of these species in the HCP area. Based on the results of the research program, IID will implement measures to avoid, minimize, and mitigate the impacts of any take of these activities resulting from the covered activities.

<table>
<thead>
<tr>
<th>Cheeseweed moth lacewing</th>
<th>Western small-footed myotis</th>
<th>Yuma hispid cotton rat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew's dune scarab beetle</td>
<td>Occult little brown bat</td>
<td>Flat-seeded spurge</td>
</tr>
<tr>
<td>Colorado River toad</td>
<td>Southwestern cave myotis</td>
<td>Banded gila monster</td>
</tr>
<tr>
<td>Lowland leopard frog</td>
<td>Yuma myotis</td>
<td>Jacumba little pocket mouse</td>
</tr>
<tr>
<td>Mexican long-tongued bat</td>
<td>Western mastiff bat</td>
<td>Orcutt's aster</td>
</tr>
<tr>
<td>California leaf-nosed bat</td>
<td>Pocketed free-tailed bat</td>
<td>Foxtail cactus</td>
</tr>
<tr>
<td>Pallid bat</td>
<td>Big free-tailed bat</td>
<td>Munz's cactus</td>
</tr>
</tbody>
</table>

**FIGURE 3.8-5**
Christmas Bird Count results for the Salton Sea (South end) for White-Faced Ibis.
TABLE 3.9-1
Covered Species Addressed Separately from the Habitat – Based and Species-Specific Conservation Strategies

<table>
<thead>
<tr>
<th>Covered Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pale western big-eared bat</td>
</tr>
<tr>
<td>Colorado River hispid cotton rat</td>
</tr>
<tr>
<td>Orocopia sage</td>
</tr>
<tr>
<td>Spotted bat</td>
</tr>
</tbody>
</table>

3.9.1 Measures for the Other Covered Species

**Other Species - 1.** IID will implement a study program for the species listed in Table 3.9-1 in the HCP area. The program will focus on determining the occurrence and distribution of these species in the HCP area and determining their habitat requirements to the degree necessary to develop avoidance, minimization and mitigation measures that meet the issuance criteria for federal and state incidental take permits. IID will commit $625,000 to fund the study program. IID will define the specific surveys and studies to be conducted. Before initiating the studies, IID will submit a detailed description of the study program to the USFWS and CDFG for approval.

To ensure that appropriate and effective conservation measures are implemented for these species, IID will implement a study program designed by the HCP IT to determine the specific occurrence and habitat requirements of these species in the HCP area. The study program will determine the distribution of the covered species listed in Table 3.9-1 in the HCP area. For those species determined to occur in the HCP area, the study program also will provide information on their specific habitat requirements in the HCP. This information will be used in developing appropriate avoidance, minimization and mitigation measures (See Other Species – 2).

**Other Species - 2.** Following completion of the study program or discrete species-specific components of the study program, the HCP IT will meet to review the results. Based on the results of the study program, the HCP IT will

- assess the potential effects of the covered activities on each of the species listed in Table 3.9-1
- recommend measures to avoid, minimize, and mitigate the impacts of the covered activities as necessary to meet the issuance criteria for state and federal incidental take permits
- develop compliance and effectiveness monitoring programs
- identify additional studies necessary to develop measures meet the issuance criteria.

IID will prepare a report of the results of the studies, describes the impacts of the covered activities on the covered species, and proposes avoidance, minimization and mitigation measures for those impacts. IID will submit the report to the USFWS and CDFG for approval of the measures.

IID will reserve $625,000 to fund the minimization and mitigation program. IID will initiate the study program at the time of issuance of the permits and implement appropriate measures within one year of receiving recommendations from the HCP IT.

Prior to completion of the study program or species-specific components of the study program, the HCP IT will annually review the results of the study program. Based on this review the HCP IT will develop interim measures to avoid, minimize and mitigate the impacts of the covered activities on the...
covered species. IID will submit an annual report of the study results and the proposed interim measures to the USFWS and CDFG for approval.

With the information gained through Other Species - 1, the HCP IT will be able to better define the potential impacts to these species from IID’s covered activities. This information also will be important to developing measures to avoid, minimize, and mitigate potential effects of the covered activities on the covered species listed in Table 3.9-1. The final measures to be implemented will be developed in coordination with the USFWS and CDFG as part of the HCP IT and will be subject to their approval. 3.9-1 illustrates the process for implementing the study program, using the information obtained in the study program to develop avoidance and mitigation measures, and obtaining approval from the USFWS and CDFG for the measures. By delaying development of minimization and mitigation measures until additional information is available, better decisions can be made on the minimization and mitigation measures that are necessary and appropriate for compliance with the issuance criteria for incidental take permits under federal and state ESAs.

3.9.2 Effects to the Other Covered Species

Implementation of Other Species-1 and Other Species-2 will provide an overall benefit to these covered species for two principle reasons. First, the habitat requirements and distribution of these species are poorly understood. The information gained through the study program will make a substantial contribution to understanding these species. This information will be valuable in developing management strategies for these species in other portions of their ranges and thereby contribute to the conservation of these species beyond the limits of the HCP area.

Second, under the HCP, IID is committing to implementing measures to avoid, minimize, and mitigate potential effects of covered activities on these species as identified through the study program. In the absence of these measures, any adverse effects of the covered activities to these species would continue. Because none of the covered species in Table 3.9-1 are currently listed, they are afforded minimal to no protection under state or federal law. An individual species could receive protection in the future if it was listed. However, it is uncertain whether any of these covered species would be listed in the future. Also, protection afforded by listing of one of the covered species would only extend to the species actually listed. The remaining covered species would remain vulnerable. The certainty that protective measures would be implemented over an extended period of time (75 years) would provide a long-term benefit to these species in the HCP area, contribute to improved management elsewhere, and possibly prevent the need to list them in the future.
FIGURE 3.9-1
Process for Addressing Other Covered Species