

## **5. Environmental Consequences**

### **5.1 Introduction**

This chapter provides an analysis and evaluation of the environmental consequences of implementing the alternatives described in Chapter 4. Impact evaluation has been conducted for each aspect of the environment described in Chapter 3 – Refuge Resources (i.e., physical environment, biological resources, cultural resources, socio-economic environment). The adverse and beneficial effects of each alternative presented for the Sonny Bono Salton Sea NWR and the Coachella Valley NWR are generally described under several action categories, including wildlife and habitat management (including habitat enhancement and restoration), public use, and where applicable, Refuge operations. Cumulative effects (impacts) on the environment of implementing the alternatives described for each Refuge are presented later in this chapter.

The extent of analysis provided for the wildlife and habitat management, restoration, and public use proposals (strategies) included within each alternative reflects the level of detail currently available for the specific proposal. The environmental effects of implementing the various strategies are evaluated at the project-specific level whenever sufficient detail about the project and its implementation has been presented in Chapter 4. For instance, the analysis of the environmental effects of implementing restoration within Red Hill Bay, presented in Alternatives B and C for the Sonny Bono Salton Sea NWR, is intended to fully comply with NEPA. Other projects that have not yet been designed and/or fully described would require additional review under NEPA prior to project implementation.

It should be noted that the impact analysis for the Salton Sea SCH project, which may include portions of Bruchard Bay that are located within the Sonny Bono Salton Sea NWR, is provided in a separate draft EIS/EIR prepared by the USACOE and California Natural Resources Agency (2011). A complete analysis of the effects of restoring portions of Bruchard Bay in accordance with the Salton Sea SCH project is presented in the draft Salton Sea SCH Project EIS/EIR. Only the conclusions presented in the draft are summarized here. The Service, as a NEPA Cooperating Agency, will continue to work with the State and USACOE on the completion of that document. The draft EIS/EIR is available online at: <http://www.water.ca.gov/saltonsea/habitat/eir2011.cfm>.

### **5.2 Effects to the Physical Environment**

Topics addressed under the physical environment section include direct and indirect effects related to topography, visual quality, geology and soils, geological hazards, paleontological resources, mineral resources, alternative energy resources, agricultural resources, hydrology/water quality, climate change, air quality, greenhouse gas emissions, and contaminants.

Noise is not addressed in this section because the activities proposed on both Refuges would generate noise well below applicable county noise standards. In addition, the Sonny Bono Salton Sea NWR is not located in proximity to any sensitive noise receptors (e.g., residential uses) and sites within the Coachella Valley NWR where potential actions could occur are located at least 400 feet from any sensitive noise receptors. Finally, mineral resources are not addressed in this section because no important mineral resources, including significant PCC-grade aggregate deposits, occur within the boundaries of either Refuge.

The criteria used in this document to determine if a particular impact represents a significant adverse effect are present here for each topic.

- Topography – An adverse topographic effect is considered significant if grading or other land altering activity is proposed in a highly scenic area or would alter a locally or regionally important topographic landmark, or if any proposed activities would substantially alter the existing landform.
- Visual Quality –An adverse visual impact would be considered significant if an action were to noticeably reduce the scenic quality, as seen from any high-sensitivity foreground or middle ground viewpoint or block or disrupt existing views or substantially reduce public opportunities to view scenic resources.
- Geology/Soils – Impacts related to geology and soils would be considered significant if a proposed action would trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion affecting on-site facilities or adjacent facilities, such as roadway embankments and bridge abutments. Impacts would also be considered significant if any proposed structures would be susceptible to geological hazards, such as liquefaction, settlement, ground rupture, or lateral spreading; or if the action would result in a change in or loss of a unique geologic resource.
- Paleontological Resources – A significant adverse effect related to paleontological resources would occur if a proposed action could directly or indirectly damage a unique paleontological resource or site, or if proposed excavation would disturb the substratum or parent material below the major soil horizon in a paleontologically sensitive area.
- Alternative Energy Resources - A significant adverse effect related to alternative energy resources would occur if a proposed action would result in conflicts between the proposed action and an existing or planned geothermal plant, solar project, or other alternative energy resource project and its associated infrastructure.
- Agricultural Resources – A proposed action would result in a significant adverse effect on agricultural resources (Prime Farmland, Farmland of Statewide Importance, Unique Farmland, and Farmland of Local Importance, as classified by the Farmland Mapping and Monitoring Program of the California Resources Agency), if its implementation would contribute to the irreversible conversion of farmland to nonagricultural uses.
- Hydrology – An adverse hydrologic effect is considered significant if an action would result in increased storm flooding on- or off-site, a net deficit in the aquifer volume, a drop in the local groundwater table, or changes in historical storm flow direction and velocities that would trigger or accelerate slope/bank instability or erosion affecting facilities located both on and off the Refuge. The significance threshold would also be reached if an action were to substantially impair a water body, the health of the watershed, or the functionality of major rivers, wetlands, or floodplains.
- Water Quality – Adverse impacts to water quality would be considered significant if the action would violate any water quality standards or waste discharge requirements, substantially increase sedimentation or turbidity in water courses, introduce contaminants (non-point source pollution) into the watershed, or otherwise substantially degrade water quality.

- Climate/Climate Change – The predicted effects of climate change on a proposed action would be considered significant if these effects would substantially alter or degrade sensitive habitats and/or habitats that support listed species, migratory birds, or other species of concern. In addition, effects of climate change would be considered significant if Refuge property, such as structures, trails, roads, signage, and other facilities, could be damaged or destroyed as a result of changing site conditions, including increasingly severe weather conditions.
- Air Quality – Direct adverse effects related to air quality would be considered significant if the action would result in emissions equal to or in excess of the NAAQS; sensitive receptors are exposed to substantial pollutant concentrations, including air toxics such as diesel particulates; or air contaminants are released beyond the boundaries of the Refuge. Significant indirect effects to air quality would occur if a proposed Refuge action results in the degradation of the existing level of service on adjacent roadways. Significant cumulative effects would occur if the “de minimis” (minimum) thresholds developed by the USEPA for proposed Federal actions in a non-attainment area are exceeded.
- Greenhouse Gas Emissions – The Service has not developed a quantitative threshold for determining whether a project’s greenhouse gas (GHG) emissions will have a significant effect on the environment, and no statewide threshold has been adopted by the State of California. The California Air Pollution Officers Association (CAPCOA), in its publication “CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act” (2008), does explore various options for establishing significance thresholds for GHG emissions. These options include setting the threshold at zero and setting a non-zero level for GHG emissions. Another option involves addressing project effects without establishing a threshold. This could be accomplished through a quantitative or qualitative evaluation of individual projects. Because significance thresholds for GHG emissions have yet to be established, our significance determination is currently based on the specific context of an individual action. To the extent possible, our determination is based on a quantitative evaluation of the effects of the action’s GHG emissions on the environment, including an estimate of the expected GHG emissions and the extent to which efforts are made to reduce expected emissions.
- Contaminants - Adverse effects related to contaminants are considered significant when constituents of concern are present in or could be introduced into the soil, groundwater, or surface water at levels that exceed standard screening levels for assessing ecological risk.

## **5.2.1 Effects to Topography and Visual Quality**

### **5.2.1.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management**

Continuing to conduct the wildlife and habitat management activities currently occurring on the Refuge (e.g., managing agricultural fields and wetlands to support avian species; maintaining drainage channels and irrigation lines; maintaining public use facilities) would require some soil disturbance, but no substantial alteration of the existing landform. Therefore, continuing to implement these actions would not significantly affect existing site

topography, any important topographic features located within the Refuge boundary, or the overall visual quality of the lands and structures within the Refuge. No activities are proposed that would block public views of the Salton Sea or distant mountain ranges.

### **Salton Sea Restoration Partnerships**

**Salton Sea SCH Project.** As described in the draft EIS/EIR for the Salton Sea SCH project (USACOE and California Natural Resources Agency 2011), restoration in Bruchard Bay would involve extensive excavation; the formation of berms and islands; and potentially trenching for a brackish water supply pipeline (depending upon which alternative is ultimately selected). The brackish water pipeline corridor would be restored to its previous condition once construction was completed. Once the project site is inundated with water, the topographic changes associated with the project would be all but obscured from view. The changes to the landform would therefore be less than significant.

Trucks and light vehicles would traverse nearby roads each day in order to transport workers and haul construction materials, but these would not cause a substantial visual change since trucks and heavy equipment are typically used in agricultural settings. During construction, the project would be visible from the Refuge's observation tower, but the construction activity would be a small part of a much larger view of both the Salton Sea and the distant mountain ranges. Views of the construction activities from adjacent roadways, including State Route 86, would be limited and would represent an insignificant change to the overall viewshed. Views of the heavy machinery associated with construction activity would be limited from areas located off the Refuge, although dust associated with trucks traveling to and from the site on dirt roads could be visible from various locations. Any impacts would be temporary and less than significant.

### **Public Use**

Under Alternative A, no changes to the current public use program would be implemented, therefore, public use would continue generally as it is occurring today. Existing visitor activities such as hunting, wildlife observation, photography, environmental education, and interpretation would occur within existing use areas or on existing trails. No new facilities would be provided, therefore, no adverse effects to the existing site topography, topographic features, or existing viewsheds would result from the implementation of Alternative A.

### **Refuge Operations**

The activities currently implemented to support Refuge operations (e.g., managing existing farm fields, maintaining existing irrigation channels, maintaining existing dirt access roads, trails, and existing facilities) result in little, if any, changes to the natural landform. As a result, no significant adverse effects to existing landform, important topographic features, or existing viewsheds would occur as a result of ongoing Refuge operations.

## **Sonny Bono Salton Sea NWR - Alternative B (Proposed Action)**

### **Wildlife and Habitat Management**

The management activities conducted under Alternative A would also occur under Alternative B. As described under Alternative A, none of these activities would result in adverse effects related to topography or visual quality. The potential effects to topography and visual quality of implementing the additional wildlife and habitat management actions proposed under Alternative B are described below.

- a) Implementing new management practices in managed agricultural fields (i.e., laser leveling, expanding no till practices, cooperative farming) to improve forage crop productivity and management efficiency would involve limited, if any, alteration of the existing farm fields, therefore, no substantive changes to the topographic or visual character of these areas are anticipated.
- b) Periodic rotation of the areas on the Refuge that support permanent cattail marsh would result in a change in the visual pattern of vegetation within the various managed impoundments on the Refuge as an area of permanent cattail marsh would be converted to seasonal wetlands, while an adjoining seasonal wetland area would be converted to permanent cattail marsh. Because this action would occur within an area that has experienced significant alteration over the years, the redistribution of managed habitats within the Refuge would be inconsequential in terms of existing landform or visual character. Therefore, such actions would not significantly alter the site's visual character and no noticeable changes in site topography would occur as a result of habitat rotation.
- c) Other proposals, such as increased monitoring of species, the implementation of an IPM Plan and a Predator Management Plan, and changes to the water delivery system, would have little, if any, effect on the existing landform or visual quality of the area. Potential changes to existing nesting islands to improve the quality of the nesting habitat would be minor and inconsequential to the overall landform and visual character of the areas in which they are located. No significant adverse effects to existing topographic features or visual quality are therefore anticipated as a result of these activities.

### **Restoration**

**Red Hill Bay Restoration.** The proposal to restore the Red Hill Bay portion of the Refuge to shallow, open water habitat would require some alteration of the existing landform. Several three-foot-high berms would be constructed within the bay to create two very large water impoundment cells (refer to Figure 4-12). In addition, several new water conveyance channels would be constructed in the general vicinity of the ponds and nesting islands would be created within the ponds to support nesting seabirds. Changes to the landform associated with berm and channel construction would not substantially alter the site topography, nor would these earthen structures block any views of or through the site. Much of this area has been disturbed in the past; therefore, the creation of these earthen berms would have little effect on the natural topographic character of the area.

Until about 2005, the project area was part of the Salton Sea, supporting open water habitat. The Salton Sea has subsequently receded to the point that in 2012 this area consisted primarily of exposed playa, with areas of standing water only present when winds push water from the Salton Sea onto the playa. With the berms in place, approximately 420 acres of shallow water habitat would be provided and the open water character of this area would be restored. The water would also obscure the view of all but the uppermost parts of the berms. Although the tops of the berms would continue to be visible, the area in which they would be situated is highly disturbed and would therefore not adversely affect the visual quality of the area.

The changes in the visual character of the site during construction would not be considered significant because of the isolated nature of this area, as well as the lack of any significant visual resources within the project boundary.

Solar panels, which may be installed on poles in the vicinity of the proposed water pumps, would be visible from areas located immediately adjacent to the site, as would some of the other structures associated with the pumps. None of these structures would block views, nor would they impair views of the immediate or distant surroundings. In addition, the extension of necessary utilities and other components of the water management system would not substantially alter the existing visual character or quality of the site and its surroundings. The proposed project would not create a new source of light or glare, nor would it affect day or nighttime views in the area.

Therefore, the implementation of this proposal would not result in any significant adverse effects to the visual or topographic character of the area.

### **Public Use**

Alternative B proposes some changes to the existing public use program that would involve physical alteration of the existing environment. The potential effects to topography and visual quality of implementing these changes are described here.

- a) Improving the accessibility of existing interpretive trails, replacing existing interpretive signs in Unit 1, and adding interpretive signage to the observation deck in Unit 1 would have no effect on the existing landform and would result in very minor changes to the area's existing visual character; therefore, no significant adverse effects to site topography or visual quality are anticipated.
- b) The establishment of a seasonal birding trail and creation of a small unpaved parking lot in the Hazard Tract of Unit 2 would require only minor changes to the existing, previously disturbed landform. The most visible aspects of the proposal would be an information kiosk at the trailhead and a few cars in the parking lot when the trail is being used. These conditions would not significantly alter the existing character of this area. Also proposed for Unit 2 is a new trail that would be constructed on the top of the eastern most berm in the Red Hill Bay restoration project. Providing a trail along the top of this berm would not noticeably change its appearance, therefore, construction of the trail would have no effect on the topographic or visual character of the area.
- c) The creation of a small unpaved parking area and observation blind in Unit 1 near a recently restored willow grove would require only minor alteration to the existing site; therefore, the impacts to the topographic and visual character of the area are expected to be less than significant.

### **Refuge Operations**

A number of proposals are included in Alternative B for improving or replacing existing facilities associated with the Refuge headquarters site. The potential effects to the visual and topographic character of the area from implementing these proposals are described here.

- a) Within the Refuge headquarters compound, some existing storage facilities and an existing carport would be replaced with new prefabricated structures. Implementing these proposals would result in little, if any, changes to the existing landform and none of the facilities would be visible from outside of the compound. The impacts to the topographic and visual character of the area are therefore expected to be less than significant.

- b) Proposed improvements to support Refuge visitors include construction of a new public restroom, sidewalk replacement, and the installation of shading structures for visitor parking. Specific plans for how restroom improvements would be made are not yet available, therefore, this analysis assumes a worst case scenario in which the improvements would require an expansion of the existing building to the west to accommodate both a women's and men's bathroom. Because the existing character of this area is dominated by existing buildings, a minor expansion of the building to accommodate a larger bathroom facility would have no adverse effect on the visual character of the area. Similarly, the replacement of the existing sidewalk that provides access from the parking lot to the visitor contact station and restroom would not adversely affect the existing landform or visual character of the area.
- c) Views of the proposed shading structure for the existing visitor parking area from the nearby roadway would be obscured by existing trees and would have limited visibility from the existing interpretive trail. No views of the Salton Sea or other habitat areas within the Refuge would be obstructed. The impacts to the topographic and visual character of the area as a result of this improvement are expected to be less than significant.

### **Sonny Bono Salton Sea NWR - Alternative C**

#### **Wildlife and Habitat Management and Restoration**

The effects of implementing the wildlife and habitat management and restoration proposals, included under Alternative C would be the same as those described under Alternative B; therefore, the implementation of this alternative would not result in any significant adverse effects to the existing landform or the visual character of the area.

#### **Public Use**

Under Alternative C, the two new trails proposed for Unit 2 in Alternative B would not be provided. All other public use proposals described for Alternative B would also be included under Alternative C. Therefore, the effects of implementing these proposals would be the same as those described under Alternative B.

Alternative C includes two new public use proposals: the construction of a new hunting blind in the Union Tract (Unit 2) and the eastern extension of a trail from the observation area parking lot in Unit 1 to provide visitors with opportunities to view wintering geese and sandhill cranes. Construction of a new hunting blind would require minimal ground disturbance and would not be visible from outside of the designated hunting area, therefore, no adverse effects to the topographic or visual character of the area are anticipated. The short segment of trail to be provided in Unit 1 would be constructed within an existing dirt road, therefore, little modification of the existing landform is required and changes to the exiting visual character of the area would be minimal. The impacts to the topographic and visual character of the area as a result of these proposals are therefore expected to be less than significant.

Although the potential for impacts to the topographic and visual character of the area to the south of the Imperial Valley as a result of developing an interpretive program along a designated tour route are not expected to be significant, additional details about the program are required. The route would occur along existing public roadways, but the specific sites to be interpreted, the types of interpretive elements to be provided, and location of any potential roadside pullouts or parking areas have yet to be determined. Therefore, prior to

implementing the program on the Refuge, additional evaluation of the potential for impacts to the environmental would be considered in accordance with NEPA.

### **Refuge Operations**

Building construction and facilities improvements proposed in Alternative B to support Refuge operations would also be implemented under Alternative C; therefore, as described under Alternative B, the implementation of this alternative would not result in any significant adverse effects to the existing landform or the visual character of the area.

## **5.2.1.2 Coachella Valley NWR**

### **Coachella Valley NWR - Alternative A (No Action)**

#### **Wildlife and Habitat Management**

The wildlife and habitat management activities conducted on the Coachella Valley NWR are currently limited to monitoring, sporadic hand pulling of invasive weeds, and occasional installation of low sand fences. The results of these activities have very limited visibility from adjacent roadways and distant development and none of the activities result in the physical alteration of the existing landform. Therefore, the impacts to the topographic and visual character of the area are expected to be less than significant.

#### **Public Use**

Public use on the Refuge is limited to occasional guided tours and equestrian and hiking use of an existing trail that extends along the western boundary and through the northern portion of the Refuge. These activities require no physical alteration of the land and do not alter the visual landscape; therefore, this alternative would have no impacts on the topographic or visual character of the area.

#### **Refuge Operations**

The activities implemented to support Refuge operations are limited to occasional patrols by law enforcement and other Refuge staff. There are no Refuge facilities on this Refuge. No impacts on the topographic or visual character of the area would occur as a result of the limited Refuge operations currently occurring on the Refuge.

### **Coachella Valley NWR - Alternative B (Proposed Action)**

#### **Wildlife and Habitat Management**

The management activities conducted under Alternative A also would occur under Alternative B. In addition, under Alternative B, expanded monitoring of species and sand transport processes and invasive species control through the implementation of an IPM Plan would be conducted. These activities would result in no changes to the landform and only minor changes to the Refuge's visual quality. In fact, the only change that may be visible from within and outside the Refuge boundary is small reduction in the extent of Sahara mustard infestation in some areas of the Refuge. Even if the Refuge can successfully control Sahara mustard throughout the Refuge, the loss of this species from the site would not represent a significant alteration in the visual character of the site because native annuals would be expected to occur where mustard plants are currently growing. As is the case under existing conditions, the implementation of Alternative B would not result in any significant adverse effects to the existing landform or the visual character of the site.

### **Public Use**

No changes to the current public use program implemented on the Refuge would occur under Alternative B; however, this alternative does include a proposal to develop interpretive material for display within an existing off-site visitor area, such as the Coachella Valley Visitor Center. Because the proposed interpretive elements would be installed within an area that supports similar interpretation, no adverse effects related to topography or visual quality are anticipated.

### **Refuge Operations**

Under Alternative B, the time spent on the Refuge by Refuge staff to implement surveillance, species monitoring, and invasive species control would be expected to increase, but the presence of additional Refuge personnel on the Refuge would have no substantive effect on the existing character of the landform or on the site's visual quality.

## **Coachella Valley NWR - Alternative C**

### **Wildlife and Habitat Management and Habitat Restoration**

The effects of implementing the wildlife and habitat management proposals included under Alternative C would be similar to those described for Alternative B, although Alternative C includes a proposal to restore native habitat on the old vineyard site (located within the eastern portion of the Refuge). Restoration, which would likely be phased over several years, would involve minor grading to restore the site's historical landform and drainage pattern, controlling invasive weeds, primarily Sahara mustard, and revegetating the site with native annual plants and perennial shrubs. Restoring the site to a more natural character would represent a benefit in terms of topographic character and visual quality when viewed in the context of the larger natural environment that is visible from within and surrounding the Refuge.

### **Public Use**

Alternative C includes all of the public use proposals described in Alternative B. In addition, Alternative C includes a proposal to design and install interpretive signage at an appropriate location along the existing trail on the Refuge. Although this signage may be visible from the adjacent roadways, a small kiosk or low interpretive sign placed along the trail would not be out of character for this area, which includes a significant amount of publicly conserved lands with limited signage to define conservation areas, interpret resources, or provide rules of conduct. Therefore, the impacts to the topographic and visual character of the area are expected to be less than significant.

### **Refuge Operations**

The potential effects to the topography and visual quality would be the same as those described under Alternative B.

## **5.2.2 Effects related to Geology, Soils, and Geological Hazards**

### **5.2.2.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

### **Wildlife and Habitat Management**

None of the management activities proposed under this alternative (e.g., management of agricultural fields and various wetland areas, species monitoring, invasive plant control,

maintenance of roads and irrigation systems) would trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion that would adversely affect on-site or adjacent resources or facilities. Site preparation in managed habitat areas generally occurs within contained field or impoundment areas; therefore, if sediment is generated from surface erosion, most, if not all, of the sediment is contained within these managed areas. Therefore, the potential for adverse impacts related to erosion and sedimentation are less than significant. Although this area is prone to seismic activity, Alternative A does not include any actions that would make Refuge facilities any more susceptible to geological hazards such as liquefaction, settlement, ground rupture, or lateral spreading.

### **Salton Sea Restoration Partnerships**

**Salton Sea SCH Project.** The potential for ground shaking and rupture within the project site is high; therefore, a seismic event could cause damage to the water retention berms. Failure or damage to the berms would not however represent a threat to human health or safety because the maximum water surface elevation for this project (-228 feet) is at or below the elevation of the land to the south of the restoration site, making it difficult for adjacent land to be flooded in the event of a berm failure. Therefore, berm failure at this site would not result in the exposure of people, property, or structures to substantial adverse effects, and impacts would be less than significant.

The native soils at the Salton Sea contain high plasticity clays overlain with granular deposits. Such soils are weak and dispersive. Therefore, specialized construction techniques will be required to construct, support, and strengthen the water retention berms. The implementation of these specialized techniques will increase the overall stability of the berms.

During and immediately following construction, the exposed soils will be subject to erosion. Best management practices (BMPs) would be implemented during construction as part of the Stormwater Management Pollution Prevention Plan to protect water quality in surrounding areas. Measures such as the installation of silt fences, cofferdams, and stabilization of construction traffic ingress/egress locations would avoid the potential for significant adverse impacts related to erosion.

In addition, this proposal would occur below elevation -228 feet in an area of the Sea overlain with lacustrine soils, which are weak and subject to erosion when exposed to even light wave action. These factors would be considered during the geotechnical design and would likely be addressed by allowing for settling in the design and placement of soil, adding features such as a cutoff wall to avoid seepage, and constructing berm side slopes at slope gradients that would effectively reduce seepage and increase stability.

### **Public Use**

The relatively flat surfaces and soils on which the Refuge trails, unpaved parking areas, and observation towers and decks are situated show no evidence of susceptibility to severe or even moderate erosion. Even the steep trail segment that ascends Rock Hill (Unit 2) shows only limited evidence of erosion.

There is limited risk of damage to the Refuge's existing facilities as a result of seismic activity. However, if a seiche were to occur in the Salton Sea, there is a potential those facilities located closest to the Salton Sea could be subject to flooding or damage. Overall, the potential for adverse impacts to public use facilities and the visitors who use them as a result of geological and soil hazards related to liquefaction, settlement, ground rupture, or erosion are less than significant.

### **Refuge Operations**

The activities implemented to support Refuge operations under Alternative A result in only minor physical changes and do not include actions that would make existing Refuge facilities susceptible to geological hazards, such as liquefaction, settlement, ground rupture, or lateral spreading.

The Refuge headquarters compound is located on flat land, approximately 0.4 miles to the south and east of the Salton Sea. The soils in this area are well compacted, with a low susceptibility to erosion. Although this area is prone to seismic activity, Alternative A does not include any actions that would increase the potential for geological hazards. The potential for flooding due to a seiche is low.

### **Sonny Bono Salton Sea NWR - Alternative B (Proposed Action)**

#### **Wildlife and Habitat Management**

The implementation of new and expanded management practices (e.g., laser leveling, no till, cooperative farming) within the managed agricultural fields would have mixed effects with respect to geology and soils. Expanding the no till practice and/or laser leveling the fields would reduce surface manipulation reducing the potential for erosion. On the other hand, cooperative farming, which could be implemented on the Refuge in the future under this alternative, could result in additional soil manipulation either through additional discing or leveling or as a result of cattle or sheep activity, although the extent of this manipulation in either case is expected to be limited. The rotation of cattail marsh habitat areas and improvements to existing nesting areas is not expected to affect or be affected by issues related to geology and soil.

Another action proposed under Alternative B that is affected to some extent by the types of soils that overlay the site is the implementation of an IPM Plan—in particular, the use of herbicides. To ensure maximum effectiveness, while minimizing the amount of chemical being applied to a site, it is important to consider the types of soils present in an area proposed for treatment. Some active ingredients respond differently depending upon the soil type (sandy soils versus clay soils) and soil permeability. For example, some products bind with clay soils; therefore, higher application rates may be necessary in clay soil environments to ensure that adequate amounts of the herbicide are available for uptake by the targeted invasive plants. To minimize the amount of product applied to a site, chemicals being considered for use in a specific area would be evaluated based on volatility, mobility in soil, and water solubility.

Adverse effects, as they related to geology and soils, of implementing the wildlife and habitat management actions described in Alternative B would be less than significant, and no adverse effects related to geological hazards are anticipated.

#### **Restoration**

**Red Hill Bay Restoration.** As noted previously, the area in and around the Salton Sea is one of the most seismically active regions in California due in part to the presence of the San Andreas Fault, which runs beneath the seabed of the Salton Sea, and the San Jacinto Fault Zone, which is located immediately to the west of the Sea. As a result, the potential for ground shaking and rupture within the Refuge boundary is high. A seismic event could cause a portion of the berms proposed within the Red Hill Bay Restoration project to fail and/or cause damage to other features of the project such as the water conveyance structures or the earthen nesting islands. Such failures or damage are not considered a threat to human health or safety for the reasons described in the following section.

It is likely that the Red Hill Bay restoration site contains high plasticity clays overlain with granular deposits derived from years of drainage flow into the Sea. Although the high plasticity clays tend to have a low potential for liquefaction, the more recent deposits have a high liquefaction potential, therefore, berm failure or damage to proposed earthen islands could occur as a result of liquefaction generated by a seismic event. The slopes of the berms have been designed to minimize the potential for failure. Specifically, the internal slopes of the berms (those that would be inundated) would be constructed at an 8:1 slope, with the outer slopes graded at 4:1. However, if the berms were to fail, no associated safety issues would be anticipated because of the low water levels (approximately one foot in depth) to be maintained in the ponds, the flow direction of inadvertently released water, which would be into the Salton Sea, and the lack of sensitive land uses in the vicinity of the project site. Thus, any water released from the ponds as a result of a seismic event would not expose people, property, or structures to adverse effects. Therefore, potential impacts related to geological hazards would be less than significant.

This proposal to maintain water in an area of recently exposed Salton Sea seabed would minimize the potential for wind-generated soil erosion, representing a benefit to the human environment over existing conditions. Some water-generated erosion could occur during construction and immediately following project completion until conditions stabilize, but for the most part, eroded soil would be maintained within the restoration cells. To minimize the potential for soil erosion, best management practices (BMPs) would be implemented during construction as part of the Stormwater Management Pollution Prevention Plan. Measures such as the installation of silt fences, stabilization of construction traffic ingress/egress locations to minimize erosion, and the protection of existing vegetation (applicable primarily to project construction areas to the east Red Hill Bay where a water conveyance channel would be constructed) would avoid the potential for significant adverse impacts related to erosion.

### **Public Use**

The proposal to improve the accessibility of the existing interpretive trails on the Refuge would further reduce the potential for erosion from the existing trail system. The two new birding trails proposed for Unit 2 would be constructed along either an existing road or levee or on a new berm to be constructed at part of the Red Hill Bay restoration project. These areas are or will be compacted and no significant erosion issues are anticipated. This is also true of the proposed unpaved parking area in Unit 1. BMPs, such as the use of straw wattles and silt fencing, would be implemented as appropriate during construction. The potential for impacts to these facilities as a result of seismic activity is considered less than significant.

### **Refuge Operations**

The various improvements and new construction project proposed within the Refuge headquarters compound to support Refuge operations (e.g., new carport, new storage facilities), as well as the improvements proposed to support Refuge visitors (e.g., restroom expansion, sidewalk repair) would occur on already developed sites, with minimal ground disturbance required to accommodate the improvements or new facilities. Where ground disturbance is proposed, BMPs such as the use of straw wattles and silt fencing would be incorporated into the project's design specifications and construction plans, as appropriate, to ensure that no erosion or siltation occurs that could affect nearby waterways or habitats. As a result, the potential for erosion would be less than significant.

Although this area is prone to seismic activity, Alternative B does not include any actions that would increase the potential for geological hazards, and the potential for flooding due to a seiche would be low.

### **Sonny Bono Salton Sea NWR - Alternative C**

#### **Wildlife and Habitat Management**

The effects related to geology and soils of implementing the wildlife and habitat management proposals included under Alternative C would be the same as those described under Alternative B; therefore, the implementation of this alternative would not trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion, nor would they make the Refuge and its facilities any more susceptible to geological hazards, such as liquefaction, settlement, ground rupture, or lateral spreading. The types of soils present within an area where invasive plant species control is proposed would be evaluated prior to herbicide application as described under Alternative B.

#### **Habitat Restoration**

The effects related to geology, soils, and geological hazards as result of implementing the proposed Red Hill Bay Restoration project and the Salton Sea SCH project (Bruchard Bay alternatives) under Alternative C would be the same as those described under Alternative B.

#### **Public Use**

The effects of implementing the public use proposals included under Alternative C would be essentially the same as those described under Alternative B. BMPs, as described under Alternative B, would be implemented as appropriate during the construction of any new facilities (e.g., trails, hunting blind).

The potential for impacts related to geology, soil, and geological hazards as a result of developing an interpretive tour route within the area are not expected to be significant, however additional details about the program are required. Therefore, prior to implementing the program on the Refuge, additional evaluation of the potential for impacts to the environment would be considered in accordance with NEPA.

#### **Refuge Operations**

The potential for impacts related to geology, soil, and geological hazards under Alternative C would be the same as those described under Alternative B.

### **5.2.2.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternative A (No Action)**

#### **Wildlife and Habitat Management and Refuge Operations**

The wildlife and habitat management activities conducted on this Refuge are limited to surveillance, species monitoring, opportunistic control of invasive plants, and occasional maintenance of sand fences. These activities are not adversely affected by nor do they adversely affect issues related to geology, soils, or geological hazards. The sand fences provide some benefit in that they allow sand that might otherwise blow off the Refuge to be retained behind the fences. As there are no Refuge facilities maintained on this Refuge, there is no potential for significant effects from geological hazards such as liquefaction, settlement, ground rupture, or lateral spreading.

### **Public Use**

The only public uses permitted on the Refuge are special guided tours of the Refuge's dune habitat and equestrian and hiking use, which is restricted to a designated trail along the western and northern portions of the site. Although these uses could result in some soil disturbance, these effects would be minimal. No facilities are provided on site to support these uses, so there is no potential for significant effects to Refuge facilities from geological hazards such as liquefaction, settlement, ground rupture, or lateral spreading.

### **Coachella Valley NWR - Alternative B (Proposed Action)**

#### **Wildlife and Habitat Management**

This alternative proposes to expand invasive species control within the Refuge's sand dune and sand field habitats, as well as on the old vineyard site, through an integrated approach to pest management. These activities would result in some soil disturbance and the potential for limited wind-generated soil erosion. The overall effects to the environment of the anticipated soil disturbance would be minimal due to the relatively small size of the disturbance areas and the proposal to reseed the controlled areas with appropriate native species. With respect to the potential for wind erosion, the soils present on the Refuge are naturally transported through the valley by high winds so any additional potential for erosion as a result of invasive species control would be inconsequential.

The IPM Plan includes the use of appropriate herbicides in its list of invasive species control methods. To ensure maximum effectiveness, the type of soil present in a control area is one of the factors to be considered when selecting a herbicide. Some active ingredients respond differently depending upon the soil type (sandy soils versus clay soils) and soil permeability. To minimize the amount of product applied to a site, chemicals being considered for use in a specific area would be evaluated based on volatility, mobility in soil, and water solubility.

#### **Public Use and Refuge Operations**

The potential for impacts related to geology, soil, and geological hazards under Alternative B would be similar to those described under Alternative A. The primary difference between the two alternatives is the proposal to install interpretive element(s) related to the resources on this Refuge at an offsite location, such as an existing visitor center, located elsewhere within the Coachella Valley. Installation of the interpretive element(s) would be coordinated with the appropriate agency or non-profit organization to ensure that no impacts related to geology, soil, or geological hazards would occur.

### **Coachella Valley NWR - Alternative C**

#### **Wildlife and Habitat Management and Habitat Restoration**

The potential for impacts related to geology, soil, and geological hazards under Alternative C would be generally the same as those described under Alternative B. The primary difference between the two alternatives is the management of the old vineyard site on the Refuge. Under Alternative C, invasive plants in this area would be removed, the site would be recontoured to restore natural drainage patterns; and the site would be replanted with appropriate native perennial shrubs and annual native flowering plants. This restoration process, which would likely be phased over several years, would temporarily expose soils to wind and water erosion. These effects would be minimized by implementing appropriate BMPs, such as avoiding grading during high wind events and applying water to exposed soils as necessary to reduce

wind erosion, as well as installing silt fencing, erosion control wattles, and sand bags to minimize erosion during storm events. Restoring native vegetation to the site would improve the long term stabilization of site soils over that currently provided by annual invasive weeds. Therefore, any loss of soil as a result of implementing this proposal would be limited; and the long term impact would be less than significant when compared to the existing environmental setting.

### **Public Use and Refuge Operations**

The potential for impacts to geology, soil, and geological hazards from implementing the public use program and other refuge operations would be the same as those described under Alternative B.

## **5.2.3 Effects to Paleontological Resources**

### **5.2.3.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Although there is the potential for paleontological resources to be present within the Sonny Bono Salton Sea NWR, the actions to be implemented under Alternative A would not result in any significant excavation. Activities under Alternative A are generally limited to habitat management within areas that have been farmed or maintained to support wildlife in a consistent manner for more than forty years, public uses that have little effect on subsurface deposits, and general Refuge operations that only involve periodic site manipulation to maintain the existing irrigation and drainage system, roads, and other facilities. Therefore, no adverse effects to subsurface paleontological resources are anticipated under this alternative.

Protection of paleontological resources, should they be inadvertently discovered, would occur in compliance with all applicable policies and regulations. In addition, Federal regulations and policies that prohibit the collection of paleontological resources will be enforced on lands managed by the Service.

##### **Salton Sea Restoration Partnerships**

Salton Sea SCH Project. The potential for impacts to paleontological resources would vary depending on the depth of construction required. In the Bruchard Bay area, shallow excavation (e.g., two to three feet in depth) would have a low potential for causing impacts, while construction below five feet, as is proposed for the deeper pools in the projects, as well as for the interception ditch, brackish water pipeline, and sedimentation basin, would have a greater potential for impacts. Because much of the Salton Sea is underlain by sediments that are paleontologically sensitive, avoidance is not a practicable means for reducing or eliminating potential impacts to paleontological resources.

To reduce the potential for significant adverse effects to paleontological resources as a result of implementing the Salton Sea SCH project, the following measures are proposed in the draft EIS/EIR:

- Prepare and implement a survey plan and paleontological monitoring plan;
- Conduct worker training; and

- Prepare and implement a paleontological resource data recovery plan, if paleontological resources are encountered during construction.

The implementation of these measures would reduce the potential impacts to paleontological resources to a less than significant level.

### **Sonny Bono Salton Sea NWR - Alternatives B and C**

#### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Similar to the proposals described under Alternative A, no significant grading would be required to implement the wildlife and habitat management, public use, and Refuge operations proposals included under Alternatives B and C; therefore, the implementation of any of these actions would not result in any significant adverse effects to the paleontological resources.

#### **Restoration**

**Red Hill Bay Restoration.** Habitat restoration in Red Hill Bay is proposed in both Alternatives B and C; therefore, the potential effects to paleontological resources would be the same under either alternative. Much of the Salton Sea is underlain by sediments that are paleontologically sensitive (designated as having moderate to high paleontological sensitivity). In the case of Red Hill Bay, the native sediments have been overlain by approximately five feet of sediment, consisting primarily of sand (The Redlands Institute 2002), that has been carried into the Bay over the years by drainage water and storm runoff. Therefore, no paleontological resources would be expected within this material. However, any excavation that occurs in this area at a depth greater than five feet would have the potential to impact paleontological resources. The potential for impacts as a result of excavation depths ranging from five to eight feet would be low since intrusion into the native sediments would not exceed three feet in depth. A construction depth greater than eight feet, which may be necessary to construct one or more of the water conveyance channels, has a greater potential for impacts.

The primary risks to paleontological resources from the implementation of this restoration project would be damage or destruction from construction activity. A significant impact would occur if physical damage to a scientifically useful fossil resulted in the reduction or loss of the data potential of that fossil, and/or if fossils were unearthed and removed from their stratigraphic context without appropriate scientific recordation of that context.

To reduce the potential for significant adverse effects to paleontological resources as a result of excavation activities associated with the project, the following actions would be implemented:

1. Review final construction drawings for the project and identify those areas, if any, where excavation would be required at depths greater than five feet from the current surface elevation. If excavation would not exceed five feet below the current surface elevation, no further action would be required.
2. If excavation is proposed that would exceed five feet below the current surface elevation, a paleontological monitoring plan would be prepared in consultation with the Regional Cultural Resources Program and implemented during excavation in those portions of the project site where there is a potential for impact to paleontological resources.

3. If paleontological resources are encountered during excavation, work in the affected area would stop until a paleontological resource data recovery plan is prepared and implemented.

If a monitoring plan is required, the Service would enter into a formal agreement with a recognized museum repository for the curation of any fossils that may be uncovered. Additionally, prior to construction, a certified paleontologist would be retained to supervise the monitoring of construction excavations, and to produce a Paleontological Resource Management Recovery Plan, should one be required. Paleontological monitoring would include inspection of exposed rock units and microscopic examination of matrix to determine if fossils are present. The monitor would have authority to temporarily divert grading away from exposed fossils to recover the fossil specimens. Monitoring would occur on a full-time basis in areas where construction is proposed at depths greater than eight feet. Monitoring of excavation activity that exceeds five feet in depth but will not exceed eight feet in depth would occur through spot checking. The paleontologist is responsible for documenting the results of the construction monitoring program. Should fossils be encountered, field data forms would be completed for each fossil locality. The locality would be recorded, the stratigraphic columns measured, and appropriate scientific samples submitted for analysis.

Construction supervisors and crew would receive training by a certified paleontologist in the procedures for identifying and protecting paleontological resources, as well as the procedures to be implemented in the event fossil remains are encountered during ground-disturbing activities.

If paleontological resources are encountered during construction, construction activities would be temporarily diverted from the discovery, appropriate parties would be notified, and processing of the resources would begin under the direction of the Project paleontologist. To expedite removal of fossil-bearing matrix, heavy machinery may be used to assist in moving large quantities of matrix out of the path of construction to designated stockpile areas. Construction would resume at the discovery location once all the necessary matrix is stockpiled, as determined by the Project paleontologist. Testing of stockpiles would consist of screen washing small samples to determine if important fossils are present. If such fossils are present, the additional matrix from the stockpiles would be water screened to ensure recovery of a scientifically significant sample. Samples collected would be limited to a maximum of 6,000 pounds per locality. The Project paleontologist would direct identification, laboratory processing, cataloguing, analysis, and documentation of the fossil collections. When appropriate, splits of rock or sediment samples would be submitted to commercial laboratories for microfossil, pollen, or radiometric dating analysis. The recovered materials would be prepared for curation, the appropriate field and laboratory documentation would be prepared, and a final Paleontological Resource Recovery Report, which summarizes the construction monitoring and presents the results of the fossil recovery program, will be prepared and submitted to the Service and the curation repository.

The implementation of these measures would reduce the potential impacts to paleontological resources to a less than significant level.

### **5.2.3.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternatives A, B, and C**

##### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Although there is some potential for paleontological resources to be present within the Coachella Valley NWR, no actions are proposed in any of the alternatives for managing this Refuge that would require significant excavation, and only the proposal in Alternative C to restore habitat in the old vineyard site would involve surface grading. This grading would be limited to reestablishing the subtle drainage contours on this previously disturbed site. Therefore, no adverse effects to subsurface paleontological resources are anticipated under any alternative. Protection of these resources, should they be inadvertently discovered, would occur in compliance with all applicable policies and regulations. In addition, Federal regulations and policies that prohibit the collection of paleontological resources will be enforced on the Refuge.

### **5.2.4 Effects to Alternative Energy Resources**

#### **5.2.4.1 Sonny Bono Salton Sea NWR**

##### **Sonny Bono Salton Sea NWR - Alternatives A, B, and C**

##### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Unit 2 of the Refuge is located within a geothermal resource area, with geothermal energy exploration and development activities occurring in the vicinity of Red Hill Bay. Geothermal developers have expressed interest to IID (the land owner) regarding the development of geothermal resources in the Red Hill Bay area at some point in the future. However, no specific geothermal development plans are being made or are in place at this time. The restoration proposal included in Alternatives B and C for the Red Hill Bay area can accommodate future energy development and is not expected to preclude geothermal production in the future. If energy development is pursued in the future in this area, it may require small adjustments to the Refuge lease with IID as energy development and infrastructure is likely not compatible with the purposes for which the Refuge was established (e.g. narrow strips of land for pipelines may be removed from the lease and a similar amount of land with habitat potential added elsewhere to avoid a net loss). Therefore, none of the alternatives include proposals that would conflict with future plans to construct geothermal energy plants in the area.

A number of solar energy facilities have been or are being constructed in the northern portion of the Imperial Valley. No facilities are currently proposed in the general vicinity of the Refuge. If a solar energy facility were to be proposed in proximity to the Refuge in the future, none of the actions proposed under Alternatives A, B, or C would conflict with the operation of the facility.

The potential for impacts to alternative energy resources as a result of implementing Alternative A, B, or C is considered less than significant.

#### **5.2.4.2 Coachella Valley NWR**

##### **Coachella Valley NWR - Alternatives A, B, and C**

###### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

The Coachella Valley NWR protects core habitat areas for a number of species covered under the Coachella Valley MSHCP and has therefore been included in the MSHCP Reserve System. The development of alternative energy projects in conserved core habitat areas, including the Refuge, would be inconsistent with the objectives of the Coachella Valley MSHCP and would be incompatible with the Refuge purpose of protecting listed species. The Coachella Valley MSHCP was developed to ensure a balance between environmental protection and economic development, including alternative energy development, in the MSHCP planning area (CVAG 2007a). Therefore, the continued protection of the lands within the Coachella Valley NWR would assist in achieving both the environmental protection and economic development objectives of the MSHCP. Potential impacts to alternative energy resources from preserving the native habitats and species within the Coachella Valley NWR under any alternative would be less than significant.

#### **5.2.5 Effects to Agricultural Resources**

##### **5.2.5.1 Sonny Bono Salton Sea NWR**

###### **Sonny Bono Salton Sea NWR - Alternatives A, B, and C**

###### **Wildlife and Habitat Management, Restoration, Public Use, and Refuge Operations**

Approximately 1,100 acres of land in Units 1 and 2 are designated as Prime Farmland or Farmland of Statewide Importance. Although the Refuge does not currently use these lands to produce commercial crops, the Refuge actively cultivates green forage crops on approximately 850 acres within Units 1 and 2. These lands are specifically managed to protect adjacent commercial crops from depredation by wintering geese, which provides a benefit to agricultural resources in the area. All three alternatives propose to continue this practice of providing green forage for wintering geese, with Alternatives B and C including proposals to further improve the productivity in the Refuge's managed agricultural fields. Further, current and future wildlife and habitat management actions would not substantially alter the existing quality or quantity of these farmlands on the Refuge.

Proposals to restore open permanent water areas on the Refuge would be implemented in areas that were previously submerged below the Salton Sea and are not designated as important farmlands; therefore, these actions would have no effect on agricultural resources.

##### **5.2.5.2 Coachella Valley NWR**

###### **Coachella Valley NWR - Alternatives A, B, and C**

###### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Approximately 400 acres within the Coachella Valley NWR are classified as Farmland of Local Importance. There are no areas within the Refuge designated as Prime Farmland or Farmland of Statewide Importance (CDOC 2010). The 400 acres, which were in grape production sometime prior to the establishment of the Refuge, currently support a combination of native and nonnative plants and in some years, are partially covered by blowsand deposits.

Currently, management of this area is limited to occasional invasive species control. Both action alternatives (Alternatives B and C) propose varying levels of habitat restoration within these 400 acres. No structures or other uses are proposed, therefore, Refuge management under any of the alternatives would not irreversibly alter the quality or quantity of those lands identified as Farmlands of Local Importance.

## **5.2.6 Effects to Hydrology**

### **5.2.6.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management**

The wildlife and habitat management activities occurring on the Refuge, including farming, maintenance of various types of wetland habitats, and maintenance of access roads, fencing, and signage, have a limited effect on the hydrologic conditions surrounding the Salton Sea, including the flow patterns and rates of the Alamo and New rivers, which are the main drainages in the Imperial Valley. Originating in Mexico and flowing northward into the Salton Sea, the water flowing in these rivers generally consists of drainage (agricultural return) from the irrigated farmlands within the valley. The subsurface tile drains within the Refuge's farm fields also convey drainage water to these rivers.

Records indicate that the Alamo and New rivers have overtopped their banks on several occasions causing localized flooding in Brawley, Calexico, and Calipatria (Imperial County 2007a). Flooding in the Imperial Valley can be the result of winter storms originating in the Pacific Ocean, which are characterized by moderate rain spread over broad areas; local cloudburst storms that produce significant rainfall for a short duration impacting relatively small areas; and summer tropical storms which can bring varying degrees of rainfall.

The lands within Units 1 and 2 are identified on FEMA's (Federal Emergency Management Agency) Flood Insurance Rate Maps (FIRM Maps) as areas of undetermined but possible flood hazard (Zone D). All of Unit 2 and the northern portion of Unit 1 are surrounded by areas located within the 100-year flood zone, in areas where base flood elevations and flood hazard factors have not been determined (Zone A). Therefore, wildlife and habitat management areas are subject to flooding.

Potential flood hazards in the vicinity of the Refuge include stream flooding, which can erode natural and man-made drainage channels; flash flooding, which results in debris and mud flows; and sheetflow flooding, in which floodwaters spread out over the floodplain. A slow-rise flood, usually the result of prolonged, heavy rainfall, are often predictable and provide some opportunity for action (e.g., evacuation, sandbagging) that may lessen flood-related damage (Imperial County 2007a). Flash floods, on the other hand, provide limited if any time for preparation. Although flooding can have deleterious effects on cropland, the types of crops and wetland habitats maintained on the Refuge are less susceptible to these impacts than commercially produced crops. As a result, the potential for adverse effects to Refuge managed habitats from existing flood hazards are considered less than significant.

The managed fields and wetlands on the Refuge are designed to take advantage of winter rainfall but do not impede stormwater runoff from flowing through the site. Therefore, no impacts to upstream properties as a result of actions implemented on the Refuge are

anticipated during a flood event. The removal of invasive plant material from drainage channels and the lower reaches of the New River would improve, to some extent, the hydrologic conditions within these drainages; however, the overall effect on the watershed is minimal. Therefore, the potential for adverse effects to the existing hydrologic conditions in the area as a result of the continuation of current Refuge operations would be less than significant.

Areas historically submerged by the Salton Sea that are proposed for restoration in Alternatives B and C (i.e., Red Hill Bay, potentially portions of Bruchard Bay) would not be altered under Alternative A. The Alamo River, New River, and adjacent drains would continue to drain to the Salton Sea, and rainwater would continue to pool within these exposed areas of the Sea during the winter months, only to evaporate in the hotter summer months. As a result, no adverse effects related to hydrology are anticipated in these areas under Alternative A.

### **Salton Sea Restoration Partnerships**

**Salton Sea SCH Project.** The berms proposed within this project would be constructed to avoid the large natural watercourses that enter the project site west of the New River, allowing large flows to continue to enter the Salton Sea without interruption. The structures needed to divert water by gravity or pumping would be constructed by notching the banks of the river to set the structures into the bank rather than allowing them to project into the river. This notching would help avoid debris fouling and maintain the river cross section that is used by floodwater (USACOE and California Natural Resources Agency 2011).

Based on simulations of possible project operations described in the draft EIS/EIR (USACOE and California Natural Resources Agency 2011), the diversion of river water to the SCH ponds would reduce the average annual flow and the peak monthly flow immediately downstream of the diversion. The reduction would be present only in the portion of the river between the diversion and the Salton Sea. The water would be returned to the Sea, less the evaporation loss that occurred while the water was in the ponds. For the average annual condition, the diversion would range from 5 percent to 51 percent of the New River flow depending on the pond size, pond salinity, and residence time. For the peak evaporation month (June), the reduction downstream of the diversion would range from 7 percent to 56 percent for the New River. According to the draft EIS/EIR, reductions in flow would be offset by the flow returned to the Sea and no runoff would be generated in excess of the capacity of the drainage facilities.

### **Public Use and Refuge Operations**

The facilities on the Refuge that support public use (e.g., trails, observation decks, hunting blinds, photography blinds) and the structures within the Refuge headquarters compound that support Refuge operations do not impede water flow within existing rivers or channels, nor do they have any substantive effect on stormwater movement across the site. These facilities also have limited potential for catastrophic damage as a result of a flood event.

The offices, shops, and other facilities located at the Refuge headquarters are also within an area of undetermined, but possible flood potential. No significant flood events have occurred within this portion of the Refuge since the Refuge office facilities were constructed in 1984, however, the refuge residence, which is located at a slightly lower elevation, sustained some minor flood damage in the summer of 2012, following a storm event that resulted in three inches of rainfall within a short period of time. The damage was the result of localized water accumulation, not the overtopping of the nearby Alamo River. The potential for catastrophic damage as a result of a flood event is therefore considered to be low.

## **Sonny Bono Salton Sea NWR - Alternatives B and C**

### **Wildlife and Habitat Management**

Alternatives B and C propose some changes to the current management practices described under Alternative A that would improve water distribution across individual fields or water impoundment areas. These changes will have a nominal effect on the existing hydrologic conditions within and surrounding the site. Expansion of current invasive species control within existing waterways (e.g., rivers, drainage channels, and irrigation canals) would improve to some extent the flow rates within these waterways, but the overall effect would be minimal.

### **Restoration**

**Red Hill Bay Restoration.** This restoration project proposes to divert some of the water that flows down the Alamo River into a water impoundment area that would be created in the previously submerged Red Hill Bay area. The water would be diverted into a newly constructed channel that would intercept the river channel about 1.4 miles to the southeast of where it currently empties into the Salton Sea. The diverted water would be blended with Salton Sea water to achieve the desired salinity range within the managed water area. In addition, water that is currently discharged into the Alamo River from the freshwater ponds on the Refuge east of Red Hill Bay would be discharged into the new diversion channel, flowing into the restoration area instead of the Alamo River.

The proposed diversion of water from the Alamo River would represent a relatively insignificant reduction in flow (about 10 cubic feet per second immediately downstream of the diversion). Even if Alamo River flows are reduced by 30 percent in future years as a result of various water agreements, the proposed diversion would represent only 2.6 percent of the total water volume within the River. In addition, a small portion of the diverted water would be returned to the Salton Sea through the proposed project.

No downstream water rights holders and/or users would be affected by the proposed diversion. In addition, the reduction in flows within the Alamo River north of the proposed diversion channel would not significantly alter the existing hydrology in the area. Although water would be diverted from the Alamo River, it would not be diverted to an area located outside of the existing Salton Sea watershed.

None of the facilities proposed as part of this project, including the berms and drainage channels, would impede or cause the existing path of flood flows within the Alamo River to be altered. In addition, the proposed diversion of waters from the main course of the Alamo River would have no measurable effect on groundwater levels due in part of the low permeability of the aquifer in this portion of the Imperial Valley.

The project site could become inundated during a 100-year flood which would have the potential to submerge berms, drainage ditches, pumps, and other facilities. The proposed restoration site would not however alter the site to the point that flood levels would increase on adjacent properties as a result of project implementation. In addition, due to its location at the bottom of the watershed, the project is unlikely to be impacted by significant flow velocities during a large storm event.

### **Public Use and Refuge Operations**

The public uses and improvements to existing refuge operations and facilities proposed under Alternatives B and C would not result in any substantive changes to existing drainage

patterns, flood flow routes, or drainage and irrigation channels; therefore, no significant adverse effects to the area hydrology is anticipated.

### **5.2.6.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternatives A, B, and C**

##### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Under any of the management alternatives proposed for the Coachella Valley NWR, the extent of physical change to the existing conditions on the Refuge would be limited. The primary action in all cases would be to preserve and protect existing conditions, particularly within the sand dune and sand field habitats. Actions related to invasive species control and limited habitat restoration within the old vineyard site, as proposed in Alternatives B and C, would not result in any substantive changes in existing drainage patterns on the site, therefore, no measurable increases in erosion or siltation on- or off-site are anticipated and the rate or amount of surface runoff from the site would remain unchanged.

The major groundwater subbasins serving the Coachella Valley are currently in a state of overdraft, where the rate of groundwater extraction exceeds both natural and artificial recharge (CVAG 2007a). This is the current situation within the Refuge. Groundwater levels are currently too low to support native honey mesquite shrubs, which are important to the sand balance within the Refuge dune system. As a result, much of the honey mesquite population on the Refuge has died. The goal of the recently updated Coachella Valley Water Management Plan (CVWD 2012) is to meet a number of water management objectives including reducing and/or eliminating long-term groundwater overdraft within the water management planning area. Meeting this water management objective would benefit the Coachella Valley NWR and support its wildlife and habitat goals and objectives.

The potential effects to groundwater levels and flood flows from flood control plans currently being evaluated for the area by CVWD are currently unknown. Therefore, to ensure that any potential changes in surface runoff volumes or velocities through the Refuge and/or any effects to natural groundwater recharge due to future flood control plans would not adversely affect Refuge resources, coordination with CVWD is necessary under any of the alternatives.

### **5.2.7 Effects to Water Quality**

#### **5.2.7.1 Sonny Bono Salton Sea NWR**

##### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management and Refuge Operations**

Management actions occurring on the Refuge, as described under Alternative A, that could affect water quality include annual site preparation (e.g., discing, weeding, site leveling) of managed habitat areas, periodic water movement within managed habitat areas, activities related to Refuge operations, and the use of herbicides. Potential impacts to water quality can occur as a result of spills, leaks, or improper discharges of chemicals, fuels, or other substances that percolate down into the groundwater basin or flow into irrigation, drainage, or natural water courses. Contaminants and solids (i.e., trash) can flow into waterways via storm runoff, and loose sediment from construction, farming, and other ground disturbing activities can be flushed into waterways by wind and rain.

To avoid the introduction of pollutants into the groundwater basin and the introduction of pollutants and excessive siltation into adjacent wetlands and waterways, including the Salton Sea, a variety of BMPs are implemented on the Refuge. These BMPs include proper use and disposal of all chemicals and their containers; regular inspection and maintenance of fueling facilities and associated spill control and containment equipment; provisions for secondary containment during fueling of construction or farm vehicles in the field; periodic training on proper response and reporting in the event of a spill; maintaining appropriate spill kits at Refuge headquarters and on construction and farming vehicles, as appropriate, to facilitate quick response in the event of a herbicide, fuel, oil, or other chemical spill; and installation of fiber rolls and silt fencing when necessary to minimize erosion and sedimentation associated with major road maintenance or other projects involving major soil disturbance in proximity to natural waterways. The continued implementation of these types of measures would minimize or avoid water quality impacts within the Refuge.

### **Salton Sea Restoration Partnerships**

**Salton Sea SCH Project.** To minimize impacts to water quality related to construction activities, a variety of BMPs would be implemented during and after construction, such as: proper maintenance and fueling of construction vehicles to avoid spills; tire cleanouts to avoid tracking dirt onto public roadways; and appropriate erosion control techniques following construction to minimize the potential for erosion. The potential for impacts to water quality would be further reduced by the implementation of a Storm Water Pollution Prevention Plan (SWPPP) during construction.

With respect to surface water quality following the completion of Salton Sea SCH project, the draft EIS/EIR (USACOE and California Natural Resources Agency 2011) for the project concludes that the proposals to restore portions of Bruchard Bay would not preclude the use of New River water, nor Salton Sea water, for their designated beneficial uses. Further, the restoration proposals being considered for the Bruchard Bay area would result in a change to the Salton Sea's salinity when compared to existing conditions, however, the salinity of the Sea is expected to change regardless of whether this project is implemented or not.

### **Pest Management**

Control of invasive plant species on the Refuge involves the periodic application of herbicides. Before a herbicide or any other pesticide can be used on a Refuge, it must be approved through the Service's Pesticide Use Proposal System (PUPS), which has been established to ensure that all chemical pesticides approved for use have been reviewed for their potential impacts to groundwater, surface water, and terrestrial and aquatic non-target vegetation and wildlife, including threatened and endangered species. The PUPS identifies specific pesticides approved for use on each Refuge, as well as provides details on target pests, current site conditions, presence of sensitive habitats or species, application dates, rates, and methods, and BMPs to be employed to avoid impacts to Refuge resources. Pesticides approved for use are those that pose the lowest toxicity-related threat to non-target terrestrial and aquatic ecosystems while addressing the specific pest control objectives. The pesticides approved for use on the Sonny Bono Salton Sea NWR Complex are addressed in Chapter 4.

The use of herbicides to control invasive plants could pose several environmental risks, including water contamination and persistence in the environment (Bossard et al. 2000). The potential for such risks under this alternative are considered minimal due to the types and limited quantities of herbicides used on the Refuge, the requirement that all applications of approved pesticide products be conducted in accordance with the specifications on the product

label, and the need to have all potential products reviewed and approved through the PUPS. The basic hazards and environmental fate of the products currently approved for use on the Refuge are presented in Table 5-1.

The following information about the basic hazards and environmental fate of pesticides is from the Programmatic Biological Evaluation Pesticide Use on Federal Leased Lands on Tule Lake and Lower Klamath National Wildlife Refuges (USFWS 2006a).

Two things may happen to pesticides when they are released into the environment. They may be broken down, or degraded, by the action of sunlight, water or other chemicals, or microorganisms, such as bacteria. This degradation process usually leads to the formation any of less harmful breakdown products but in some instances can produce more toxic products. The alternative is the pesticide will be very resistant to degradation by these means and thus remain unchanged in the environment for long periods of time. Pesticides that degrade rapidly have the shortest time to move or to have adverse effects in the environment. Those which persist can move over long distances and may build up in the environment leading to greater potential for adverse effects to occur.

In addition to degradation there are other pesticide properties which determine their behavior and fate in the environment. Generally pesticides have four properties that determine the tendency of pesticides to move off-target. The most important of these properties are persistence, soil adsorption, and vapor pressure. Solubility also is involved, but to a lesser extent than the others. [Solubility, as opposed to the tendency to adsorb to soil or sediment particles in environments, results in the pesticide remaining in solution (e.g., ground water, surface water).]

Using knowledge of these and other characteristics, it is possible to predict in a general sense how a pesticide will behave in the environment. For example, there are many different soil types which vary in sand, silt and clay content, organic matter, soil pH, etc. All of these characteristics influence the behavior of a pesticide so that a pesticide which might be anticipated to contaminate groundwater in one soil type may not do so in another soil type.

Similarly, surface waters vary in their properties, such as pH, depth, temperature, clarity, flow rate, and general chemistry. These properties and others can affect pesticide movement and fate.

Due to the interaction of these many variables, determining precisely what will happen to a particular pesticide once it is released into the environment cannot be accomplished with a high degree of certainty. However, pesticides can be grouped into general categories with regard to their properties. This can provide some understanding as to where a released pesticide will most likely be found and infer its potential fate and behavior. Thus it is possible to gather information to make informed decisions about what pesticides to use in particular situations and what possible risks may be associated with a particular use pattern.

Persistence, which is the potential for a pesticide to remain in the environment, is measured as the time it takes for half of the amount of pesticide to dissipate or degrade. Thus if a pesticide's half-life is 30 days, half will remain after thirty days, one-quarter after sixty days, one-eighth after ninety days and so on. Half-life units are usually expressed in days. In general pesticides with a half-life less than 30 days are considered non-persistent, half-life between 30 and 100 days are moderately persistent, and pesticides with a half-life greater than 100 days are considered persistent (Kerle et al. 1996).

Another measure of pesticide persistence is dissipation time ( $DT_{50}$ ). Dissipation time represents the rate at which a pesticide degrades and its movement from a site, whereas half-life describes the rate of degradation only. As with half-life units for dissipation is usually expressed in days.

All half-life or dissipation data that may be useful for inclusion in a quantitative or qualitative analysis will be recorded. Half-life data is usually available for aquatic and terrestrial environments. Also, the degradation mechanisms and half-life for photolysis, chemical, microbial degradation and the degradation products are published in the literature. Field or foliar dissipation half-life is the preferred data for use to estimate pesticide concentrations in the environment. However, soil half-life is the most common persistence data cited in the published literature. If field or foliar dissipation data are not available soil half-life data may be used. The average or representative half-life value of most important degradation mechanism will be selected for quantitative analysis for both terrestrial and aquatic environments.

A separate risk assessment may be necessary for degradation products. First-order degradation products and associated half-life will be recorded when the data are available.

Mobility of a pesticide is a function of how strongly the pesticide is adsorbed to soil particles and organic matter, its solubility in water, and its persistence in the environment. Pesticides that are strongly adsorbed to soil particles, relatively insoluble in water and environmentally not persistent are less prone to move across the soil surface into surface waters, or to leach down through the soil profile and contaminate groundwater. Conversely, pesticides that are not strongly adsorbed to soil particles, are highly water soluble and are persistent in the environment have greater potential to move from the application site (i.e., off-target movement).

The degree of pesticide adsorption to soil particles and organic matter (Kerle et al. 1996) is expressed as the soil adsorption coefficient ( $K_{oc}$ ). The larger the soil adsorption coefficient the more strongly the pesticide is adsorbed to soil particles. Conversely, the smaller the soil adsorption coefficient value the less strongly the pesticide is adsorbed to the soil particles. The soil adsorption coefficient is expressed as micrograms of pesticide per gram of soil ( $\mu\text{g/g}$ ), and can range from near zero to the thousands.

**Table 5-1  
Environmental Fate of Herbicides Presently Used or Proposed for Use  
on the Sonny Bono Salton Sea NWR Complex**

<b>Active Ingredient</b>	<b>Product Name(s)</b>	<b>Application Details</b>	<b>Solubility in Water</b>	<b>Volatility</b>	<b>Behavior in the Environment</b>
<b>Imazapyr</b>	Stalker	Best when applied directly to vegetation, using a low-volume backpack sprayer or cut-stump or basal bark application method	High	Low, but potential increases with increasing temperature, increasing soil moisture, and decreasing clay and organic matter content	Half-life in water is about two days, and decreases with increasing pH; adsorption to soil particles is generally weak, but varies depending on soil properties; persistence in the soil, average half-life in soils 25-141 days, but in drought conditions it can persist for more than a year; not known to contaminant water areas
<b>2,4-D DMA (amine salt formulation)</b>	WEEDAR 64	Applied once per growing season; measures must be implemented to control spray drift; apply at wind speeds below 10 mph with no inversion conditions	High	Varies; high in esters, lower in alkali and amine salt formulations	Half-life in water is relatively short, averaging 10 days in soil and less than 10 days in water, although it can be significantly longer in cold, dry soils.
<b>Dicamba</b>	Clarity	Applied using ground or aerial broadcast, soil treatment, basal bark or cut-stump treatment, tree injection, and spot treatment; low applications rates reduces mobility to non-target plants following application	High	Moderate	Moderately persistent in soil with a half-life of 1 to 4 weeks; highly mobile in the soil and may contaminate groundwater; product labeling prohibits applying this product directly to water or to areas where surface water is present
<b>Tribenuron-methyl</b>	Express	Ground or aerial application permitted in California, with specific requirements for aerial application	Increases with increasing pH	Low	Half-live in soil is less than 1 day at pH 5, 3-6 days at pH 7, and 32 days at pH 9; minimal potential for leaching and not persistent in the environment

**Table 5-1  
Environmental Fate of Herbicides Presently Used or Proposed for Use  
on the Sonny Bono Salton Sea NWR Complex**

<b>Active Ingredient</b>	<b>Product Name(s)</b>	<b>Application Details</b>	<b>Solubility in Water</b>	<b>Volatility</b>	<b>Behavior in the Environment</b>
<b>Halosulfuron-methyl</b>	Sandea	Applied as a broadcast or band application; not to be applied directly to water	Very high	Slightly volatile	Can be very persistent in the environment and has a high potential to leach into surface and ground water
<b>Glyphosate</b>	AquaNeat	Applied to foliage using a backpack sprayer; application should not occur during a temperature inversion, as drift potential is high	Very High	Non-volatile	Runoff, leaching potential, half-life in water is 12 days to 10 weeks; immobile in soil, half-life ranges from 1 to 174 days; strongly adsorbed to soil particles, which prevents it from excessive leaching or from being taken-up from the soil by non-target plants
<b>Glyphosate</b>	Roundup, Roundup Pro, Razor Pro	Applied to foliage using tractor sprayer; do not apply directly to water, do not apply when winds exceed 10 miles per hour or when inversion conditions exist	Very High	Non-volatile	Runoff, leaching potential, half-life in water 12 days to 10 weeks; immobile in soil, half-life in soil ranges from 1 to 174 days
<b>Aminopyralid</b>	Milestone VM	Directed ground spray, broadcast ground spray, and aerial spray	High	Low	Aerobic microbial degradation is the primary route of breakdown in soil, average half-life is 34.5 days; some potential for mobility; half-life in water is about 0.6 days; low potential for groundwater contamination
<b>Triclopyr (ester)</b>	Garlon 3A	Applied to foliage using a boom sprayer, due to high volatility it is only applied at cool temperatures with low wind speed and no inversion conditions	Medium	Highly volatile	Insoluble and persistent in water; very high mobility in soil and can be persistent, average half-life is 30-90 days but in anaerobic soils the half-life ranges from 1,600-1,300 days

Water solubility describes the amount of pesticide that will dissolve in a known quantity of water. The water solubility of a pesticide is expressed as milligrams of pesticide dissolved in a liter of water (mg/l or ppm). Pesticide solubility less than 0.1 ppm denotes a pesticide that is virtually insoluble in water (USGS 2000), while levels between 100 ppm and 1,000 ppm are considered moderately soluble. Levels above 10,000 ppm are highly soluble. The higher the pesticide solubility, the greater the potential for it to move off-target.

The soil adsorption coefficient (Koc) and/or water solubility (mg/l) of the proposed pesticide, as well as any additional information or data that may influence the potential for a pesticide to move off-target will be provided in the PUP application and considered as part of the PUP approval process.

A qualitative assessment of a pesticide's potential to move in the environment will be made based on soil adsorption coefficients, water solubility and half-life. Based on these factors and its relative toxicity a qualitative decision will be made regarding its ecological risk to Refuge wildlife resources, and its suitability for inclusion into the pesticide use list for Federal lease lands. In general, pesticides that are weakly adsorbed to soil particles (i.e., a low Koc value), soluble in water (i.e., a high water solubility value), have a relatively long half-life (i.e., greater than 100 days), and have a relatively high toxicity are less likely to qualify for inclusion into the Federal lease land approved pesticide use list. On the other hand, pesticides that are relatively low in toxicity, but are strongly adsorbed, water insoluble and have a short half-life will be viewed favorably for inclusion into the approved pesticide use list.

Pesticides may volatilize from soil and plant surfaces and move off-target into the atmosphere. The potential for a pesticide to volatilize is determined by the pesticide's vapor pressure which is affected by temperature, sorption, soil moisture and the pesticide's water solubility. Vapor pressure is often expressed in mm Hg. To make these numbers easier to compare, vapor pressure may be multiplied by  $10^7$  producing a vapor pressure index. In general, pesticides with a vapor pressure index less than 10 have a low potential to volatilize. Pesticides with a vapor pressure index greater than 1,000 have a high potential to volatilize. Caution should be exercised to assure when collecting vapor pressure data that appropriate expression unit is used when assessing the potential for volatilization. Pesticides that have a moderate to high potential for volatilization will be assessed less favorably by the PUP Committee than those with low potential for volatilization. Vapor pressure values for pesticides are usually available in the pesticide product material safety data sheet or the USDA Agricultural Research Service (ARS) pesticide database.

Products such as Clarity, Sandea, Aquaneat, and Garlon 3 can be persistent in the environment and can impact water quality if improperly applied. To avoid such impacts, these products are applied in accordance with product label requirements and in a manner that avoids spray drift and takes into consideration environmental factors such as wind, temperature, humidity, potential for rainfall, and temperature inversions. The lowest application rate needed to achieve the desired control is selected to minimize the amount of product used on a particular

treatment site. Buffers are also provided between treatment areas and water courses as required by the product label.

The continuation of these practices would minimize the potential for adverse impacts to water quality. Therefore, no significant adverse effects to groundwater or surface water quality are anticipated as a result of using herbicides as proposed under Alternative A.

### **Public Use**

The continuation of the current public use activities on the Refuge are not expected to impact water quality. The trail systems are stable and show no indication of serious erosion issues. With the exception of the parking area at the Refuge headquarters, the parking areas that provide access to observation areas, trails, and hunting blinds are unpaved and are maintained in the manner that minimizes the potential for erosion. Continued maintenance of these facilities would assure that no significant adverse effects to water quality would occur as a result of the current public use program.

### **Sonny Bono Salton Sea NWR - Alternatives B and C**

#### **Wildlife and Habitat Management**

Changes in current management practices, such as the expansion of current no till practices and laser leveling of managed agricultural fields, would result in less soil manipulation in the Refuge's farm fields. This would reduce the potential for erosion and siltation into adjacent water ways and decrease habitat quality for invasive annual weeds that tend to germinate better in areas of disturbed soils. Reducing the number of annual weeds in the farm fields would reduce to some extent the amount of herbicide applied to these fields. In addition, these practices are expected to improve water coverage in the fields, which would in turn improve forage crop productivity, allowing the desirable forage crops to better compete with invasive weeds. This, too, could reduce the need for some herbicide use.

#### **Restoration**

**Red Hill Bay Restoration.** The restoration of Red Hill Bay would require the excavation of material in and around the Alamo River and the Salton Sea to create water conveyance channels, sediment basins, and low berms. These activities have the potential to impact surface water quality by increasing the amount of sediment entering the Alamo River, Salton Sea, and other water courses in the area, as well as the potential to introduce pollutants into these surface water areas. To minimize such impacts, a variety of BMPs would be implemented during and after construction. These BMPs, which have been incorporated into the scope of the project include: proper maintenance and fueling of construction vehicles to avoid spills; tire cleanouts to avoid tracking dirt onto public roadways; and appropriate erosion control techniques following construction to minimize the potential for erosion. The potential for impacts to water quality would be further reduced by the implementation of a Storm Water Pollution Prevention Plan (SWPPP) during construction, as required by the State of California as part of the California NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities. With the implementation of appropriate BMPs and adherence to the measures outlined in the SWPPP, no significant adverse effects to water quality are anticipated as a result of implementing the Red Hill Bay Restoration project.

Another potential effect to water quality of excavating the bay to create channels, levees, and islands a short-term increase in suspended sediments in the water column. These sediments may include legacy pesticides (e.g., DDE) carried into the area from upstream agricultural fields. If pesticides are present in the soils, mobilizing them during construction would

increase their availability for biological uptake. To better understand the extent of pesticides that may be present at the construction area, twenty sediment samples from the site would be collected and analyzed by the USGS Pesticide Fate Research Group in Sacramento, California for current-use and legacy pesticides. The results of this work will help inform the Service, including Refuge staff and the Environmental Contaminants Division, of potential hazards, as well as provide guidance for implementing construction methods that can limit the mobilization of pesticides.

The river water that would flow into the restored bay would transport selenium into the site and immediately be diluted with lower selenium Salton Sea water. (Selenium levels in the Salton Sea are currently lower than those in the river water due to biological uptake by microorganisms followed by sequestration in anoxic sediments when these organisms die.) Based on current selenium levels in the Sea, selenium is not expected to pose a significant threat to wildlife. However, monitoring of the biotic and abiotic functions of the restored habitat, including water quality monitoring focused primarily on pesticide and selenium levels within the restoration site, would be implemented during the initial two years of the restoration project and extended if warranted. The monitoring effort would follow the survey protocols identified in the preliminary review draft Salton Sea Ecosystem Monitoring and Assessment Plan ([http://www.water.ca.gov/saltonsea/docs/Draft\\_SaltonSeaMAP.pdf](http://www.water.ca.gov/saltonsea/docs/Draft_SaltonSeaMAP.pdf)). These data would provide a measure of the risk from pesticides and/or selenium which could then be used to inform management decisions. Additional information regarding this monitoring program is provided in Chapter 4. As the Sea recedes, the conditions that result in the sequestration of selenium could change, therefore, periodic monitoring of selenium levels in the restored area would be conducted in partnership with the Service's Environmental Contaminants Division and/or other partners.

### **Pest Management**

Under Alternative B, pesticide use within the Refuge Complex, including the Sonny Bono Salton Sea NWR and the Coachella Valley NWR, would be addressed through the IPM Plan presented in Appendix D. The herbicides described under Alternative A would also be considered for use under Alternative B, and additional products may be considered in the future in accordance with approval process described in the IPM Plan. Also, under this alternative several of the herbicides currently approved for use on the Sonny Bono Salton Sea NWR would be applied via aerial spraying.

As described in the IPM Plan, along with the selective use of pesticides, IPM involves the implementation of a number of other strategies for eradicating, controlling, and containing pest species. These strategies include prevention, mechanical and physical methods, cultural methods, biological control methods, and habitat maintenance, enhancement, and restoration. The effects of these non-pesticide IPM strategies (e.g., the physical removal of invasive plants with hand tools, possible future use of biological controls to eliminate species such as tamarisk, restoration of native species in disturbed areas) to address pest species on the Refuge would be similar to those effects described elsewhere within this chapter where they are discussed specifically as habitat management techniques to achieve resource management objectives.

Pesticides considered for use on the Refuge are and would continue to be evaluated through the PUPS process using scientific information and analyses that is documented in Chemical Profiles. (Chemical Profiles have already been prepared for the herbicides currently approved for use on the Refuge and are provided as Attachment B of the IPM Plan). These profiles, which are described in detail in the IPM Plan, provide quantitative assessment/screening tools and threshold values to evaluate potential effects to water, soil, and air.

Under the IPM Plan, PUPs for new herbicides would be approved where the Chemical Profiles provide scientific evidence that potential impacts to the Refuge's physical environment are likely to be only minor, temporary, or localized in nature.

A number of BMPs intended to protect water quality would be implemented on the Refuge as part of the pesticide application process. Some of those BMPs are listed here and a detailed list of the BMPs is provided in the IPM Plan (Appendix D).

- As a precaution against spilling, spray tanks will not be left unattended during filling;
- Refuge staff will consider the water quality parameters (e.g., pH, hardness) that are important to ensure the greatest efficacy, when specified on the pesticide label;
- All pesticide spills will be addressed immediately using procedures identified in the Complex's Emergency Action Plan - Incidental or Emergency Chemical Spills;
- No-spray buffers will be provided between the treatment area and open water areas as required by the product label or special BMPs provided in the Chemical Profile, with the more restrictive requirement to be implemented;
- Refuge staff will use low impact herbicide application techniques (e.g., spot treatment, cut stump, oil basal, Thinvert system applications) rather than broadcast foliar applications (e.g., boom sprayer, other larger tank wand applications), where practical;
- Application rates will not exceed the maximum product rate for a single application or the maximum number of applications per season, as provided in the Chemical Profile;
- Equipment will be calibrated regularly to ensure that the proper rate of pesticide is applied to the target area or species; and
- Spray applications will not be conducted on days with a greater than 30 percent forecast for rain within six hours, except for pesticides that are rapidly rain fast (e.g., glyphosate in 1 hour) to minimize or eliminate potential runoff.

In some cases, as described in the Environmental Fate discussion in the IPM Plan, product specific BMPs must be implemented to ensure that impacts to water quality are not significant. For example, to minimize the potential for groundwater quality degradation as a result of leaching and/or surface runoff, a pesticide with a soil half-life or aquatic persistence half-life of more than 100 days would only be approved for use on the Refuge if the application of the particular product is limited to one application per site per year.

The same BMP would be applicable if the soil or aquatic dissipation time ( $DT_{50}$ ) (i.e., the time required for 50 percent of the deposited pesticide to degrade and move from a treated site) for a proposed product is greater than 100 days.

The potential for a pesticide to move to groundwater is another factor that is considered in the PUPS approval process. This potential is determined using the Groundwater Ubiquity Score (GUS) (refer to IPM Plan for more information about GUS). Where GUS is greater than 4.0, a PUP will only be approved with additional BMPs implemented specifically to protect water quality. These BMPs are similar to those described above.

Several factors can result in the introduction of pesticides to surface waters; surface runoff as a result of rainstorms or excessive irrigation can carry pesticides into nearby rivers or other drainages, and pesticide spray drift during or following application. Implementation of the BMPs presented in this section, as well as those presented in the IPM Plan, would minimize the potential for herbicides to enter nearby water sources via runoff.

When herbicides are applied by helicopter, ground boom sprayer, backpack sprayer, or other spraying method, particle drift can occur during application and in some cases, such as with dicamba, for some time following application. Field drift studies conducted by the Spray Drift Task Force, a joint venture of several agricultural chemical businesses, were used to develop a generic spray drift database. This database has enabled researchers to identify and, in many cases, quantify the relationship between environmental and operational application conditions and the magnitude of off-target movement of pesticides during application. This database provides a scientific basis to fulfill USEPA pesticide registration spray drift data requirements, and provides a scientific basis for evaluating off-target movement of pesticides via particle drift and assessing the effects of exposure to humans and wildlife (USFWS 2006).

The AgDRIFT computer model is a product of this database. Several versions of the computer model have been developed (i.e., v2.01 through v2.10). The Spray Drift Task Force AgDRIFT® model version 2.01 (AgDRIFT 2001) is used to estimate drift of pesticides to Refuge resources from aerial and ground pesticide applications. The USEPA has validated version 2.01 (USFWS 2006). Using this model, appropriately sized buffer areas between treatment areas and water sources, as well as treatment areas and sensitive crops or vegetation, can be established for ground applications. These buffer areas are described in the Chemical Profiles under “Specific Best Management Practices.”

Evaluation of the AgDRIFT aerial model (Bird et al. 2001) indicates model predictions multiplied by a safety factor of two will generally be in excess of the observed (field) value over 80 percent of the time. For example, AgDRIFT calculates the estimated average environmental concentration is equal to the selected toxicological endpoint at 40 feet from a sensitive site such as a water body. Statistically the estimated environmental concentration would be expected to be equal to or less than the reference toxicological endpoint 80 percent of the time at 80 feet from the downwind edge of the application (USFWS 2006). The Service will use this procedure to establish aerial buffer zones for pesticide use proposals on the Sonny Bono Salton Sea NWR. Since the minimum distance researched by the Spray Drift Task Force was 25 feet, the minimum distance for an aerial buffer zone will be 50 feet from rivers, drainages, and wetlands. Using this procedure to establish buffer zones for aerial applications has two important attributes. First, it will provide a definable conservative estimate of pesticide deposition resulting from particle drift by aerial application, and second, it is supported by peer reviewed scientific research. Buffers for specific products will be determined as part of the PUP approval process. The products currently proposed for aerial application include Milestone VM (active ingredient: aminopyralid), WEEDAR 64 (active ingredient: 2,4-D DMA), and Clarity (active ingredient: dicamba), which would be used to control broad-leafed weeds in the managed agricultural fields; as well as Stalker or Habitat (active ingredient: imazapyr), which would be used to control dense stands of salt cedar. Other products may be considered for use in the future.

This procedure for determining buffer zones for aerial pesticide applications produces a conservative estimate of pesticide deposition from particle drift and likely will result in an overestimate of ecological risk, particularly for low toxicity or reduced-risk pesticides. All aerial applications would be conducted by licensed aerial applicators.

Based on scientific information and analyses documented in the Chemical Profiles in the IPM Plan, pesticides allowed for use on Refuge lands would be relatively low risk to surface and groundwater quality as a result of low toxicity or short persistence in the environment, and/or the implementation of general and pesticide specific BMPs. Information regarding the risks to water quality of particular pesticides is provided on the product labels and is available in the

Pesticide Properties Database (PPDB 2009) developed by the Agriculture & Environment Research Unit of the University of Hertfordshire; available online at: <http://sitem.herts.ac.uk/aeru/footprint/en/index.htm>.

The potential impacts, if any, to water quality from the application of these pesticides in accordance with the directions on the label and the general BMPs described in the IPM Plan would be minor, temporary, or localized in nature and not considered a potentially significant impact to the environment.

If a cooperative farming agreement is implemented on the Refuge in the future, any pesticides proposed for use by the cooperative farmer would have to be reviewed and approved through the PUPS process and Chemical Profiles would be prepared to address the specific products and use.

### **Public Use and Refuge Operations**

The implementation of the BMPs previously described for construction and maintenance activities would minimize the potential for adverse impacts to water quality related to the construction and maintenance of new trails, parking areas, and general refuge operations.

## **5.2.7.2 Coachella Valley NWR**

### **Coachella Valley NWR - Alternatives A, B, and C**

#### **Wildlife and Habitat Management and Refuge Operations**

Management activities on this Refuge under any of the alternatives are generally associated with habitat and species protection and monitoring. These activities have little, if any, effect on water quality. Vehicular activity is confined to existing roads and little ground disturbance is anticipated. The most significant ground alteration would occur under Alternative C, which proposes the phased restoration of the old vineyard area to native desert scrub habitat. This process would likely involve some site leveling to remove old agricultural rows and the mechanical and chemical control of invasive weeds, primarily Sahara mustard. Site leveling would have no effect on groundwater quality and there are no nearby surface water sources. To reduce the potential for off-site erosion associated with storm runoff, BMPs, such as silt fences, would be installed and maintained during construction and until adequate soil stabilization and revegetation have occurred within the restoration area.

Potential impacts to water quality as a result of the use of herbicides would be similar to those described for the Sonny Bono Salton Sea NWR; however, no aerial spraying of herbicides is proposed at the Coachella Valley NWR. Products that could be used on the Refuge under any of these alternatives include glyphosate (Roundup, Roundup Pro), imazapyr (Stalker), and triclopyr (Garlon 3A). Application would be via backpack sprayer either for foliar application or in associate with cut stump applications. To ensure that adverse effects to water quality related to the application of pesticides will not occur, Refuge staff will adhere to all label directions (e.g., application methods and rates; proper cleaning, storage, and disposal of application equipment and herbicide products), Service regulations, and guidance provided through the PUPS approval process.

The implementation of appropriate BMPs and the use of application of pesticides in accordance with label requirements will reduce the potential for significant adverse effects to below a level of significance.

**Public Use**

Public use on the Coachella Valley NWR under any of the alternatives would include use of an existing level trail that traverses the Refuge and occasional guided tours of the sand dunes. These activities have limited potential to impact groundwater or surface water quality within or adjacent to the Refuge.

**5.2.8 Effects from Climate Change****5.2.8.1 Sonny Bono Salton Sea and Coachella Valley NWRs****All Alternatives**

Because of the nature of the management activities occurring within the Sonny Bono Salton Sea NWR Complex (i.e., highly managed in the case of the Sonny Bono Salton Sea NWR and very limited management in the case of the Coachella Valley NWR) the effects of climate change on Refuge resources are expected to be very similar under any of the proposed alternatives.

As discussed in Chapter 3, world climate is changing as a result of the accumulation of carbon dioxide and other greenhouse gases in the atmosphere (USFWS 2010a, Cayan 2009). These changes are expected to affect mean average temperature, extreme temperatures, duration of extreme temperature events, average rainfall, amount of rainfall versus snowfall, increases in severe storm events, sea levels, and other associated climatic factors. The USEPA (2013) reports that worldwide the last decade (2001 through 2010) was the warmest decade on record since thermometer-based observations began. Global average surface temperature has risen at an average rate of 0.076 °C (0.14 °F) per decade since 1901, and the average surface temperature across the contiguous 48 states has risen during the same time period at an average rate of 0.07 °C (0.13 °F) per decade (0.7 °C [1.3 °F] per century).

In California, the surface air temperature has risen about 0.55 °C (1 °F) over the last 100 years (Cayan 2009), and there is general consensus that temperatures in southwestern California will increase in most months by about 2 °C (3.64 °F) over the next 100 years (PRBO Conservation Science 2011). Regional climate models project a significant increase in extreme temperature events in coastal southern California, as well as increases in prolonged hot spells. In addition, some models project even higher summer temperatures in the areas of southern California located outside the influence of the coastal zone (Cayan 2009).

For the Sonoran Desert ecoregion, various climate models project increases in the median annual temperature in excess of 2 °C (3.64 °F) (PRBO Conservation Science 2011) by the end of the 21<sup>st</sup> century. With respect to projected changes in mean annual rainfall however there is considerable uncertainty. Climate modeling results indicate changes in mean annual rainfall that range from an increase of 3 mm to a decrease of 55 mm by 2070 (PRBO Conservation Science 2011).

Current and predicted future changes in temperature and precipitation are expected to affect refuge resources and long-term refuge management in a variety of ways. For example, recent research and species distribution modeling predict large changes in the distributions of species and vegetation types in the western interior of the U.S. in response to climate change (Finch 2012).

Predictions of increased temperatures and longer periods of excessively high temperatures during the summer months may impact wildlife such as birds and lizards on the Sonny Bono Salton Sea and Coachella Valley NWRs if temperatures exceed the thermal tolerance or result in severe water stress for such species (PRBO Conservation Science 2011). Birds, unlike lizards and invertebrates, have a greater ability to relocate to more favorable climate zones. It is unknown how lizards and invertebrates endemic to the Coachella Valley will be affected by these changes in temperature over time. Barrows and Murphy-Mariscal (2012) identify as a critical tool in informing natural resource management efforts the need for more accurate predictions of such ecological responses to a changing climate, and suggest that scaling larger scale models to more local-scale analyses “may identify local adaptations and climate-change refugia” that may not be possible to predict with larger scale analyses.

Predicted changes in the magnitude, timing, and distribution of precipitation have the potential to affect the availability of surface and groundwater resources, and significant and/or frequent flood events could increase erosion, alter dune structure, or effect local topography. Changes in precipitation also have the potential to increase the diversity and abundance of invasive plants within desert habitats, particularly on the Coachella Valley NWR. Depending upon the timing of the rains, this could affect the ability of native plants, such as the Coachella Valley milk-vetch, to germinate, flower, and produce seed. An increase in invasive non-native plant coverage on the Coachella Valley NWR has the potential to increase the intensity and frequency of fire, potentially leading to the loss of honey mesquite hummocks within blowsand habitats, along with the loss of native vegetation in creosote desert shrub habitat. The potential for adverse effects related to fire is higher for climate models that predict a wetter climate for this area and lower for those models that predict a drier climate (PRBO Conservation Science 2011).

Although current projections for Colorado River flows indicate a relatively modest decrease (Christensen and Lettenmaier 2007 in PRBO Conservation Science 2011), this change could have a substantial impact on the Imperial Valley and the Salton Sea due to the increasing demand for water to support urban development in southern California and elsewhere. These impacts will translate into higher salinities and greater loss of surface water area within the Salton Sea, and they may eventually reduce water availability for managed habitats on the Sonny Bono Salton Sea NWR. In the Coachella Valley, the effect could be greater dependence on groundwater to support urban and agricultural uses, which could lead to a sustained lowering of the water table and greater loss of honey mesquite, an important component in the delicate sand balance on the Refuge.

The prediction of increased temperatures and lower precipitation throughout the western U.S. indicates that existing wetlands throughout the Pacific Flyway will be impacted, thereby increasing the significance of the remaining larger water bodies and managed wetland habitat areas within the flyway. Additional demand for water in urban areas will exacerbate this problem and could result in decreases in amount of water available to the Sonny Bono Salton Sea NWR for managed habitats, including freshwater cattail wetlands, seasonal shallow wetlands, managed agricultural fields, and permanent open water wetlands. In addition, any additional reductions in water discharge to the Salton Sea as a result of expanded water conservation measures throughout the Imperial Valley would also lead to increased salinity levels in the Salton Sea, adversely affecting the remaining fish population and aquatic invertebrates that provide essential fuel to migrating birds.

Another potential threat to wildlife at the Sonny Bono Salton Sea NWR relates to the potential increase in the availability or concentrations of contaminants in water and soil due to changes

in precipitation and increases in temperature. Alterations in temperature, humidity, and rainfall patterns could also result in changes to disease transmission dynamics and increase infection pressure on wildlife populations, particularly avian populations.

Climate change is considered a major threat to biodiversity at the global and local level (Dawson et al. 2011, Gardali et al. 2012); however, we have only just begun to assess the full extent of this threat. According to Dawson et al. (2011), “Assessing the biodiversity consequences of climate change is complicated by uncertainties about the degree, rate, and nature of projected climate change, the likelihood of novel and disappearing climates, the diversity of individual-species responses to a broad suite of interacting climate variables, and interactions of climate-change effects with other biotic factors (e.g., competition, trophic relationships) and stressors (land use, invasive species, pathogens, pollutants).” To address this threat, it is important to understand the various aspects of a species’ vulnerability (e.g., exposure, sensitivity, adaptive capacity) to climate change. With this information, it may be possible to adapt management actions to address these vulnerabilities and to take advantage of a species’ adaptive capacities. The research necessary to assess this threat and identify appropriate management actions cannot occur solely at the Refuge level, it must involve participation at the regional, flyway, landscape, and national level.

Magness et al. (2011) after examining the vulnerability of the reserve units within the NWRS suggested a suite of management approaches that would capitalize on local conditions to facilitate adaptation and help spread ecological risk across the NWRS network. These management approaches ranged from retrospective strategies (e.g., maintaining historic conditions) for refuges with slow rates of environmental change to prospective approaches that would facilitate ecological transitions consistent with future climatic conditions.

The National Fish, Wildlife and Plants Climate Adaptation Strategy, released in 2012 to inspire, enable, and increase meaningful action to safeguard the nation’s natural resources in a changing climate, emphasizes that actions to help fish, wildlife, plants, and natural systems adapt to climate change can be coordinated with measures taken in other sectors, such as agriculture, energy, water, and transportation, to increase the benefits for all sectors (National Fish, Wildlife and Plants Climate Adaptation Partnership 2012). The seven major goals of the Strategy include: 1) conserve and connect habitat; 2) manage species and habitats; 3) enhance management capacity; 4) support adaptive management; 5) increase knowledge and information; 6) increase awareness and motivate action; and 7) reduce non-climate stressors.

The wildlife and habitat management actions currently being implemented on both Refuges, as well as those actions proposed in the various alternatives described for each Refuge, are consistent with these goals. The actual effects to Refuge resources as a result of climate change are difficult to predict; therefore, future management actions, as proposed in Alternatives B and C for each Refuge, would attempt to measure and address the effects of climate change on Refuge resources through monitoring and adaptive management.

At some point, the salinity levels in the Salton Sea will become too high to support fish, due primarily to increased salinity levels related to reductions in drainage water flowing into the Sea. If temperatures rise and annual rainfall decreases, the rate at which the salinity levels rise in the sea could increase. Therefore, of the public uses proposed in the various management alternatives, fishing could be adversely affected by predicted changes in climatic conditions over the 15-year life of the CCP. Other public uses would continue, but the quality of the experience could change based on changes in the abundance and diversity of birds and other wildlife present on the two Refuges.

## 5.2.9 Effects to Air Quality

### 5.2.9.1 Sonny Bono Salton Sea NWR

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management and Refuge Operations**

Current wildlife and habitat management activities on the Refuge require the use of vehicles for access to the various Refuge management areas, as well as the use of specialized vehicles, such as tractors, excavators, and motorized boats, to manage and maintain the various wildlife habitat areas on the Refuge. To minimize total emissions, all motorized Refuge vehicles receive routine maintenance to ensure compliance with State and local emission standards.

A variety of Refuge activities can result in the generation of fugitive dust including use of unpaved access roads by staff and visitors, agricultural activities, and general Refuge maintenance. As described by the Imperial County Air Pollution Control District, fugitive dust contributes to the total amount of fine particulate matter (PM<sub>10</sub>) entrained in the ambient air within the local air basin. To reduce the amount of particulate matter being generated, the Imperial County Air Pollution Control District has enacted various regulations that address activities such as the use of earthmoving and construction equipment, use and maintenance of unpaved access roads, transport of bulk materials such as soil, sand, and rock, and agricultural operations. These regulations are addressed in Rule 800 (General Requirements for Control of Fine Particulate Matter [PM<sub>10</sub>]), Rule 801 (Construction and Earthmoving Activities), Rule 805 (Paved and Unpaved Roads), and Rule 806 (Conservation Management Practices), which relates specifically to agricultural operations. These regulations have been enacted pursuant to the USEPA guidance for Serious PM<sub>10</sub> Non-Attainment Areas, and are intended to reduce the impact of various activities on the level of fine particulate matter in the air.

In accordance with air quality regulations for the air basin, the Refuge implements these actions to reduce the fugitive dust generated by driving on unpaved roads: minimizing total staff trips on unpaved roads by combining activities; when possible, using existing paved roads rather than unpaved roads to access Refuge lands; reducing travel speeds on unpaved roads; applying soil stabilizers on major unpaved access roads and parking areas; and limiting the use of unpaved roads by restricting access on some roads to Refuge personnel only.

To reduce the amount of particulates generated as a result of agricultural field management, the Refuge implements the following conservation management practices: no till practices in some of the Refuge's agricultural fields; no use of insecticides; no crop harvesting since the crop is intended to provide feed for wintering geese; reduced travel speeds on unpaved access roads in and around agricultural fields; and maintenance of tree rows, which in addition to providing habitat for native species also reduce wind speeds across cultivated fields.

Over the years, the Refuge has on occasion found it necessary to burn excessive vegetation within managed marsh areas. Such burning requires a permit from the Imperial County Air Pollution Control Officer and is subject to the rules and regulations established by the Imperial County Air Pollution Control District and the California Health and Safety Code and implementing regulations. Additionally, the use and maintenance of the incinerator located within Refuge headquarters compound for the disposal of diseased bird carcasses is conducted in a manner consistent with local air quality regulations.

The contribution of particulate matter and other air emissions to the air basin as a result of current wildlife and habitat management practices conducted on the Refuge is limited, and implementing the various actions described above, as well as ensuring continued adherence to all local, State, and Federal guidance, rules, and regulations related to air quality, will mitigate potential impacts to less than significant.

### **Salton Sea Restoration Partnerships**

Salton Sea SCH Project. The draft EIS/EIR (USACOE and California Natural Resources Agency 2011) for the project concludes that the proposals to restore portions of Bruchard Bay would not conflict with or obstruct the implementation of applicable air quality plans. Mitigation measures described in the draft EIS/EIR would be incorporated into the construction contract specifications to reduce PM<sub>10</sub> and NO<sub>x</sub>.

Implementing the proposal would provide long-term benefits to the air basin by converting a source of unmanaged fugitive dust (soon to be exposed Salton Sea playa) to managed wetlands.

### **Pest Management**

Herbicide applications are made annually within various locations on the Refuge. Several of these herbicides can volatilize from soil and plant surfaces and move from the treated area into the atmosphere. The potential for a pesticide to volatilize is determined by the pesticide's vapor pressure. As indicated in Table 5-1, herbicides with the active ingredient triclopyr (e.g., Garlon, Pathfinder) and 2,4-D DMA (e.g., WEEDAR 64) are highly volatile and herbicides with the active ingredient dicamba (e.g., Clarity) are moderately volatile.

To address potential air quality impacts related to herbicide volatility, these products are applied at very low volumes and using calibrated application equipment. In the case of triclopyr, special spray tips are used to increase efficiency and reduce drift. Triclopyr, 2,4-D DMA, and dicamba are applied once a year. When applied at low volumes, even these volatile products quickly become diluted in the atmosphere, minimizing the effect on local air quality.

The potential for adverse air quality impacts as a result of pesticide use is also reduced through compliance with Federal, State, and local pesticide use laws and regulations, as well as Service and NWRS pesticide-related policies. This includes compliance with the Federal Insecticide, Fungicide and Rodenticide Act of 1996 (FIFRA), which requires all pesticides to be applied at the rates and with the application equipment specified on the pesticide label. The use of herbicides on the Refuge also requires the implementation of BMPs developed as part of the PUPS review process. These include restricting herbicide application to periods when wind speeds are less than ten miles per hour and no inversion conditions exist and using the lowest effective application rate.

Based on this analysis, the continuation of the Refuge's current invasive species management actions would not result in any significant adverse effects to air quality.

### **Public Use**

The primary source of air emissions as a result of implementing the current public use program on the Refuge are motorized vehicles used by visitors to the Refuge. Public use also results in limited contributions of fugitive dust due to travel on unpaved access roads and parking areas. The number of daily trips generated on the Refuge is relatively low, approximately 8,000 trips per year, with most trips occurring in the winter and spring when rains reduce the potential for dust emissions along unpaved roads.

In the context of the emissions generated throughout the air basin, the trips generated by the Refuge's public use program are negligible. As described above, the Refuge takes actions to reduce the generation of fugitive dust on unpaved roads, including those used by visitors. Based on the number of visitors to the Refuge and the actions taken to reduce the generation of dust, the continuation of the current public use programs on the Refuge is not expected to result in any significant adverse effects to air quality.

### **Sonny Bono Salton Sea NWR - Alternatives B and C**

#### **Wildlife and Habitat Management**

The wildlife and habitat management activities conducted under Alternative A would also occur under Alternatives B and C. As described in Alternative A, these activities are not expected to result in any adverse effects to air quality. Under Alternatives B and C, additional actions (e.g., laser leveling, expanded practice of no till, improved water distribution across fields) would be taken to reduce land manipulation in the managed agricultural fields, the effect of which would be to further decrease the amount of fugitive dust generated on the Refuge. The proposal for future consideration of cooperative farming practices on the Refuge would not be expected to increase fugitive dust generation from the Refuge above existing conditions because any new agricultural use on the Refuge would have to comply with the rules and regulations enforced by the Imperial County Air Pollution Control District, including Rule 806. Wildlife and habitat management proposals under Alternatives B and C would result in little, if any, increases in the total number of miles traveled.

#### **Restoration**

Red Hill Bay Restoration. Construction activities associated with the restoration of Red Hill Bay, which could be conducted in two distinct phases, would result in temporary, localized adverse impacts to air quality related to fugitive dust and tailpipe emissions generated by construction equipment (e.g., graders, tractors, dump trucks), however, this project is not expected to generate dust or emissions in excess of current air quality standards. Measures to reduce the amount of fugitive dust and other emissions during construction, as required in Rule 800 and Rule 801 would be incorporated into the project plans for each construction phase. These measures, which are to be included in the construction specifications for the project, include:

- Prepare and comply with the requirements of a dust control plan pursuant to Rule 801.
- Implement actions to prevent visible dust emissions from leaving the project site boundary. Measures shall include but not be limited to watering prior to and during any earth movement; watering exposed soil three times per day, as applicable; installing wind fencing; covering excavated materials to prevent erosion; and limiting or stopping work during high wind conditions.
- Cover the load of all haul vehicles transporting materials to or from the project site to reduce fugitive dust generated during the transport of materials and cover any stockpiled material to reduce the production of dust.
- Install track-out control structures at appropriate locations to prevent dirt and dust from accumulating on adjacent public access roads, and wash/sweep all equipment and tires prior to leaving the project site.
- Maintain all equipment used on the site in compliance with applicable air quality standards.

The implementation of these measures, as well as compliance with other applicable Imperial County APCD rules and regulations, would ensure that air emission from the proposed restoration would not contribute significantly to a cumulative increase in emissions within the air basin. In addition, the project would not conflict with or obstruct implementation of any air quality management strategies or plans for the Imperial Valley Air Basin, nor would any air quality standard be violated.

In addition to the measures that would reduce impacts during construction, this phased restoration of 420 acres of exposed sea floor would provide long term benefits to the air basin by replacing the currently dry, silty playa with permanent open wetlands, thereby eliminating a source of unmanaged fugitive dust from the air basin.

The excavation associated with the construction of the project sump and pump station may result in temporary, localized odors from exposure of buried sediments; however, no sensitive receptors have been identified in the project area. Therefore, no impacts to the environment as a result of the potential for causing temporary, localized objectionable odors are anticipated.

### **Pest Management**

As described under Alternative A, some pesticides can volatilize from soil and plant surfaces and move from the treated area into the atmosphere. An integrated approach to pest management is proposed under Alternatives B and C that would include the use of herbicides to control invasive plant species. The products currently being used on the Refuge would continue to be used under Alternatives B and C, although in accordance with the IPM Plan, other products may be approved for use in the future. Also under these alternatives, aerial application of herbicides with the active ingredient glyphosate (non-volatile) or aminopyralid (low volatility) is proposed.

To minimize potential effects to air quality, the IPM Plan (Appendix D) includes a number of BMPs that would be implemented in association with pesticide use on the Refuge. Some of these BMPs include:

- Refuge staff will use low impact herbicide application techniques (e.g., spot treatment, cut stump, oil basal, Thinvert system applications) rather than broadcast foliar applications (e.g., boom sprayer, other larger tank wand applications), where practical.
- Refuge staff will use low volume rather than high volume foliar applications when low impact methods are not feasible or practical, to maximize herbicide effectiveness and ensure correct and uniform application rates.
- Applicators will use and adjust spray equipment to apply the coarsest droplet size spectrum with optimal coverage of the target species while reducing drift.
- Applicators will use the largest droplet size that results in uniform coverage.
- Applicators will use drift reduction technologies such as low-drift nozzles, where possible.
- Spraying will occur during low (average less than 7 mph and preferably 3 to 5 mph) and consistent direction wind conditions with moderate temperatures (typically less than 85°F).

- Applicators will avoid spraying during inversion conditions (often associated with calm and very low wind conditions) that can cause large-scale herbicide drift to non-target areas.
- Equipment will be calibrated regularly to ensure that the proper rate of pesticide is applied to the target area or species.
- Spray applications will be made at the lowest height for uniform coverage of target pests to minimize or eliminate potential drift.
- If windy conditions frequently occur during afternoons, spraying (especially boom treatments) will typically be conducted during early morning hours.

A complete list of the BMPs to be implemented on the Refuge is provided in the IPM Plan.

In some cases (as described in the Environmental Fate discussion found in the IPM Plan), product specific BMPs must be implemented to ensure that impacts to air quality are not significant. For example, pesticides with a high potential to volatilize (evaporate) from soil and plant surfaces and move off-target into the atmosphere will only be approved for use on the Refuge if additional BMPs are implemented specifically to minimize drift and protect air quality. The BMPs required under these circumstances include:

- Do not treat when wind velocities are less than 2 or greater than 10 miles per hour with existing or potential inversion conditions;
- Apply the largest-diameter droplets possible for spray treatments;
- Avoid spraying when air temperatures exceed 85°F;
- Use the lowest spray height possible above target canopy; and
- Where identified on the pesticide label, incorporate the pesticide into the soil as soon as possible during or after application.

The implementation of the various BMPs described in the preceding paragraphs would ensure that localized and regional air quality impacts related to the ground application of herbicide would be minimized to the point that the potential for adverse effects would be considered insignificant.

Aerial application of herbicides on the Refuge would most likely be conducted using a helicopter with a boom sprayer, as helicopters are highly maneuverable and applications can be made at speeds slower than fixed-wing aircraft, although a fixed-wing aircraft might also be proposed for use. In any case, the applicator must be a licensed contractor experienced in the aerial application of herbicides. To maintain precise application rates, aircraft are equipped with variable-rate, flow-control units to compensate for changes in airspeed. Spray equipment and techniques used during aerial applications (i.e., helicopters, fixed-wing aircraft) are designed to minimize drift. Spraying only occurs when wind speed is between 2 and 10 mile per hour. Spraying is not conducted when there are no winds as this could indicate an inversion or unexpected shifts in wind direction. Imperial County APCD Rule 806 (Conservation Management Practices) describes the use of more efficient application equipment such as aerial applications as one of the conservation management practices to be considered to reduce the production of fugitive dust in agricultural settings.

Aerial spraying in California is regulated by the USEPA, California Department of Pesticide Regulation (CDPR), and Imperial County Agricultural Commissioner. CDPR (2011) recommends a variety of measures in addition to the drift minimization measures described on the pesticide label to minimize drift during aerial applications. These measures, which are described below, would be incorporated into the scope of work for all aerial application contracts to be conducted on the Refuge under Alternatives B and C.

Aircraft application equipment used to apply a pesticide spray solution shall be configured as follows:

- Functional boom length, measured from outboard nozzle to outboard nozzle, shall not exceed 75 percent of the overall wing span or rotor length.
- Boom pressure shall not exceed 40 pounds per square inch for the nozzles being used.
- The flow of liquid from each nozzle shall be controlled by a positive shutoff system.
- Nozzle orifices shall be directed backward, neutral to the airstream.
- Aircraft shall be equipped with:
  - Jet nozzles having an orifice of not less than one-sixteenth of an inch in diameter;
  - Nozzles shall not be equipped with any device or mechanism which would cause a sheet, cone, fan, or similar type dispersion of the discharged material, except helicopters operating at 60 miles per hour or less may add a number 46 (or equivalent) or larger whirl plate, a plate inserted into a hollow cone nozzle that causes the spray to rotate as it is applied;
  - Helicopters operating at 60 miles per hour or less may, instead of (a), be equipped with fan nozzles with a fan angle number not larger than 80 degrees and a flow rate not less than one gallon per minute at 40 pounds per square inch pressure (or equivalent); or
  - After evaluation, the director may authorize other nozzles for aircraft use (CDPR 2011).

Aerial applications of a pesticide spray solution shall meet the following requirements:

- Apply only when there is a positive air flow. Wind speed shall not be more than ten miles per hour at the application site, as measured by an anemometer positioned four feet above the ground.
- Discharge shall start after entering the target site; discharge height shall not exceed ten feet above the crop or target; discharge shall be shut off whenever necessary to raise the equipment over obstacles; discharge shall be shut off before exiting the target site.

Applying herbicides using aircraft or ground equipment in accordance with label requirements, as well as incorporating BMPs, as presented in the IPM Plan and Chemical Profiles, and the minimization measures described above, would reduce the potential for significant adverse impacts to air quality to below a level of significance.

### **Public Use**

Alternatives B and C include several new or expanded public use proposals. These include a new parking area in Unit 1 to accommodate wildlife observation, new birding trails in Unit 2, and minor changes to the hunting program. These proposals would not require any new access roads and implementation would involve only limited construction activity. The measures described in Alternative A for minimizing the production of fugitive dust on unpaved roads and parking areas would also be implemented under these alternatives. The proposal to stabilize the trail tread on existing trails would provide some minor benefits, as the potential for the generation of dust would be further reduced.

These facilities would provide visitors for more opportunities to view wildlife on the Refuge, and could result in a modest increase in the number of visitors coming to the Refuge. Vehicular emissions generated by new visitors would, however, continue to represent relatively low numbers when considered in the context of the larger air basin. To reduce total emissions generated from public use activities, carpooling to Refuge events will be encouraged.

### **5.2.9.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management**

The wildlife and habitat management activities implemented under Alternative A have little effect on the air quality within the Coachella Valley. Daily auto or truck trips associated with management, monitoring, maintenance, and law enforcement average less than 10 per day, therefore, the emission generated from these trips are insignificant.

##### **Pest Management**

Herbicide use is limited on this Refuge, but when used, herbicides are applied using a backpack sprayer or ATV boom. Pesticide permits for this Refuge are obtained from the Riverside County Agricultural Commissioner. All of the measures implemented on the Sonny Bono Salton Sea NWR related to herbicide application would apply to this Refuge; therefore, the use of herbicides on the Refuge would not result in any significant adverse impacts to air quality.

##### **Public Use**

Public use on the Refuge is limited to special guide tours of a portion of the Refuge, which generally involve carpooling, and trail use. The number of trips generated by these uses is very low and the total emissions are nominal. The potential for generation of dust from these uses is also very low. Therefore, continuing to implement the limited uses provided on the Refuge would not result in any adverse significant effects to air quality.

#### **Coachella Valley NWR - Alternatives B and C**

##### **Wildlife and Habitat Management**

The wildlife and habitat management activities proposed under Alternatives B and C would require some additional visits to the Refuge to implement monitoring, habitat enhancement, habitat restoration, and expanded control of invasive plants. With the exception of habitat restoration, these activities would involve only limited increases in emissions from motorized vehicles, with more trips to the Refuge being generated. Some trips would originate at the Sonny Bono Salton Sea NWRC headquarters, while others would originate in the Coachella

Valley. These trips are still not expected to exceed an average of 10 trips per day; therefore, the total contribution of emission would continue to be nominal.

The use of herbicides would increase as control of Sahara mustard and other invasive plants increases, however, pest management would be implemented in accordance with the IPM Plan developed for the Complex. Therefore, implementation of BMPs included in the IPM Plan and the Chemical Profiles, along with adherence to the application requirements on the product labels, would minimize the potential for impacts to air quality to below a level of significance.

Habitat restoration of the old vineyard site could result in the generation of fugitive dust during site preparation. To reduce the potential for dust, the following measures would be incorporated into the scope of the restoration project under Alternative C:

- Prepare and comply with the requirements of a dust control plan;
- Implement actions (e.g., watering prior to and during any earth movement, watering exposed soil three times per day, as applicable, installing wind fencing, covering excavated materials to prevent erosion, limiting or stopping work during high wind conditions) to prevent visible dust emissions from leaving the project site boundary;
- Cover the load of all haul vehicles transporting materials to or from the project site to reduce fugitive dust generated during the transport of materials and cover any stockpiled material to reduce the production of dust;
- Install track-out control structures at appropriate locations to prevent dirt and dust from accumulating on adjacent public access roads, and wash/sweep all equipment and tires prior to leaving the project site; and
- Maintain all equipment used on the site in compliance with applicable air quality standards.

The implementation of these measures would reduce the potential for adverse effects to air quality to below a level of significance.

## **5.2.10 Effects Related to Greenhouse Gas Emissions**

### **5.2.10.1 Sonny Bono Salton Sea and Coachella Valley NWRs**

#### **All Alternatives**

The scientific community overwhelmingly agrees that the earth's climate is becoming warmer and that human activity is contributing to this change. Unlike other environmental impacts, climate change is a global phenomenon in which large and small GHG generators throughout the earth contribute to the impact. Therefore, although many GHG sources are individually too small to make any noticeable difference to climate change, the number of small sources around the world combine to produce a very substantial portion of total GHG emissions (CAPCOA 2008).

On February 18, 2010, the White House Council on Environmental Quality (CEQ) issued draft guidance on when and how Federal agencies should analyze the environmental effects of climate change and GHG emissions when they describe the environmental impacts of a proposed action under NEPA. Within this draft guidance, CEQ suggests that Federal agencies consider during the scoping process whether a quantitative and qualitative analysis of GHG emissions from a proposed action would provide meaningful information to decision makers and the public. CEQ proposes that direct emissions of 25,000 metric tons or more of

CO<sub>2</sub>-equivalent GHG emissions on an annual basis should be considered the indicator that a quantitative and qualitative assessment may be warranted. This level of GHG emissions is not, however, intended to be an indicator of a threshold of significant direct or indirect effects. Further, CEQ does not propose to make this guidance applicable to Federal land and resource management actions and is instead seeking public comment on the appropriate means for assessing the GHG emissions of Federal land and resource management decisions.

At the State level, various options are being considered for setting a threshold for GHG emissions in California, including zero and non-zero levels, while another option involves addressing project effects without establishing a threshold. The latter could be accomplished through a quantitative or qualitative evaluation of individual projects.

GHG emissions are reported in metric tons of CO<sub>2</sub> equivalent emissions, which represent a single metric that embodies all GHGs, including CO<sub>2</sub>, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons, and sulfur hexafluoride. Because these GHGs all have varying heat-trapping abilities and atmospheric lifetimes, a global warming potential (GWP) value has been assigned to each GHG to facilitate comparison among GHGs, with the GWP representing the heat-trapping impact of a GHG relative to CO<sub>2</sub>, which has a GWP of 1.0 (CEQ 2012).

Under any of the alternatives, activities associated with wildlife and habitat management, public use, and Refuge operations would result in the generation of GHGs. Alternatives B and C would result in slightly higher emissions than Alternative A due to a potential increase in the number of staff members proposed (an increase of five staff members to support both Refuges within the Complex), limited expansion of opportunities for wildlife-dependent recreational uses, and short term construction activities associated with restoration at Red Hill Bay and potential restoration by the State of California at Bruchard Bay. The emission associated with the construction would be temporary and limited in duration. The relative differences between the alternatives can be described qualitatively, but quantifying the amount of GHG emissions generated from these types of uses is difficult.

In 2012, the Sonny Bono Salton Sea NWRC consumed approximately 15,835 gallons of gasoline and diesel fuel to power Service vehicles and habitat maintenance equipment. In the same year, 62,720 kilowatt-hours of electricity were consumed to power the Refuge headquarters building and associated facilities. Of this total, 44,128 kilowatt-hours were generated by the Refuge's solar panels, resulting in the use of approximately 18,592 kilowatt-hours of energy generated from a combination of fossil fuels and renewable energy sources (renewable energy sources account for 24.5 percent of the energy produced in the Imperial Valley).

According to the USEPA Greenhouse Gas Equivalencies Calculator (USEPA 2012), the operations at the Refuge Complex annually generate approximately 141 metric tons of CO<sub>2</sub> equivalent associated with vehicle fuel and 13.1 metric tons of CO<sub>2</sub> equivalent associated with the use of electricity. Energy consumption at the Refuge headquarters would be expected to increase only slightly as a result of the proposed increase in Refuge staff under Alternatives B and C, because much of the energy consumed is the result of heating and cooling the existing facility. The consumption of gasoline by additional staff traveling to and from work would also represent a slight increase in emissions. Even with the implementation of the various construction projects proposed under Alternatives B and C, the GHG emissions would not begin to approach the 25,000 metric tons or more of CO<sub>2</sub> equivalent annually that CEQ suggests would warrant analysis to determine significance.

Nevertheless, the Service has a mandate to reduce the total GHG emissions generated from the operation and maintenance of the Refuge; therefore, as vehicles are replaced, new vehicles will be selected that have better fuel economy; wherever possible, tasks requiring off-Refuge travel will be combined to reduce the total number of miles driven by Refuge staff; office equipment, including light fixtures, will be evaluated and replaced as necessary with “Energy Star” qualified products; power management features on all computers and monitors will be activated and laptop power cords will be unplugged when not in use; and all equipment and lights will be turned off at the end of the day. The Refuge already has taken steps to reduce GHG emissions at the Refuge Complex headquarters by installing solar panels and energy efficient air conditioners and water heaters. Between 2010 and 2011, the Refuge’s photo-voltaic project produced over 81,659 kilowatts per hour providing a carbon dioxide emission savings of approximately 57.6 metric tons. Based on this analysis, GHG emissions resulting from the implementation of any of the alternatives are not expected to represent a significant direct or indirect impact on the environment.

## **5.2.11 Contaminants**

### **5.2.11.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

Under Alternative A, Refuge staff would continue to work with the Service’s Contaminants Program to evaluate potential sources of environmental contaminants on the Refuge and to ensure that potential contaminants issues are appropriately addressed as part of the Refuge’s overall management plan. In addition, Refuge staff would continue to adhere to all Federal, State, and label requirements related to the safe and secure storage, as well as use, of regulated and unregulated chemical products (e.g., pesticides, gasoline, motor oil, lubricants, paints) on the Refuge. Required containment structures would continue to be properly maintained and spill plans and training would continue to be updated as necessary.

The Carlsbad Fish and Wildlife Office Contaminants Program completed the Contaminants Assessment Process (CAP) for the Refuge Complex in 2012. The CAP identified selenium and DDE levels in the Sea as important issues to be considered in conducting habitat and wildlife management actions, while also concluding that hypereutrophication and hypersalinity of the Salton Sea presented the greatest long-term threat to Refuge resources. The results of the CAP will assist Refuge staff in prioritizing necessary sampling and/or clean-up actions, developing proposals for future investigations, and initiating pollution prevention activities.

Contaminants in the water and sediment, such as selenium and pesticides, could impact biota utilizing the ponds created as part of the Salton Sea SCH project. As described in the draft EIS/EIR for that project, Ecorisk modeling was conducted to estimate potential selenium concentrations in water and biota for different alternatives and operations (USACOE and California Natural Resources Agency 2011). No significant adverse effects were identified, however, to ensure that no unanticipated adverse effects occur the project scope includes a monitoring program that would be implemented to collect data necessary to assess the status of contaminant-related threats (e.g., selenium concentration in water, sediment, and bird eggs) (USACOE and California Natural Resources Agency 2011). Monitoring data would be collected in accordance with guidelines being developed by USGS for the Salton Sea Ecosystem Monitoring and Assessment Plan.

With regard to pesticides, disturbance of bottom sediments due to berm construction and grading of swales would redistribute buried sediment-sorbed DDT and pyrethroid pesticide residues to the sediment surface. These DDT residues and pyrethroid pesticides are highly hydrophobic and would be expected to remain bound to disturbed sediments in the ponds and berms (USACOE and California Natural Resources Agency 2011).

### **Sonny Bono Salton Sea NWR - Alternatives B and C**

The potential effects of implementing Alternatives B and C as they relate to contaminants would be similar to those described under Alternative A. Coordination with the Service's Contaminants Program would continue and BMPs would be implemented during the application of pesticides. Through an integrated approach to pest management, pesticide use would be combined with other non-chemical approaches to invasive plant control and additional BMPs would be implemented during aerial applications. The restoration of Red Hill Bay would have the potential to redistribute sediment-sorbed legacy contaminants (DDE) and pyrethroid pesticide residues to the sediment surface, as described for the SCH project, but these effects are expected to be limited. Additional discussion related to contaminants is provided later in this section under Effects to Wildlife.

#### **5.2.11.2 Coachella Valley NWR**

### **Coachella Valley NWR - Alternatives A, B, and C**

#### **Wildlife and Habitat Management, Public Use, and Refuge Operations**

With no permanent structures, roads, or other facilities located on the Refuge, the potential for adverse effects to Refuge resources from Refuge operations on this Refuge are minimal. The use of herbicides to control invasive plants would continue under any of the alternatives, and restoration of the old vineyard site, as proposed under Alternative C, would involve the use of motorized equipment. The implementation of the measures described under water quality would ensure that no adverse effects related to contaminants from these activities would occur.

## **5.3 Effects to Habitat and Vegetation Resources**

The effects to the habitats and vegetation supported on the Sonny Bono Salton Sea NWR and the Coachella Valley NWR as a result of implementing the various management alternatives described for each Refuge are presented in this section. Potential impacts to these resources are characterized by evaluating direct, indirect, and cumulative effects. Direct impacts would involve the removal of vegetation as a result of ground-disturbing actions, while indirect impacts would involve changes to habitat or vegetation that are incidental to the implementation of an action. Cumulative impacts to habitat and vegetation resources, described in a subsequent section titled Cumulative Effects, would result when the incremental impact of an action is added to other, closely related past, present, or reasonably foreseeable future actions.

An adverse effect to habitat or vegetation resources would be considered significant if:

- A substantial portion of native habitat would be removed or otherwise modified to accommodate a proposed action.
- An action would result in the direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation of a sensitive or narrow endemic plant species.

- A significant cumulative effect would occur if the loss (adverse effect) or restoration (beneficial effect) of native habitat or a sensitive or narrow endemic plant species as a result of the proposed action is minor but, when considered in light of other similar losses or gains within the region, would be considerable.

A significant beneficial impact would occur if a substantial area of native habitat (an increase of more than 30 percent) is restored or the reproductive success of a sensitive or narrow endemic plant species is substantially increased as a result of improved habitat quality.

### **5.3.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

##### **Wildlife and Habitat Management**

The continued implementation of the wildlife and habitat management activities occurring on the Refuge, as proposed under Alternative A (e.g., annual preparation of managed agricultural fields and seasonal shallow wetlands; periodic maintenance of permanent cattail marsh and open water wetlands; control of invasive plants in riparian areas; conducting surveys and implementing monitoring protocols; maintaining primary access and farm roads, irrigation and drainage channels, and irrigation pumps and equipment; monitoring avian disease in the Salton Sea) would result in little, if any, adverse effects to existing managed and native habitat areas, therefore, impacts to habitat and vegetation under this alternative would be considered less than significant.

Implementing this alternative over Alternative B or C would not however realize the benefits associated with the proposals to restore permanent open water habitat within exposed portions of the Salton Sea. Habitat values within Bruchard Bay and Red Hill Bay are expected to decrease as water levels continue to recede and salinity levels increase. Therefore, without restoration, the overall availability of stable open water habitats to support shorebirds and seabirds within the Refuge would continue to decline.

##### **Salton Sea Restoration Partnerships**

Salton Sea SCH Project. The draft EIS/EIR for the Salton Sea SCH project identifies the potential for adverse impacts related to the removal of riparian habitat. As currently planned, no native riparian habitat (i.e., mesquite bosque) would be removed; however, non-native salt cedar would be eliminated as a result of the construction of the diversion along the New River, and non-native tamarisk (salt cedar) scrub and tamarisk woodland could be removed during construction of the open water ponds. To reduce impacts related to the loss of non-native riparian habitat, the project proposes to establish native riparian habitat within the project site at a minimum rate of one acre of restored native riparian habitat for every acre of non-native riparian habitat (i.e., tamarisk woodland, tamarisk scrub) impacted by the project.

##### **Pest Management**

Under Alternative A, invasive plant removal involves both mechanical and chemical control methods. Within managed agricultural areas, the primary target species are non-native broadleaf weeds, while within the Refuge managed and natural wetland habitat areas, much of the control focused on perennial non-native invasive plant species such as salt cedar and common reed. When mechanical control methods are implemented to remove perennial plant species, there is some potential for the unintentional removal of native plant species; however,

the potential is limited since most control is occurring in areas that support nonnative invasive species almost exclusively.

When chemical control is implemented, areas that support native vegetation are avoided and buffer areas are established between native vegetation and the treatment area to ensure reduction of the potential for pesticide drift. In addition, only herbicides that have been approved for use on the Refuge through the PUPS process are applied on the Refuge. In considering which product(s) to use at a particular location on the Refuge, the product with the least potential for impact to native vegetation, while also providing effective control of the target pest species, is selected.

When applying a pesticide, application equipment is selected that will provide site-specific delivery to target pests while minimizing or eliminating direct or indirect (e.g., drift) exposure to non-target areas. Following these procedures, as well as the application requirements provided on the product label, minimizes the potential for impacts. Therefore, no significant adverse effects to habitat and native vegetation are anticipated as a result of herbicide use, and benefits to native habitat would be expected, as control of non-native vegetation would likely enhance the habitat quality.

### **Public Use**

Wildlife-dependent recreational uses occurring on the Refuge have limited potential to adversely affect wildlife habitat and native vegetation. Habitat areas are well-defined and public use activities are generally restricted to established trails or designated hunting blinds. Hunting regulations require all hunters to stay within 100 feet of their assigned blind site or stakes, except to retrieve downed birds, reducing the potential for trampling or damage to native plants in the Hazard Tract. Hunting on the Union Tract occurs in managed agricultural fields.

There is a potential for off-trail activity associated with wildlife observation and photography, which could result in trampling of vegetation and damage to shrubs; however, evidence of such activity is limited and has not resulted in any significant adverse effects to managed or native habitat areas.

Therefore, no significant adverse effects to native vegetation or habitat quality would occur as a result of continuing the current public use activities on the Refuge.

### **Refuge Operations**

Refuge operations occurring on the Sonny Bono Salton Sea NWR have limited potential for adverse effects to native vegetation or habitat, as most activities occur within the confines of the Refuge headquarters site. Those activities that occur within managed and natural habitat areas are described above.

## **Sonny Bono Salton Sea NWR - Alternative B (Proposed Action)**

### **Wildlife and Habitat Management**

The primary difference between Alternative A and Alternative B with respect to effects on managed habitat and native vegetation is that Alternative B includes some changes in current management practices to improve habitat quality, as well as two restoration proposals that would restore open water habitat within areas recently exposed by the receding Salton Sea. In addition, some areas dominated by non-native salt cedar would be replaced with appropriate

native vegetation (e.g., willows, mesquite). These proposals would provide benefits in the form of improved habitat quality and would result in limited, if any, adverse effects to existing wildlife habitat or native vegetation.

The effects to native vegetation as a result of entering into a future cooperative farming agreement for those areas that are currently managed to produce winter forage for geese would be similar to those described above.

### **Restoration**

**Red Hill Bay Restoration.** Restoration at Red Hill Bay would occur primarily on recently exposed lakebed playa; therefore, the project has minimal potential to adversely affect terrestrial vegetation and habitat. However, approximately 450 square feet (0.01 acre) of salt cedar scrub occurring along the Alamo River would be impacted as a result of the proposed construction. This habitat, which is comprised of non-native salt cedar and common reed, would be removed to create the freshwater intake channel for the project's pumping station. This area, as well as the downstream habitat in and along the Alamo River, is currently of low value. The overall effects of the proposed Red Hill Bay restoration project on this low quality habitat would be minimal. The project, which would restore 420 acres of aquatic habitat to support shorebirds, seabirds, waterfowl, and other waterbirds, would provide far greater ecological value than is currently provided by the 0.01 acres of salt cedar-dominated riparian habitat that would be lost. Therefore, adverse impacts related to habitat and native vegetation as a result of this restoration project are considered less than significant.

### **Pest Management**

Potential effects to native vegetation, sensitive plant species, and overall habitat quality as a result of implementing the IPM Plan would generally be minor, temporary, or localized in nature. Because of the existing habitat conditions on the Refuge, control of invasive plant species is unlikely to result in the inadvertent loss of native vegetation.

The IPM Plan addresses the selective use of pesticides to eradicate, control, or contain pest species in order to achieve resource management objectives. The process of preparing Chemical Profiles (per the IPM Plan) for the pesticides used on the Refuge, as well as any that may be considered for use in the future, ensures that adequate analyses of the potential effects of each product on Refuge resources has been conducted and that the use of a particular product represents a relatively low risk to non-target species. Where there is the potential for risk to non-target plants as a result of the use of a specific herbicide, BMPs related to proper application of each product, precautions to be taken during mixing, and various steps to be taken to avoid overspray or drift (refer to Appendix D for a complete listing of BMPs) would be implemented to ensure that adverse effects to non-target vegetation is minimized and/or avoided.

As indicated in Table 5-2, several of the herbicides used on the Refuge and addressed in the IPM Plan — imazapyr, triclopyr, dicamba, tribenuron-methyl, halosulfuron-methyl, and aminopyralid—represent a risk to non-target plant species via spray drift, runoff, or accumulation in the soil. Imazapyr can damage non-target trees and plants via root uptake of the product from the soil. This product can accumulate in the soil due to spray drift, as well as from treated plants such as legume species that actively exude imazapyr into the soil.

To avoid impacts to native species, such as mesquite and willow, a minimum 25-foot buffer must be maintained between the treatment site and adjacent habitat areas during ground spraying and a minimum 100-foot buffer must be maintained during aerial applications.

**Table 5-2  
Relative Toxicity of Herbicides Presently Used or Proposed for Use  
on the Sonny Bono Salton Sea NWR Complex**

<b>Active Ingredient</b>	<b>Toxicity to Birds</b>	<b>Toxicity to Mammals</b>	<b>Toxicity to Reptiles and Amphibians</b>	<b>Toxicity to Fish and Aquatic Invertebrates</b>	<b>Risk to Non-target Plants</b>	<b>Toxicity of Soil Bacteria and Fungi</b>	<b>Safety Issues</b>
<b>Imazapyr</b>	Relatively low toxicity	Relatively low toxicity	No data	Low (Habitat form of imazapyr registered for use in aquatic areas)	Some legume species (e.g., mesquite) may actively exude imazapyr into the soil, adversely affecting nearby vegetation; movement of soil particles containing imazapyr can cause unintended damage to desirable vegetation	No data available	Can cause severe eye damage; skin irritant
<b>2,4-D DMA</b>	Moderate toxicity to practically non-toxic	Moderate toxicity	No data	Slightly toxic to practically non-toxic to fish; slightly toxic to practically non-toxic to marine invertebrates	Potential for off target movement and non-target effects via spray drift	No data available	Can cause severe eye damage
<b>Dicamba</b>	Low acute toxicity, no adverse effects at application rates of 0.3 pounds per acre	Practically non-toxic	No data	Slightly toxic, although a few incidents of fish mortality have been reported ; risk to sediment-dwelling benthic organisms is uncertain	Non-target plants potentially at risk due to off target movement of product following application; can become airborne for days after application, particularly in high temperatures and low relative humidity	Very little indication of adverse effects to soil microorganisms	Can cause moderate skin and eye irritation

<b>Table 5-2 Relative Toxicity of Herbicides Presently Used or Proposed for Use on the Sonny Bono Salton Sea NWR Complex</b>							
<b>Active Ingredient</b>	<b>Toxicity to Birds</b>	<b>Toxicity to Mammals</b>	<b>Toxicity to Reptiles and Amphibians</b>	<b>Toxicity to Fish and Aquatic Invertebrates</b>	<b>Risk to Non-target Plants</b>	<b>Toxicity of Soil Bacteria and Fungi</b>	<b>Safety Issues</b>
<b>Tribenuron-methyl</b>	Practically nontoxic	Low toxicity	No data	Practically nontoxic	Potential for non-target effects via spray drift	Limited data	Moderate eye irritation
<b>Halosulfuron-methyl</b>	Low toxicity	Low toxicity	No data	Low toxicity	Potential for non-target effects via spray drift	No data	Skin irritation
<b>Glyphosate (aquatic)</b>	Practically nontoxic	Low toxicity	No data	Moderate toxicity, toxicity of different glyphosate formulations can vary considerably	Non-selective but harmless to most plants once in the soil	Some impacts to microbial populations noted, but recovery is rapid	Possible skin or eye irritation
<b>Glyphosate (terrestrial)</b>	Practically nontoxic	Low toxicity	No data	Practically nontoxic, but surfactants may be highly toxic to aquatic organisms	Non-selective but harmless to most plants once in the soil	Some impacts to microbial populations noted, but recovery is rapid	Possible skin or eye irritation
<b>Aminopyralid</b>	Very low toxicity	Practically nontoxic	Very low potential for toxicity	Practically nontoxic	Potential for non-target effects; more toxic to dicots than monocots	Practically nontoxic	Possible severe eye irritation
<b>Triclopyr (ester)</b>	Slightly toxic	Slightly toxic; potential for long-term exposure when fruit or foliage of treated plants is eaten	No data	Highly toxic	Residues in soil can damage non-target plants via root uptake; very persistent in evergreen foliage and twigs	Inhibits growth of some species of fungi	Possible skin or eye irritation

Sources: Tu et al. 2001; USEPA 2005; USEPA 2006a; Durkin and Bosch 2004; Durkin 2007

Further, drift management strategies must be implemented in accordance with the product label. In addition, herbicide application would be postponed when weather conditions have the potential to increase the likelihood of spray drift (e.g., high or gusty winds, high temperatures, low humidity, temperature inversions).

Triclopyr, which controls woody plants, broadleaf weeds, and vines, may be used on the Refuge to control salt cedar in and around managed agricultural fields and dry ditches. Although this product has the potential to damage non-target plant species, no native plant species occur within the fields proposed for treatment. In addition, a minimum 25-foot buffer must be maintained between the treatment site and adjacent habitat areas, including surface water resources.

The use of dicamba, 2,4-D DMA, tribenuron-methyl, halosulfuron-methyl, and aminopyralid, which are all applied in the Refuge's managed agricultural fields to control broadleaf weeds, have the potential to damage other non-target broadleaf plants. Tribenuron-methyl and halosulfuron-methyl would be applied using a tractor boom sprayer, while aminopyralid, 2,4-D DMA, and dicamba would be applied by helicopter or airplane. To minimize the potential for impacts to non-target native plants, the Chemical Profiles prepared for these herbicides include specific BMPs to reduce drift and specify the required buffers to be maintained between treated areas and other managed habitats, adjacent wetlands, and/or commercial agricultural areas. With the implementation of these actions, there is little potential for damage to non-target native plants from the use of these products.

Aminopyralid, dicamba, and 2,4-D DMA are proposed for application via aerial spraying. All applications would occur over the Refuge's managed agricultural fields. These products have the potential to impact non-target plant species, including commercially grown crops. To minimize the potential for impacts to non-target native plants and commercially grown crops, a minimum 100-foot buffer would be maintained between treatment areas and adjacent managed wetlands or other native habitat areas, as well as adjacent commercial crops or surface waters intended for irrigation of cultivated crops. In addition, BMPs, including the use of a coarse, low pressure spray to reduce drift and consideration of weather factors such as wind speed and variability, temperature, humidity, and inversions, would be implemented to minimize the potential for damage to non-target plants.

For all herbicide applications, the potential for impacts to non-target plants would be minimized by adherence to the BMPs outlined under the sections addressing air quality and water quality. In addition, adherence to product label directions and implementation of general and product specific BMPs (as presented in the Chemical Profiles) would reduce potential adverse effects to below a level of significance.

### **Public Use**

The improvements proposed under Alternative B to enhance current public use opportunities would have little, if any, impact on existing native vegetation since the new facilities and proposed improvements to existing facilities would not require any removal of existing native vegetation. In addition, indirect impacts to native vegetation are not anticipated, as the proposed uses (i.e., wildlife observation, photography, interpretation, and environmental education) would occur within designated trails, bird blinds, and parking areas.

### **Refuge Operations**

Impacts to native vegetation as a result of the refuge operations proposed under Alternative B would be similar to those described under Alternative A.

## **Sonny Bono Salton Sea NWR - Alternative C**

### **Wildlife and Habitat Management**

The wildlife and habitat management proposals included under Alternative C would be essentially the same as those proposed in Alternative B; the implementation of these actions is not expected to result in any significant adverse impacts to native habitat or listed or sensitive plant species.

### **Pest Management**

The analysis of potential effects to habitat quality and individual plant species from the implementation of the IPM Plan would be the same under this alternative as described previously for Alternative B.

### **Public Use**

Although there are some differences between the public uses proposed under Alternative B and those proposed under Alternative C, these differences do not result in any impacts to areas that support native vegetation, therefore, the impacts associated with these uses would be generally the same as those described for Alternative B. Specifically, the installation of a new hunting blind, as proposed under Alternative C, would occur within a managed agricultural field, resulting in no adverse effects to native vegetation.

### **Refuge Operations**

The actions associated with Refuge operations described under Alternative B would also be implemented under Alternative C. Therefore, the impacts associated with these uses would be same as those described previously for Alternative B.

## **5.3.2 Coachella Valley NWR**

### **Coachella Valley NWR - Alternative A (No Action)**

#### **Wildlife and Habitat Management and Refuge Operations**

The continued implementation of the wildlife and habitat management activities occurring on the Refuge, as proposed under Alternative A (e.g., protection of sand dune and sand field habitats, opportunistic control of invasive weeds, monitoring of listed species) results in little, if any, adverse effects to existing native vegetation. Some minor trampling of vegetation may occur, but care is taken to walk between plants when on dunes and over all, the activity levels on the Refuge are extremely low. Therefore, impacts to habitat and vegetation under this alternative would be considered less than significant.

#### **Pest Management**

Under Alternative A, the control of invasive plants is limited to occasional hand-pulling of Sahara mustard and limited use of glyphosate to periodically control salt cedar, and on occasion, Sahara mustard. To avoid impacts to native plant species, herbicide is applied with a backpack spray and is carefully applied to a cut stump of a salt cedar or to foliage of individual salt cedar or Sahara mustard plants. Herbicide use is limited and application rates are low, therefore, the potential for adverse effects to native vegetation is very low and considered less than significant.

### **Public Use**

Authorized public use on the Refuge is limited to occasional guided education tours and the use of an existing equestrian trail that extends along the western and northern edge of the Refuge. Limited site inspections of the existing equestrian trail indicate that users are adhering to the requirement to stay on the designated trail while on the Refuge.

During guided education tours of the Refuge's dune habitat, there is the potential for trampling of native vegetation. To minimize potential impacts, guides provide an introductory talk about why and how to avoid impacts to Refuge resources before they enter the dune habitat. In addition, the number of persons participating in the tours is limited to better control movement while on the Refuge and participants are required to follow behind the guide in single file to limit the area of impact.

Unauthorized uses on the Refuge include pedestrian and motorized access onto sensitive habitat areas. With no Federal wildlife officer assigned to the Sonny Bono Salton Sea NWR Complex, visits to the Refuge to enforce regulations related to access are very limited. As a result, there is the potential for native habitat damage under Alternative A.

### **Coachella Valley NWR - Alternatives B and C**

#### **Wildlife and Habitat Management and Refuge Operations**

Under Alternatives B and C, varying levels of habitat enhancement and restoration are proposed that would benefit native plant communities and individual native plant species. Since enhancement and restoration is proposed in an area previously disturbed by agriculture and dominated by non-native vegetation, no significant adverse effects to native vegetation are anticipated.

#### **Pest Management**

Pest management under Alternatives B and C would be implemented in accordance with an IPM Plan. Currently, the herbicides that could be used on the site to control invasive weedy plants and/or invasive shrubs include products with the active ingredients glyphosate, imazapyr, and triclopyr. Other products may be used in the future, provided they are approved in accordance with the procedures described in the IPM Plan. Both imazapyr and triclopyr have the potential to damage non-target plant species, therefore, care would be taken to minimize spray drift. Triclopyr, which is a selective herbicide, is very effective in controlling salt cedar and can be effective when applied to the cut stump of a salt cedar. This method of application significantly reduces the potential for spray drift.

Imazapyr is a non-selective herbicide that can be used on a variety of invasive plants; however, its use can result in damage to non-target plants. In addition to the potential for spray drift, the herbicide is persistent in the soil, can be exuded into the soil by shrubs such as mesquite, and has the ability to move from one plant to another via intertwined root grafts. These actions have the potential to adversely affect surrounding desirable vegetation (Tu et al. 2001). To avoid impacts to sensitive plant species, imazapyr is not proposed for use within the Refuge's sand dune or sand field areas.

Informed use of these products, the implementation of the BMPs included in the IPM Plan along with the product specific BMPs presented on the Chemical Profiles would reduce the potential for impacts to native vegetation and individual native plant species to below a level of significance.

### **Public Use**

No new public uses are proposed on the Refuge under Alternatives B or C; therefore, the potential effects to vegetation and native plants under these Alternatives would be the same as those described for Alternative A.

## **5.4 Effects to Wildlife**

The effects to wildlife from implementing the various alternatives are described in this section. Once again, potential impacts to these resources are characterized by evaluating direct, indirect, and cumulative effects. Direct impacts involve the primary effect of implementing an action, such as the flushing of a bird from its foraging area as a result of wildlife observation activities. Indirect impacts include habitat modifications that result in a change in abundance or breeding success of a species (or group of species), such as removing shrubs that provide nesting habitat for song birds. Cumulative impacts, described in a subsequent section titled Cumulative Effects, would occur when the incremental direct or indirect impact of an action is added to other related actions that would affect the same species (or group of species), such as the direct effect of disturbance to nesting Yuma clapper rails with removal of marsh habitat that supports Yuma clapper rail habitat elsewhere in the vicinity of the Refuge. An effect to wildlife would be considered significant if:

- An action would result in a substantial change in the amount or quality of available habitat of a wildlife species. (For migratory songbirds, a substantial reduction in habitat resulting in a significant adverse impact would be defined as a reduction of 30 percent or more of the available acreage or quality of habitat for these species within the Refuge; a significant beneficial impact would be defined as a 30 percent or greater increase in the quantity or quality of habitat available to support these birds.)
- An action would result in a substantial adverse effect, either directly or through habitat modifications, on any wildlife species identified as a sensitive or special status species in local or regional plans, policies, regulations, by CDFW or the Service, or any avian species identified as a Bird of Conservation Concern.
- There would be a permanent loss (adverse effect) or gain (beneficial effect) of occupied sensitive species habitat or the direct mortality (adverse effect) of individuals of sensitive species as a result of a proposed action.
- An action would substantially interfere with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife breeding sites for sensitive or special status species or any other species of conservation concern.

A significant cumulative impact would result from habitat modifications affecting wildlife that would be considered minor for the proposed action but when considered in light of other similar losses within the region would be considerable.

## 5.4.1 Sonny Bono Salton Sea NWR

### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

#### **Wildlife and Habitat Management**

Under Alternative A, current wildlife and habitat management activities would continue on the Refuge. Implementing some of these activities could result in impacts to wildlife, including temporary disturbance related to noise and human activity as a result of habitat site preparation, monitoring, water movement, and vegetation control in marsh habitat. To minimize the potential for direct and indirect impacts to wildlife, care would be taken to avoid entering sensitive habitat areas when possible, and where entry is required, it would be timed to avoid the sensitive life stages such as breeding seasons, dispersal periods, and migration, unless the objective of the monitoring or research is to investigate breeding, dispersal, or the foraging habits of migratory birds. Monitoring activities that must occur within sensitive habitat during the breeding season would only be conducted by qualified personnel to avoid any unintentional impacts to listed or sensitive species. Deleterious effects to wildlife associated with its management would be mitigated by the benefits of management in manipulating populations of target species. The knowledge gained in monitoring and research would mitigate associated impacts by better informing current and future management efforts.

#### **Salton Sea Restoration Partnerships**

Salton Sea SCH Project. The implementation of the Salton Sea SCH project within Bruchard Bay would result in short-term impacts to wildlife through direct habitat disturbance, noise, and human activity. To minimize these short term impacts, preconstruction surveys would be conducted to ensure that construction activities would not result in the direct loss of individual birds and wildlife, such as burrowing owls and badgers. To avoid disturbance to nesting and wintering birds, buffers would be established around burrows and nesting sites.

The potential for impacts to wildlife is addressed in detail in the draft EIS/EIR for the Salton Sea SCH project (USACOE and California Natural Resources Agency 2011). To minimize the potential for impacts to rail and other secretive marsh bird habitat, the construction of interception ditches within and adjacent to the Refuge would be designed to avoid any changes to water levels within the freshwater cattail marsh vegetation located in proximity to the project footprint. The long-term benefits of project implementation include providing a continued food source within the ponds for fish eating birds, including black skimmers, and shoreline habitat along the ponds for shorebirds and other waterbirds.

#### **Pest Management**

Mechanical and chemical control of invasive weedy plants is conducted in various locations throughout the Refuge. This activity can result in disturbance to wildlife; however, to minimize the potential for adverse effects, control of invasive plants is not conducted in proximity to known nesting areas during the nesting season, and applications of pesticides are generally limited to one to three applications per year. When conducting control, a site reconnaissance occurs prior to work to ensure that the potential for direct effects to wildlife is minimized.

In addition to disturbance, the risk to wildlife of using herbicides includes indirect exposure to mammals and birds from eating contaminated prey or vegetation and direct exposure of skin or eyes, or through inhalation, at the time of application, as well as from product residue or vapors (USDA Forest Service 2005). As indicated in Table 5-2, the majority of these herbicides have not been shown to pose a threat to birds or mammals. However, little data are

available regarding toxicity to reptiles and amphibians. In some cases, the USEPA has assumed that the risk or hazard to reptiles would likely be similar to that of birds and the risk or hazard to amphibians would be similar to fish (USEPA 2005). Various studies conducted to determine the risk of specific herbicides to wildlife indicate that birds or mammals that eat vegetation, primarily grasses, sprayed with herbicides have a relatively higher risk for adverse effects than other wildlife (USDA Forest Service 2005). For birds and mammals, the potential for and extent of exposure is affected by various factors including the application method, size of the treatment area, the type of habitat treated, and the season and timing of the application (Bautista 2005). To minimize the potential for maximum exposure, herbicides are applied early in the season to avoid the peak of bird migration and applications are staggered to avoid treating all available habitats at the same time.

At high exposure levels, certain herbicides have the potential to affect the vital organs of some wildlife species, change body weight, reduce the number of healthy offspring, increase susceptibility to predation, or cause direct mortality (USDA Forest Service 2005). This may be the direct result of the active ingredient in herbicides or may be due to the type of surfactants or other additives included in the product. For example, some surfactants are highly toxic to fish, as is the case with some glyphosate products formulated for use in upland areas.

Of the herbicides used on the Refuge, triclopyr is likely to pose the greatest risk to wildlife. Although it is considered only slightly toxic to birds and mammals, products such as Garlon 3A have been shown to cause severe eye damage to both humans and wildlife, due to the high pH of its water-soluble amine salt base (Tu et al. 2001). Some studies also indicate a potential concern for grass-eating birds from both triclopyr and dicamba (Bautista 2005), although these concerns are based on the results of studies which addressed both high application rates and high residue levels on foraging grasses (Bautista 2005). Other studies indicate that acute toxicity of dicamba to birds appears to be relatively low (USDA Forest Service 2004). Triclopyr is considered highly toxic to fish and aquatic invertebrates.

Understanding the ecological risks of these products is important when selecting a specific product to control invasive species in sensitive habitat areas. This, combined with BMPs to prevent spray drift, minimize the risk for runoff into adjacent wetland and other habitat areas, provide adequate buffers between treatment areas and sensitive habitat area, and avoid spills, will reduce the potential for adverse effects to wildlife to below a level of significance.

### **Public Use**

**Hunting and Fishing.** Currently, hunting and fishing are permitted in designated areas within the Refuge, with fishing permitted only on the Salton Sea. No fishing from the shoreline or within the irrigation and drainage channels within the Refuge is permitted. Sport fish abundance and diversity in the Salton Sea has been declining as the Sea becomes more saline. Based on the limited number of participants fishing in proximity to the managed areas of the Refuge and the prohibition of fishing in Units 1 and 2 of the Refuge, no significant adverse effects to wildlife are anticipated under Alternative A as a result of fishing.

The current waterfowl hunting program, managed on the Refuge by CDFW, would continue under Alternative A. All hunting activity would continue to be conducted within Unit 2 on the Hazard Tract, located to the northeast of the Refuge Complex headquarters, and on the Union Tract, located to the southwest of the Refuge Complex headquarters (refer to Figure 4-4). No hunting is permitted in Unit 1, thereby providing a large area on the Refuge where wintering geese and other migratory and wintering waterfowl can loaf and forage with limited disturbance during the hunting season.

*Establishing Hunting Seasons and Bag Limits for the Pacific Flyway*

Geese and other waterfowl are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–712 and 16 U.S.C. 742 a–j). Among other things, the MBTA grants the Secretary of the Interior the authority to establish hunting seasons for migratory birds that have been identified in the MBTA as migratory game bird species. This authority has been delegated to the USFWS, which works in cooperation with the States and the flyway councils to develop regulations for some 60 species of migratory game birds. The Pacific Flyway Council cooperates with the Service in the development of regulations for migratory game birds in the United States west of the Continental Divide.

Hunting regulations are set annually through a process that begins in January of each year. This process involves coordination between Service and State biologists to gather and interpret survey data that are then presented to the flyway councils and committee. Recommendations for appropriate hunting seasons and bag limits for the different flyways are then developed and submitted to the Service. Migratory bird hunting regulations are then prepared by the Service that establish the framework, or outside limits, for season lengths, season dates, bag limits, and areas for migratory game bird hunting. Proposed and final regulations are published annually in the Federal Register. Once the regulations are final, the State wildlife agencies, through their appointed commissions and boards, set the State migratory game bird hunting regulations within the frameworks established by the Service. The States have the authority to reduce season and bag limits below Service recommendations, but are not permitted to increase these limits.

Since 1995, the Service has set duck-hunting regulations based on Adaptive Harvest Management, a system of resource monitoring, data analyses, and rule making. The adaptive approach recognizes that the consequences of hunting regulations cannot be predicted with certainty, and provides a framework for making objective decisions in recognition of that uncertainty. The data available for waterfowl are provided by the Breeding Population and Habitat Survey, which is conducted throughout portions of the U.S. and Canada, and is used to establish the annual Waterfowl Population Status Report. The number of waterfowl hunters and resulting harvest are closely monitored using Migratory Bird Harvest Information Program (HIP) and Parts Collection Survey data.

HIP is based on a voluntary survey of selected migratory bird hunters throughout the country who provide information on the kind and number of migratory birds they harvested during the hunting season. The Parts Collection Survey involves having a sample of hunters provide the Service with one wing from each duck that they shoot during the season and the wing tips and tail feathers from each goose they shoot. With these samples in hand, Service biologists are able to generate species-specific harvest estimates. The combination of the data provided by these two surveys and the data provided by annual waterfowl surveys assists the Service and the State wildlife agencies in developing more reliable estimates of the number of migratory birds harvested throughout the country and enables biologists to make sound decisions concerning hunting seasons, bag limits, and population management. A detailed discussion of how the process for setting waterfowl hunting regulations is conducted in the U.S. is provided in the “Adaptive Harvest Management: 2012 Hunting Season” (*USFWS 2012*, <http://www.fws.gov/migratorybirds/NewReportsPublications/AHM/Year2012/AHMReport2012.pdf>).

Following the procedures described here, the Service has established Migratory Bird Hunting Early Seasons and Bag and Possession Limits and Migratory Bird Hunting Late Seasons and Bag and Possession Limits for the 2012/2013 waterfowl hunting seasons.

These Final Rules were published in the Federal Register on August 31, 2012 (77 FR 53752) and September 21, 2012 (77 FR 58628), respectively.

*Hunting Season and Bag Limits for the Refuge.* Following issuance of the final rules for the 2012/2013 migratory bird hunting season, the Fish and Game Commission met to approve hunting seasons and bag limits for the 2012/2013 waterfowl hunting season in California. A summary of the hunting season and bag limits applicable to the Sonny Bono Salton Sea NWR are presented in Table 5-3.

<b>Table 5-3 Sonny Bono Salton Sea NWR - Hunting Season and Bag/Possession Limits for 2012-2013</b>		
Species	Dates	Limits
Waterfowl – Ducks	From Oct 20 to Jan 27 on Saturdays, Sundays, and Wednesdays only	Daily Bag Limit: 7 ducks total with no more than: - 2 female mallards, - 2 pintails (either sex) - 1 canvasback (either sex) - 2 redheads (either sex) - 7 scaup (either sex)  Possession Limit: double the daily bag limit
Waterfowl – White Geese (Ross’ or Snow)	From Nov 3 to Jan 27 on Saturdays, Sundays, and Wednesdays only	Daily Bag Limit: 6  Possession Limit: double the daily bag limit
American Coot and Common Moorhen	From Oct 20 to Jan 27 on Saturdays, Sundays, and Wednesdays only	Daily Bag Limit: 25, either all of one species or a mixture of these species  Possession Limit: 25
Black Brant	From Nov 10 through Dec 9 on Saturdays, Sundays, and Wednesdays only	Daily Bag Limit: 2  Possession Limit: double the daily bag limit
Youth Waterfowl Hunting Days (for youth 15 years of age or younger, accompanied by a non-hunting adult 18 years of age or older)	Saturday and Sunday following the closing of waterfowl season	Daily Bag Limit and Possession Limit Same as Regular Season

*Effects to Hunted Wildlife Species.* NEPA considerations by the Service for hunted migratory game bird species are addressed by the programmatic document, “Final Supplemental Environmental Impact Statement: Issuance of Annual Regulations Permitting the Sport Hunting of Migratory Birds (FSES 88– 14),” filed with the USEPA on June 9, 1988. The Service published a Notice of Availability in the Federal Register on June 16, 1988 (53 FR 22582), and the Record of Decision on August 18, 1988 (53 FR 31341). This document addresses the NEPA requirement to analyze the potential effects of issuing annual regulations permitting the sport hunting of migratory birds. In addition, the Service in 2010 (75 FR 39577) issued a draft Supplemental EIS on the setting of annual regulations permitting the hunting of migratory birds. These documents address waterfowl hunting at the national level.

Each National Wildlife Refuge considers the cumulative impacts to hunted migratory species through the Migratory Bird Frameworks published annually in the Service's regulations on Migratory Bird Hunting. Season dates and bag limits for Refuges open to hunting are never longer or larger than the State regulations, and in many cases, such as on the Sonny Bono Salton Sea NWR, the number of days the Refuge is open for waterfowl hunting are more restrictive than the State regulations.

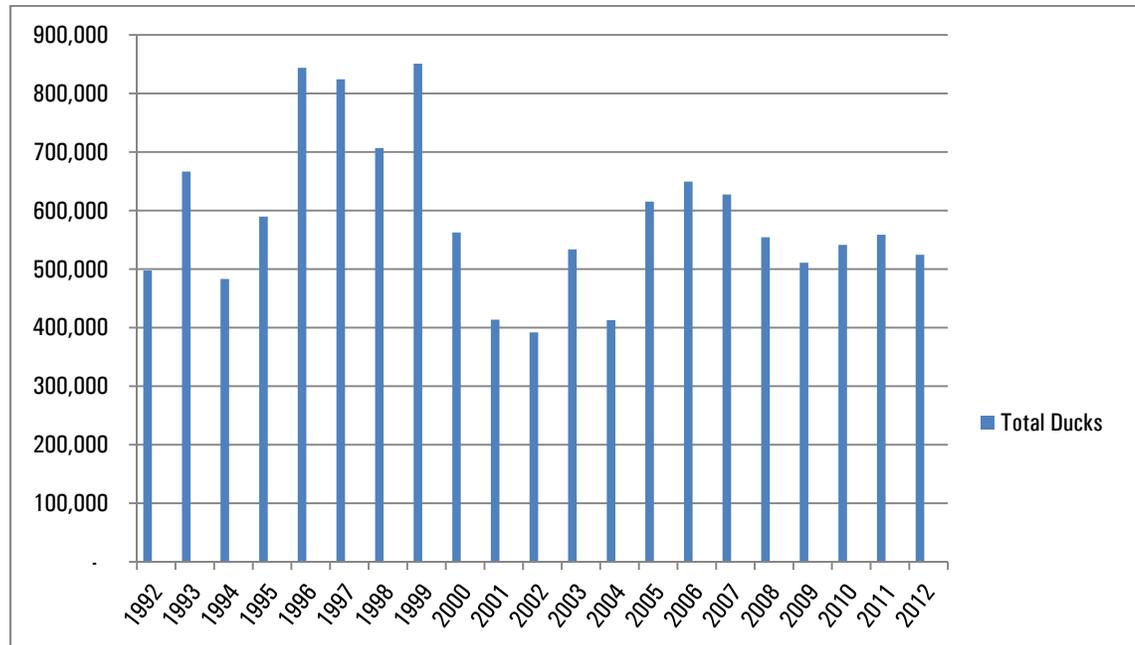
The estimated average annual duck harvest in 2010 for the Pacific Flyway was just under 3.1 million birds, an 8 percent increase over 2009, and for the entire U.S., the estimated harvest in 2010 was almost 14.1 million ducks, an increase of about 13 percent over 2009 (USFWS 2011). Table 5-4 presents additional harvest data.

<b>Table 5-4 Duck Harvest Estimates for California, Pacific Flyway, and US</b>						
	All Ducks	Mallard	Northern Pintail	Canvas-back	Lesser Snow Goose	Ross' Goose
Total harvested in US (2010)	14,867,000	4,166,013	704,668	145,686	320,020	45,084
Percent change in US harvest from 2009	+13.1%	+0.7%	+41.3%	+107%	-6.3%	+27%
Total harvested in the Pacific Flyway (2010)	3,046,254	906,964	357,813	25,168	65,033	16,875
Percent change in Flyway harvest from 2009	+8%	+1.1%	+28.3%	+41.5%	+21.2%	+67.9%
Total harvested in CA (2010)	1,734,100	331,987	242,628	17,603	54,548	14,974
Percent change in CA harvest from 2009	+20.3%	+26.5%	+37%	+79.8%	+77.7%	+71.3%
Average number harvested in CA (2001 – 2010)	1,363,776	296,650	130,309	10,865	42,614	11,195
Percent of Pacific Flyway's total average harvest (2001 – 2010) attributed to harvest in CA	48%	29.2%	60.8%	66.8%	36.7%	92.2%

Source: (USFWS 2011)

For comparison, in 2012, the total duck population (excluding scoters, eiders, long-tailed ducks, mergansers, and wood ducks) within the USFWS and Canadian Wildlife Services' Waterfowl Breeding Population and Habitat Survey area was seven percent higher than in 2011 and 43 percent higher than the long-term average (1955 to 2011) (USFWS 2012). Estimated mallard abundance was 15 percent above the 2011 estimate, green-winged teal was 20 percent above, and scaup (greater and lesser) was 22 percent above the 2011 estimate, while gadwall, American wigeon, blue-winged teal, northern shoveler, redhead, and canvasback abundance were all similar to the 2011 estimate. Northern pintail was 22 percent below the 2011 estimate and 14 percent below the long-term average. The estimated population of snow geese, Ross' geese, and white-fronted geese all appear to have increased between 2011 and 2012 (USFWS 2012).

In California, 2012 waterfowl breeding population survey results indicated lower numbers of breeding waterfowl than those obtained during the 2011 survey. Although the number of mallards (the most abundant duck in the survey) did increase by 21 percent, survey results show that the total number of ducks decreased from 558,600 in 2011 to 524,500 in 2012, a decrease of about 11 percent (<http://cdfgnews.wordpress.com/2012/06/26/dfg-completes-2012-waterfowl-breeding-population-survey/CDFG>). CDFW attributes this decline to lower numbers of gadwalls and cinnamon teals. As indicated in Figure 5-1, the estimated number of breeding ducks in California has varied considerably between 1992 and 2012, with the highest numbers occurring in 1999 and the lowest in 2002.



Source: <http://www.dfg.ca.gov/wildlife/waterfowl/docs/BPStotals.pdf>

**Figure 5-1. California Duck Breeding Population from 1992 through 2012**

The Refuge also conducts waterfowl surveys on the Refuge and throughout the Salton Sea. In 2011 and 2012, these surveys were conducted during the first week in January. The results of these surveys along with the mid-winter waterfowl count averages from 2008 through 2013 are presented in Table 5-5. While there are many factors that may contribute to differences in waterfowl numbers between annual counts, including survey conditions and survey personnel, the decrease in waterfowl numbers between 2011 and 2012 is supported by a similar decrease in hunter harvest rates in recent years.

Harvest information published by CDFW for the Sonny Bono Salton Sea NWR indicates a decline in the number of ducks and geese harvested on the Refuge between the 2008/2009 hunting season and the 2010/2011 hunting season. Although there are some gaps in the data for the 2010/2011 season, the numbers available indicate that the harvest has decreased. An estimated 268 ducks and 136 geese were harvested in 2010/2011, while 955 ducks and 448 geese were harvested during the 2008/2009 hunting season (<http://www.dfg.ca.gov/wildlife/waterfowl/shoot/index.html>, accessed on 10/24/12). The ducks most often harvested include mallard, northern pintail, northern shoveler, and green-winged teal. Other species include cinnamon teal, gadwall, redhead, and ruddy duck. The geese most often harvested include snow geese and Ross' geese.

<b>Table 5-5 Results of Winter Waterfowl Surveys Conducted between 2011 and 2013 for the Salton Sea and the Sonny Bono Salton Sea NWR</b>			
	2011	2012	Mid-winter Waterfowl Count Averages from 2008-2013
Dabbling Ducks			
- Mallard	805	2,903	1,082
- Gadwall	334	1,055	371
- American wigeon	3,255	220	2,929
- Green-winged teal	8,284	3,332	6,074
- Blue-winged and cinnamon teal	12	240	64
- Northern shoveler	43,011	13,485	29,237
- Northern pintail	24,357	7,249	17,395
Subtotal (Dabbling Ducks)	80,058	28,484	57,152
Diving Ducks			
- Redhead	54	21	39
- Canvasback	no data	no data	94
- Scaup	51	67	202
- Ring-necked duck	no data	no data	3
- Goldeneye	no data	no data	2
- Bufflehead	76	35	26
- Ruddy duck	3,618	6,952	7,949
Subtotal (Diving Ducks)	3,799	7,075	8,315
Mergansers	16	6	11
Unidentified Ducks	1,770	5,220	2,371
<b>TOTAL DUCKS</b>	<b>85,643</b>	<b>40,785</b>	<b>65,467</b>
Geese			
- Snow/Ross' Undifferentiated	22,201	17,412	18,673
- Western Canada goose	10	0	25
- "Canada" Undifferentiated	0	3	29
<b>TOTAL GEESE</b>	<b>22,211</b>	<b>17,415</b>	<b>18,782</b>
<b>TOTAL DUCKS AND GEESE</b>	<b>107,854</b>	<b>58,200</b>	<b>84,249</b>
Coots	8,854	9,821	8,826

The Refuge's current waterfowl hunting program has been implemented since at least 1953. Prior to that time, hunting occurred on nearby State lands, in private agricultural fields, and at private duck clubs in the area. The waterfowl harvest on the Refuge has been tracked by CDFW since 1998. Over the years, the harvest on the Refuge has averaged approximately 1.65 birds per hunter. The total harvest on the Refuge during the 2009/2010 season represented approximately 0.5 percent of the waterfowl taken on all the CDFW conducted public hunt areas in California and approximately 0.6 percent of the waterfowl taken in California during the 2010/2011 season.

The hunting of waterfowl in the United States is based upon a thorough regulatory setting process that involves numerous sources of waterfowl population and harvest monitoring data. In recent years, California hunter's harvest is estimated at about 1.5 million ducks, which totals approximately 12 percent of the estimated U.S. harvest of 12.3 million, and 55 percent of the Pacific Flyway's 2.65 million harvest estimates (USFWS 2007). Comparative numbers for estimated goose harvest yield percentages of 4.1 percent and 33 percent of the U.S. and Pacific Flyway totals, respectively. The harvest of ducks and geese on the Sonny Bono Salton Sea NWR is well below .001 percent of the estimated harvest within the Pacific Flyway. The average harvest of coot on the Refuge between 1999/2000 and 2011/2012 hunting seasons is 24, which represents less than 0.1 percent of the harvest in 2009 and 2010.

Based on the estimated harvest numbers for the Refuge, the Service believes that the continuation of waterfowl hunting on the Sonny Bono Salton Sea NWR will not have a significant impact on local, regional, or Pacific Flyway duck, goose, or coot populations.

*Effects to Non-hunted Wildlife Species.* Waterfowl hunting on the Refuge can result in direct and indirect adverse effects to other non-hunted wildlife. Direct effects of hunting include mortality, wounding, and disturbance of non-target species (DeLong 2002). Field checks of the Hazard Tract following a hunt day has result in the discovery of dead shorebirds that have been unintentionally or intentionally shot during the course of the hunting day. Hunting also can alter the behavior (i.e., foraging time), population structure, and distribution patterns of wildlife (Owens 1977; Raveling 1979; White-Robinson 1982; Thomas 1983; Madsen 1985; Bartelt 1987; Cole and Knight 1990). Human disturbance associated with hunting includes loud noises, such as those produced by shotguns, and rapid movement. This disturbance, especially when repeated over time, can cause some wildlife species to change foraging habits, feed only at night, or relocate.

Within the Hazard Tract, shorebirds and other waterbirds (e.g., herons, egrets) are impacted to some extent by this disturbance. However, these impacts are reduced by the availability of adjacent and nearby Refuge lands where hunting is not permitted and wildlife can feed and rest relatively undisturbed (Havera et al. 1992). These areas occur to the northwest of the Refuge headquarters and within the wetlands protected within Unit 1. These protected areas also provide sanctuary for waterfowl and the managed agricultural lands in Unit 1 provide alternative foraging areas for geese. To further reduce the effects of hunting on hunted and non-hunted species, hunting only occurs on Saturday, Sunday, and Wednesday, giving all wildlife on the Refuge a respite from the effects of hunting during the hunting season. Studies have shown that intermittent hunting, in which rest periods are provided, is an effective way to minimize the effects of disturbance on non-hunted wildlife (Fox and Madsen 1997).

Although some loss of non-target species is observed annually on the Refuge, the number of non-target species lost is low and does not represent a significant adverse effect to non-target species. To ensure that direct and indirect impacts to non-target wildlife do not result in significant adverse effects, the following measures are implemented on the Refuge: Unit 1 is closed to hunting, no hunting is permitted on the Refuge during the breeding season; the number of hunters on the Refuge at any one time is limited through a reservation system; hunting activity beyond 100 feet of a designated hunting blind or stake is prohibited, except when retrieving a downed bird; and only the use of federally approved non-toxic shot is permitted on the Refuge.

Non-consumptive Wildlife-dependent Recreational Uses. Recreational uses such as wildlife observation, nature photography, environmental education, and interpretation, as well as general visitation, can negatively impact wildlife by altering wildlife behavior, reproduction, distribution, and habitat (Purdy et al. 1987, Knight and Cole 1995). Purdy et al. (1987) and Pomerantz et al. (1988) described six categories of impacts to wildlife as a result of visitor activities:

- direct mortality (i.e., immediate, on-site death of an organism);
- indirect mortality (i.e., eventual, premature death of an organism caused by an event or agent that predisposed the organism to death);
- lowered productivity (i.e., reduced fecundity rate, nesting success, or reduced survival rate of young before dispersal from nest or birth site);
- reduced use of refuge (i.e., wildlife not using the refuge as frequently or in the manner they normally would in the absence of visitor activity);
- reduced use of preferred habitat on the refuge (i.e., wildlife use is relegated to less suitable habitat on the refuge due to visitor activity); and
- aberrant behavior/stress (i.e., wildlife demonstrating unusual behavior or signs of stress likely to result in reduced reproductive or survival rates).

Wildlife and native plants may be disturbed by human contact to varying degrees. Human disturbance in the form of trampling can result in the loss of native plants, reptiles, and invertebrates. Human activities on trails can result in direct effects on wildlife through harassment, a form of disturbance that can cause physiological effects, behavioral modifications, or death (Smith and Hunt 1995). Many studies have shown that birds can be affected by human activities on trails when they are disturbed and flushed from feeding, resting, or nesting areas. Flushing, especially repetitive flushing, can strongly affect habitat use patterns of many bird species. Flushing from an area can cause birds to expend more energy, be deterred from using desirable habitat, change resting or feeding patterns, increase exposure to predation, or abandon sites with repeated disturbance (Smith and Hunt 1995). Nest predation for songbirds (Miller et al. 1998), raptors (Glinski 1976), colonial nesting species (Buckley and Buckley 1976), and waterfowl (Boyle and Samson 1985) also tends to increase in areas frequently visited by people.

Depending on the species (especially migrants vs. residents), some birds may habituate to some types of recreation disturbance and either are not disturbed or will immediately return after the initial disturbance (Hockin et al. 1992, Burger et al. 1995, Knight and Temple 1995, Madsen 1995, Fox and Madsen 1997). Rodgers and Smith (1997) calculated buffer distances that minimize disturbance to foraging and loafing birds based on experimental flushing distances for 16 species of waders and shorebirds. They recommended 100 meters as an adequate buffer against pedestrian traffic; however, they suggest this distance may be reduced

if physical barriers (e.g., vegetation screening) are provided, noise levels are reduced, and traffic is directed tangentially rather than directly toward birds.

Of the wildlife observation techniques, wildlife photographers tend to have the largest disturbance effects (Klein 1993, Morton 1995, Dobb 1998). While wildlife observers frequently stop to view species, wildlife photographers are more likely to approach wildlife (Klein 1993). Even a slow approach by wildlife photographers tends to have behavioral consequences to wildlife species (Klein 1993). Other impacts include the potential for photographers to remain close to wildlife for extended periods of time in an attempt to habituate the wildlife subject to their presence (Dobb 1998) and the tendency of casual photographers, with low-power lenses, to get much closer to their subjects than other activities would require (Morton 1995). The availability of a few photo blinds along the trail in Unit 1 helps to minimize this disturbance by concealing photographers and allowing them to spend extended time observing and photographing nearby foraging or loafing birds. Providing designated trails for the public to access various portions of the Refuge also helps to minimize disturbance by directing access away from highly sensitive habitat areas, while still providing the public with opportunities to observe and appreciate the habitat and species supported on the Refuge.

Disturbance of wildlife, particularly migratory and special status bird species, is the primary concern related to wildlife observation, photography, environmental education, and interpretation on this Refuge. To reduce the overall effect of these uses on Refuge resources, large areas of the Refuge are closed to public use. Where non-consumptive public uses are permitted, disturbance is limited to areas adjacent to designated trails, observation platforms, and roadways; therefore this disturbance is generally localized and quite intermittent.

Existing trails provide access to the perimeter of managed habitats. No access into these habitat areas is permitted. This design provides significant acreage of undisturbed habitat within habitat management areas. Managed agricultural fields that support wintering populations of geese and sandhill cranes are not open to general public access and wildlife observation is only permitted from a few perimeter roads and trails, which minimizes disturbance to these migratory species. In other areas, access is provided along the edges of large managed wetland areas. By keeping the public around the edges of these areas, the Refuge is able to maintain large expanses of undisturbed habitat away from public viewing to support migratory and resident waterbirds. To minimize off-trail activity in some of these areas, gates, vegetative barriers, and signs have been provided.

Activities associated with wildlife observation, photography, environmental education, and interpretation generally support the Refuge's purposes (Goff et al. 1988). The minor resource impacts attributed to these activities are generally outweighed by the benefits gained by educating present and future generations about refuge resources. Interpretation is a public use management tool that can be effectively used to develop a resource protection ethic within society. This tool allows us to educate refuge visitors about the need to protect habitat areas to support a range of wildlife species, including listed and sensitive species.

Other Uses. Research conducted on the Refuge can result in impacts to wildlife, primarily in the form of disturbance. To ensure that no significant adverse effects to wildlife result from research conducted on the Refuge, all proposals for research are reviewed and approved by the Refuge Manager. In addition, the Refuge Manager prepares a Special Use Permit for all approved research projects with project specific conditions (including measures to minimize disturbance) that must be adhered to while conducting activities on the Refuge.

### **Refuge Operations**

Refuge operations occurring at Refuge headquarters have little, if any, effect on wildlife. Other activities related to Refuge operations would have effects similar to those described under Wildlife and Habitat Management.

### **Sonny Bono Salton Sea NWR - Alternative B (Proposed Action)**

#### **Wildlife and Habitat Management**

As described under Alternative A, the wildlife and habitat management actions currently being implemented on the Refuge do not result in any significant adverse effects to wildlife. A number of additional actions are proposed for the Refuge under Alternative B (e.g., habitat restoration and enhancement, additional species surveys) that could result in temporary impacts to wildlife in the form of disturbance. To avoid significant adverse effects to wildlife, these activities would be avoided to the extent feasible in periods and locations when sensitive wildlife species are particularly vulnerable (e.g., the nesting season for birds). Overall, the management actions proposed under Alternative B would benefit wildlife species, particularly birds.

#### **Restoration**

Red Hill Bay Restoration. The proposal to restore open water habitat to Red Hill Bay could result in short-term adverse effects to wildlife, while providing long term benefits to migratory and resident birds. The project would convert open playa that until recently was submerged under the Salton Sea to open water, restoring wildlife habitat that until recently provided foraging and loafing areas for a broad range of migratory and wintering birds.

Construction activities associated with the restoration of Red Hill Bay, which could be conducted in two distinct phases, would result in minor, short-term adverse impacts to wildlife. These impacts would consist primarily of very local nuisance disturbance related to noise and human and vehicular activity. These impacts are not however considered significant, because habitat in and along the Alamo River is currently of low value and would only be minimally affected by the proposed project. Any adverse effects in this area would be primarily short-term construction noise generated during excavation for pump installation near the Alamo River bridge where existing traffic disturbance already occurs. Also in the short term, the exposed portion of the bed of the Salton Sea would be marginally adversely affected by installation of the proposed pumping station and sump.

Other short term effects could occur to birds and other wildlife present in the area to the east of the project site. To minimize these effects, particularly to birds, construction would occur outside of the nesting season. Any long term effects to native terrestrial vegetation would be minimal; therefore, permanent impacts to foraging and nesting areas are not anticipated. The project, once operational, is expected to provide foraging and/or nesting habitat for shorebirds, seabirds, and other waterbirds throughout the life of the project. The proposed stable shallow water habitat system that would be implemented under Alternative B would be operated and monitored for as long as feasibly possible and would provide better and more reliable habitat to biological resources during that time than that which exists now and is decreasing. Therefore, there would be beneficial effects to wildlife when the project is implemented.

There have been limited occurrences of pupfish in the vicinity of Red Hill Bay, including at the Red Hill Bay Marina in past years, and as a result measures have been incorporated into the project design to minimize take and avoid significant adverse effects to this species. These measures are described later in this section under Effects to Federally and State Listed Species and Other Species of Concern.

Another potential impact to wildlife is the possible accumulation of selenium within the restored open water habitat. Selenium is a naturally occurring element that enters the Salton Sea ecosystem through the Colorado River source water that is used for agriculture as well as Refuge wetlands. Selenium concentrates in drainage water as it flows toward the Salton Sea, resulting in average concentrations of 8  $\mu\text{g/L}$  within the Alamo River (Setmire et al. 1993). Selenium levels in the restoration site are a concern because Alamo River water would be blended with Salton Sea water to achieve the desired salinity levels within the restored area. Elevated levels of selenium in the restoration site could impact the reproductive success of nesting birds foraging in the created habitat. Species that may attempt to nest at the site include gull-billed terns, black-necked stilts, Caspian terns, black skimmers, California gulls, and American avocets. DOI has established a suggested toxicity threshold for selenium in water for vertebrates of 2.0  $\mu\text{g/L}$  (U.S. Department of Interior 1998).

Beginning in 2006, the USGS Salton Sea Science Office and Western Ecological Research Center (WERC) in Davis, California, initiated a study to estimate the ecological risks of blending Salton Sea water with Alamo River water to create Saline Habitat Ponds, a concept that many biologists have viewed as a viable method to restore habitat loss at the Salton Sea. Conclusions from that study (Miles et al. 2009) indicated that the blended water approach was effective in reducing selenium concentrations from the Alamo River, the highest source of selenium concentration among the viable sources of drainwater for the constructed habitat. Reported arithmetic mean values of selenium water concentrations ranged from 1.9-3.9  $\mu\text{g/L}$  in Pond 1 between fall 2006 and fall 2008. The lowest selenium concentrations occurred in Pond 2 which ranged from 0.9-2.4  $\mu\text{g/L}$  arithmetic mean during the same period. Generally selenium attenuation improved over time through biological removal pathways from Pond 1 to Pond 2. Based on selenium concentrations and nesting success of black-necked stilts, the study indicated a “slightly elevated risk of selenium toxicity for stilts nesting at the SHP...” (USACOE and California Natural Resources Agency 2011, Appendix I, page I-14). There was however no positive relationship between selenium and embryonic malpositioning, embryonic deformities, or post-hatch survival detected. While selenium effects may have contributed to slightly decreased hatch rates, this research identified nest predation by land predators (i.e., raccoon, coyote) to be a far greater factor in nesting success.

Many of the uncertainties associated with blending Alamo River water and Salton Sea water to create wildlife habitat have been addressed through research conducted between 2006 and 2009 at the USGS Saline Habitat Ponds. The Red Hill Bay restoration project would build on this research and provide an opportunity to further address areas of uncertainty and ultimately inform adaptive management of this and other similarly created habitats. This would be accomplished through the implementation of a monitoring program similar to that described in the draft Salton Sea Ecosystem Monitoring and Assessment Plan (available at [http://www.water.ca.gov/saltonsea/docs/Draft\\_SaltonSeaMAP.pdf](http://www.water.ca.gov/saltonsea/docs/Draft_SaltonSeaMAP.pdf)). The biotic and abiotic functions of the created habitat would be monitored during the initial three years of operation and would focus on water quality, bird use, and fish and invertebrate colonization. Data obtained from this monitoring effort would provide a measure of selenium risk which can then be used to inform management decisions.

As part of this monitoring program, USGS would be contracted to investigate selenium and pesticide exposure risk. During the first year of project operation, water samples would be collected from the Alamo River every two weeks, and this water would be sent to the USGS Pesticide Fate Research Group in Sacramento, California, for current-use pesticide analysis. This sampling effort is intended to provide a snapshot of variations in concentration of 90 current-use pesticides and may identify potentially dangerous spikes or seasonal patterns of pesticide presence in the Alamo River water and suspended sediments within the river. To address selenium, WERC would conduct sample collection and selenium analysis in water, sediments, and invertebrates on a quarterly basis for at least two years. In addition, during the breeding season, additional selenium monitoring to include bird eggs and nesting success would be implemented. As sufficient selenium data are collected, a risk assessment would be made and used to advise future management and continued monitoring needs.

Biologically, comprehensive bird surveys would be conducted during at least three of the following four time windows per season; late winter, spring migration, breeding season, and early fall in order to best capture bird use/phenology of the site during key periods of the year. Surveys of colonial nesting birds (e.g., gull-billed terns, black skimmers) would be conducted weekly throughout the breeding season to identify numbers of breeding pairs, fledging success, and evaluate nesting island design. Monthly fish surveys would be similar to those conducted by Saiki et al. (2011), using 1/8-inch minnow traps, placed strategically throughout the site and at inlets and outlets to provide an index of fish abundance and diversity with approximately 10 percent of each species measured for size class distribution. Benthic and water column invertebrates would be sampled quarterly for two years by USGS WERC and enumerated by lowest practical taxonomic group.

The monitoring program to be implemented as part of the restoration project would provide Refuge staff with information regarding selenium levels within the restoration site and would facilitate informed decisions on how best to manage the site to support nesting seabirds. The implementation of the proposed monitoring program in association with this restoration project would therefore minimize the potential for adverse effects to nesting seabirds.

Selenium uptake in birds does not persist, therefore, there would be no significant ecological risk to the many thousands of birds expected to use this restored habitat as a migration feeding and loafing site.

The net impact of the proposed project on wildlife species would be positive due to the resulting increase of foraging, resting, and potential breeding habitat provided by the project. Oceanic bird species, such as cormorants, may benefit by the additional perching options that the islands and berms would provide; for example, they could perch on a berm to dry and preen their feathers. Aquatic wildlife could benefit from the increase in distribution of oxygenated water and the reduction in the salinity levels (20 ppt in the first pond versus 52 ppt in the Salton Sea) under Alternative B.

While some minor temporary adverse impacts may occur during construction, these impacts would be outweighed by the overall beneficial impacts to be realized during the life of the project.

### **Pest Management**

Under Alternative B, the control of pests on the Refuge would be conducted in accordance with the IPM Plan (Appendix D). Herbicide use currently being implemented on the Refuge, as described for Alternative A, would continue under this alternative. Additional products also

may be approved for the Refuge in the future through the PUPS approval process. Under the IPM Plan, the potential effects to Refuge resources from the proposed site-, time-, and target-specific use of current and potentially future pesticides on the Refuge would be evaluated using scientific information and analyses documented in Chemical Profiles of the IPM Plan. These profiles provide quantitative assessment/screening tools and threshold values to evaluate potential effects to species groups (e.g., birds, mammals, and fish). PUPs (including appropriate BMPs) would be approved where the Chemical Profiles provide scientific evidence that potential impacts to wildlife are likely to be only minor, temporary, or localized in nature. Along with the selective use of pesticides, the IPM Plan proposes other appropriate strategies (i.e., biological, physical, mechanical, and cultural methods) to eradicate, control, or contain pest species in order to achieve resource management objectives. The implementation of physical and mechanical methods would be timed to avoid impacts to nesting species, as well as to minimize disturbance to stop-over populations of migratory bird species while they are foraging or resting within the Refuge.

Under Alternative B, aerial application of some herbicides may be permitted. Proposals for aerial application would take into consideration the potential effects of the herbicide on wildlife and the potential for spray drift associated with aerial application, as well as the potential for disturbance to nesting and migrating birds. The implementation of the BMPs described in the IPM Plan, the product specific BMPs included as part of the Chemical Profile, adherence to required buffers between treated areas and adjacent habitat areas during aerial application, and avoidance of areas supporting nesting or migrating birds will minimize the potential for adverse effects to wildlife. The benefits of the IPM Plan include improved foraging opportunities for wintering geese and improved habitat quality in riparian and wetland areas that support a range of avian species, including a variety of Neotropical migratory bird species.

Based on scientific information and analyses documented in Chemical Profiles, pesticides allowed for use on the Refuge would be of relatively low risk to non-target organisms as a result of low toxicity or short-term persistence in the environment. Thus, potential adverse impacts to wildlife from pesticide applications would be less than significant.

### **Predator Management**

Predator management, as described in Appendix C, would result in the removal of individual predatory mammals from the Refuge for the purpose of protecting nesting gull-billed terns and black skimmers. Mammals subject to control include raccoons and coyotes, as well as feral dogs and cats. Non-target mammals that could be affected by predator management activities include skunks, rabbits, and bobcats, which when trapped would be immediately released near the site of capture or at another suitable location on the Refuge. Electric fencing is maintained around nesting areas during the nesting season to deter raccoons and coyotes, however, some individuals continue to find ways to enter the site. Therefore, under the Predator Management Plan, raccoons and coyotes would be lethally removed (live-trapped and euthanized, or on occasion shot by an authorized agent for the Service) when deemed to pose a threat to nesting gull-billed terns and black skimmers.

The control of raccoons and coyotes on the Refuge during the nesting season could result in a localized reduction in the number of these mammals occurring within the Refuge; however, this reduction in the local population would have no effect on the regional or range-wide population of these highly resilient species.

### **Public Use**

Hunting. The potential for impacts to wildlife as a result of continued waterfowl hunting under Alternative B would be the same as those described under Alternative A.

Other Wildlife-Dependent Recreational Uses. Although additional opportunities for wildlife observation, photography, environmental education, and interpretation are proposed under Alternative B, the potential for adverse impacts to wildlife as a result of implementing Alternative B would be similar to those described for Alternative A.

Under Alternative B, a small parking area and bird blind would be constructed adjacent to a restored willow thicket in Unit 1. This facility would provide visitors with the opportunity to observe a variety of birds present within the willow habitat, as well as within the adjacent managed agricultural fields. Use of the blind would reduce the potential for disturbance, and activity adjacent to the blind would occur at the edge of management habitat areas, providing significant acreage of undisturbed habitat for supporting migratory and resident bird species.

Two new birding trails are proposed in Unit 2: one, which would be open seasonally (March 1 – September 30), is proposed for the northwest corner of the Hazard Tract; and the other would be constructed along the eastern edge of the proposed Red Hill Bay restoration area. Both trails would be located along the edge of a significantly larger habitat area, providing adequate acreage well away from any potential impacts from Refuge visitors. To provide some additional respite for birds and other wildlife utilizing the Hazard Tract, the seasonal birding trail proposed for this area would be open on March 1 of each year, one month after the close of the hunting season.

New interpretive signs are proposed for the existing trail in Unit 1 and other interpretive materials would be provided at the trailhead of the two new trails in Unit 2. Interpretive materials can help make visitors aware that their actions can have negative impacts on Refuge species, and have been shown to increase the likelihood that visitors will abide by restrictions on their actions. For example, Klein (1993) demonstrated that visitors who had spoken with refuge staff or volunteers were less likely to disturb birds.

The construction and maintenance of trails, interpretive elements, bird blinds, and parking lots will have minor impacts on soils and vegetation. This could include an increased potential for erosion, soil compaction (Liddle 1975), reduced seed emergence (Cole and Landres 1995), alteration of vegetative structure and composition, and sediment loading (Cole and Marion 1988). However, the construction of trails to direct access will concentrate foot traffic, allowing the vegetation surrounding them to remain undisturbed. To avoid impacts to water quality and adjacent native habitat during the construction of facilities proposed to support wildlife-dependent recreational uses, BMPs described previously to minimize erosion and siltation would also be implemented as part of the scope of the public use projects proposed under Alternative B.

### **Refuge Operations**

The activities and facility improvements proposed under Alternative B would generally occur in developed or previously disturbed areas, therefore, no significant adverse effects to wildlife are anticipated. Where these activities might result in disturbance to nesting birds, the activities would be timed to avoid any construction during the nesting season.

## **Sonny Bono Salton Sea NWR - Alternative C**

### **Wildlife and Habitat Management**

Management actions proposed under Alternative C are generally the same as those proposed under Alternative B; therefore, the impacts and benefits to wildlife of implementing these actions would be the same as those described under Alternative B.

### **Predator Management**

The analysis of potential effects to raccoons and coyotes from the implementation of a Predator Management Plan on the Refuge would be the same under this alternative as described previously for Alternative B.

### **Pest Management**

The analysis of potential effects to wildlife from the implementation of the IPM Plan would be the same under this alternative as described previously for Alternative B.

### **Public Use**

The impacts to wildlife from the public use proposals included under Alternative C would be similar to those described under Alternatives A and B. However, under Alternative C, the new trails proposed for Unit 2 under Alternative B would not be constructed. Wildlife observation would still occur along the roadway that extends between the Hazard Tract and the Red Hill Bay area, but disturbance would be somewhat reduced under this alternative. Within Unit 1, Alternative C proposes the extension of an existing trail eastward to provide opportunities to observe wintering geese and sandhill cranes. This trail would be located along the edge of the managed field, providing adequate buffer area to minimize any effects related to disturbance.

## **5.4.2 Coachella Valley NWR**

### **Coachella Valley NWR - Alternative A (No Action)**

#### **Wildlife and Habitat Management and Refuge Operations**

The continued implementation of the wildlife and habitat management activities occurring on the Refuge, as proposed under Alternative A (e.g., protection of sand dune and sand field habitats, opportunistic control of invasive weeds, monitoring of listed species) are intended to benefit wildlife species, particularly those identified as special status species. Some minor disturbance of sand dune habitat may occur as a result of monitoring, and some short-term disturbance to individuals of the species being monitored could occur. Such impacts are minimized by ensuring that biological monitors and other researchers are familiar with the habitats and habits of the species being monitored and by timing various monitoring activities to avoid impacts to non-target species. For instance, pit traps installed for the purpose of monitoring invertebrates are set in the afternoon and sampled the next morning in order to minimize the chance of inadvertently capturing lizards.

Through a collaborative effort among professional land managers, wildlife agencies, and researchers from the Center for Conservation Biology at the University of California, a monitoring framework for the Coachella Valley MSHCP planning area, including the Refuge, has been developed that unites single species and ecosystem monitoring approaches to address the monitoring needs of multiple species conservation programs (Allen et al. 2005). The intent is to ensure efficient and effective monitoring of sensitive species and habitats through time,

which will facilitate the detection of threats as quickly as possible so that appropriate management actions may be taken. The result is an overall benefit to one or more species as a result of this monitoring process.

### **Pest Management**

Under Alternative A, the control of invasive plants is limited to occasional hand-pulling of Sahara mustard and limited use of glyphosate to periodically control salt cedar. Glyphosate is not considered toxic to wildlife when applied in accordance with product label. The potential for impacts is further reduced by the implementation of BMPs related to handling, mixing, application, and cleanup. Glyphosate is applied at low concentrations directly to individual target plants using a backpack sprayer and care is taken to avoid spray drift onto native plants and soil. As a result of these factors, the potential for adverse effects to wildlife is very low and considered less than significant.

### **Public Use**

Authorized public use on the Refuge is limited to occasional guided tours, the use of an existing equestrian trail that extends along the western and northern edge of the Refuge, and approved research projects. During guided tours, there is the potential for short-term disturbance to wildlife and trampling of lizards and invertebrates. To minimize these impacts, the number of persons participating in the tours is limited and participants are asked to walk behind the guide, minimize noise on the dunes, and be aware of the presence of wildlife as they walk through the habitat.

Impacts to wildlife could result from off-trail activity in the vicinity of the designated trail system that traverses the northern portion of the Refuge. To reduce the potential for off-trail activity, dogs are prohibited on the trail and signs are posted reminding users to stay on the trail.

To minimize the potential for impacts to wildlife as a result of research conducted on the Refuge, all research must be approved by the Refuge Manager and a Special Use Permit must be issued which describes appropriate conduct on the Refuge, any time or seasonal restrictions for some or all activities, and other avoidance actions that may be necessary to protect sensitive species.

The measures described here to minimize impacts to wildlife as a result of authorized public use would ensure that impacts to wildlife are reduced to a level of insignificance.

Unauthorized uses on the Refuge include pedestrian and motorized access onto sensitive habitat areas. With no Federal wildlife officer assigned to the Sonny Bono Salton Sea NWR Complex, visits to the Refuge to enforce regulations related to access are very limited. As a result, there is the potential for disturbance to wildlife and impacts to wildlife habitat under Alternative A.

## **Coachella Valley NWR - Alternative B (Proposed Action)**

### **Wildlife and Habitat Management and Refuge Operations**

Under Alternative B, the control of non-native invasive weeds would be expanded throughout the Refuge. In addition, habitat enhancement in the form of more aggressive weed control and the planting of native scrubs and annual plants is proposed for the old vineyard site. Prior to conducting habitat enhancement activities in the old vineyard site, a site reconnaissance and survey for sensitive wildlife species (e.g., flat-tailed horned lizard, Coachella Valley Jerusalem

cricket, Coachella Valley giant sand treader cricket) would be conducted to determine their presence. If sensitive species are present, measures such as avoiding the use of motorized equipment to control weeds or prepare the site would be incorporated into the scope of the project to avoid significant adverse effects to these species.

The activities such as monitoring that are described under Alternative A would also be implemented under Alternative B; therefore, the effects of implementing these activities would be the same as those described under Alternative A.

### **Pest Management**

Pest management under Alternative B would be implemented in accordance with an IPM Plan. Currently, the herbicides that could be used on the site to control invasive weedy plants and/or invasive shrubs include products with the active ingredients glyphosate, imazapyr, and triclopyr. Glyphosate and imazapyr are not considered toxic to wildlife when applied in accordance with label recommendations. Triclopyr can be slightly toxic to wildlife if treated vegetation is ingested. To avoid any potential for impacts related to the use of triclopyr, application would be limited to spot treatment of invasive plants, applied at low volumes, and applied only in the early spring, prior to the emergence of native annual plants. The implementation of BMPs related to application and spray drift would further reduce the potential for exposure. Other products may be used in the future, provided they are approved in accordance with the procedures described in the IPM Plan.

### **Public Use**

No new public uses are proposed on the Refuge under Alternative B; therefore, the potential effects to wildlife under these Alternatives would be the same as those described for Alternative A.

## **Coachella Valley NWR - Alternative C**

### **Wildlife and Habitat Management and Refuge Operations**

With the exception of how the old vineyard site is treated, the wildlife and habitat management actions described for Alternative B would also be implemented under Alternative C. Therefore, the effects to wildlife of implementing those actions would be the same as those described under Alternative B.

Under Alternative C, the old vineyard would be restored to desert scrub habitat. This would involve restoring the historic landform within the restoration site, removing all non-native vegetation, implementing some initial invasive species control, and then planting and seeding the area with appropriate native vegetation. Each of these steps has the potential for short-term impacts to wildlife. These impacts may be related to ground disturbance, noise, and/or human activity.

Despite the disturbed nature of the proposed old vineyard restoration site, there is the potential for sensitive species, such as flat-tailed horned lizard, to be present on this site. Therefore, prior to any work being conducted on this site, a survey to determine the presence or absence of sensitive species would be required. If sensitive species are present, additional analysis in accordance with NEPA would be required to fully assess the potential for adverse effects to these species.

The restoration of this area would ultimately provide benefits to native wildlife in the form of improved habitat quality to support a range of native species.

### **Pest Management**

The analysis of potential effects to wildlife from the implementation of the IPM Plan would be the same under this alternative as described previously for Alternative B.

### **Public Use**

The impacts to wildlife from the public use proposals included under Alternative C would be similar to those described under Alternative A.

## **5.5 Effects to Federally and State Listed Species and Other Species of Concern**

The direct and indirect effects to endangered and threatened species and other species of concern as a result of implementing the various alternatives are described in this section. An adverse effect to these species would be considered significant if:

- An action would result in the direct mortality or habitat loss, lowered reproductive success, or habitat fragmentation of a federally or State listed wildlife and plant species, or
- Permanent loss of occupied listed species habitat, substantial loss of foraging or nesting habitat for a listed or special status species, or the direct mortality of individuals of a listed species would occur as a result of a proposed action.

An indirect beneficial impact would occur if an action would result in the creation of substantial new areas of foraging, roosting, or nesting habitat for listed or special status wildlife species or substantial new areas of habitat appropriate to support listed or special status plant species. Information about the listed species and other species of concern that are known to occur or have the potential to occur on the Refuge is provided in Chapter 3.

### **5.5.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

#### **Yuma Clapper Rail**

Under Alternative A, the Refuge would continue to maintain approximately 200 acres of freshwater marsh in various impoundments within Units 1 and 2 (refer to Figures 4-1 and 4-2). These habitat areas are managed to benefit the Yuma clapper rail, which is present in marsh areas year round. Potential impacts to these rails involve limited periods of disturbance when maintenance such as control of invasive plant species and clearing of vegetation around the primary water control structures is implemented. These maintenance activities, which only involve a few hours to complete, occur periodically throughout the year, but are avoided during the nesting season. Care is taken during these activities to avoid loss or injury to rails or other secretive marsh birds.

As described in the draft EIS/EIR, Yuma clapper rails could be present within freshwater marsh habitat along the drains or within freshwater marsh habitat immediately adjacent to the construction footprint of the Salton Sea SCH project, therefore, construction activities related to the implementation of this project could result in habitat loss, injury, or mortality of

individuals, or disruption of breeding if appropriate measures such as preconstruction monitoring, establishment of setbacks or buffer areas, and avoidance of disturbing activities during the nesting season are not incorporated into the scope of the project.

Management of invasive plant species in these marshes involves a combination of mechanical and chemical control. Herbicides that may be used include imazapyr and glyphosate, neither of which is considered a risk to birds. When using these products, BMPs related to protecting water quality and avoiding spray drift would be implemented. Low volume sprayers such as backpack sprayers for spot control and spray bottles for cut stump treatment will be sufficient in most instances. However, in some cases, such as to control common reed, a higher volume sprayer may be necessary.

Other herbicides are applied to the Refuge's managed agricultural fields, some of which are located adjacent to freshwater marsh areas. To avoid spray drift, appropriate no-spray buffer areas would be provided between the treatment area and the marsh habitat. In most cases, these buffers are a minimum of 100 feet in width. Implementing BMPs related to water quality and spray drift would reduce the potential for impacts to water quality.

As noted previously, human activity can have adverse impacts to wildlife species, particularly when reproductive or foraging activities are disrupted. Of particular concern are potential disturbances to the Yuma clapper rail. Maintaining designated trails to accommodate public use, as well as regulatory and interpretive signage to keep authorized users out of sensitive areas, has minimized disturbance to this species, as well as other secretive marsh birds species such as the State listed California black rail.

On the Refuge, Yuma clapper rails occur in dense cattail marshes that provide little opportunity for human access. The majority of these areas occur where no public access is permitted in or around the marsh, which avoids any potential for disturbance or other impacts. In Unit 1, the public does have the opportunity to walk around one of these marsh areas and listen for rails and other marsh birds. Because of the dense nature of the habitat, the potential for adverse effects to the rails from this human activity and any associated noise is limited.

The rail habitat located in the Hazard Tract of Unit 2 is located in proximity to a waterfowl hunting area, but no access into these marsh areas is permitted. Seasonal disturbance associated with the noise from shot guns is possible, but is not anticipated to impact the rails. No hunting is permitted in proximity to these areas during the nesting season. No significant adverse effects to rails as a result of the current public uses on the Refuge are therefore anticipated.

The Refuge Manager would review all research proposed to occur within rail habitat, approving only those proposals that would not have the potential to adversely affect Yuma clapper rails. All research projects would require a SUP and researchers must adhere to the conditions and stipulations outlined in the approved SUP.

### **Desert Pupfish**

**Ongoing Management Practices.** Wildlife and habitat management activities on the Refuge do not involve any direct management of desert pupfish, however, desert pupfish have been documented in some of agricultural canals that extend through the Refuge and drain into the Salton Sea (Moyle 2002, Saiki et al. 2010). They may also occur in the near shore areas of the Salton Sea. Pupfish have been documented in one permanent open water habitat area, Pond A4 in Unit 1, and may be present in other managed open water habitat areas. To avoid any

significant adverse effects to this species if and when it becomes necessary to draw down water in a management area that is occupied by desert pupfish, the Refuge is developing methods for capturing the fish prior to draw down and either translocating them to other suitable habitat on or off the Refuge or temporarily holding them in an appropriate location while the work is conducted.

Several of the herbicides used on the Refuge can be toxic to fish, including dicamba and triclopyr. Glyphosate ranges from practically nontoxic to highly toxic depending upon the formulation and types of surfactants used during application. To avoid any impacts to fish, no herbicides are applied to surface waters, BMPs are implemented to avoid spray drift, and all products are applied in accordance with label requirements. Therefore, the current use of herbicides on the Refuge would not result in any significant adverse effects to desert pupfish.

Salton Sea SCH Project. The draft EIS/EIR for the Salton Sea SCH project identifies adverse effects to pupfish during project construction and operation. Measures continue to be developed to address this issue. For additional analysis, refer to the draft EIS/EIR.

Public Use. The wildlife-dependent recreational uses currently permitted on the Refuge do not occur in areas where desert pupfish may exist; therefore, no potential adverse effects to desert pupfish are anticipated.

Potential impacts to desert pupfish as a result of future research proposals on the Refuge would be evaluated as part of the SUP process. If a potential for adverse effects to desert pupfish is identified, either the request to conduct the proposed research would be denied, or the proposal would be evaluated per the requirements of NEPA and the ESA and conservation measures would be incorporated into the SUP to avoid any adverse effects to pupfish.

### **California Least Tern**

The actions proposed under Alternative A would result in no adverse effects on California least terns since management in areas that have the potential to support least tern nesting is avoided during the nesting season. Additionally, no public uses occur in the areas that may be suitable for least tern nesting or foraging. Maintaining nest habitat within the Refuge for seabirds could benefit the least tern, although use of the existing nesting islands by least terns is unlikely.

The mudflats found at the edges of Bruchard Bay in the vicinity of the proposed Salton Sea SCH project restoration site are considered to be only marginally suitable breeding habitat for California least terns because of their size and accessibility to predators. If any activities associated with construction are proposed in this area during the nesting season, preconstruction focused surveys for nesting seabirds would be conducted to ensure that no seabird nesting is occurring in the area that could be impacted by construction activity. If seabird nesting is documented that could be impacted, no activities would occur until after the chicks have fledged or the nests are no longer occupied.

The potential effects to least terns as a result of the continued use of herbicides on the Refuge would be the same as those described above for wildlife species, and avoidance of impacts to least terns as a result of future research proposals would be provided through the SUP process.

Because potential nesting areas are not open to public access and nearby public uses, including trails, are adequately separated from potential nesting sites, none of the public uses occurring on Refuge would be expected to adversely affect or benefit California least terns.

### **Least Bell's Vireo**

Under Alternative A, the only management action that has the potential to affect the least Bell's vireo is the removal of invasive shrubs, primarily salt cedar, from riparian and other wetland areas. The least Bell's vireo has been documented in the vicinity of the Refuge in past years; therefore, to avoid impacts in potential nesting areas, invasive species control is only conducted outside of the nesting season. In addition, when salt cedar is controlled in an area, the invasive plants are replaced with native willows and mesquite, which provides higher quality nesting habitat for the vireo than is provided by salt cedar. Because of the lack of disturbance during the nesting season and replacement of salt cedar shrub habitat with appropriate native shrub vegetation, no significant adverse effects to least Bell's vireo are anticipated under Alternative A.

The riparian scrub and aquatic habitat surrounding portions of Bruchard Bay are only marginally suitable as nesting and foraging sites for the least Bell's vireo. However, to ensure that no adverse effects occur to this species as a result of the proposed restoration, if construction is proposed during the nesting season, preconstruction focused surveys would be conducted to determine species present. If least Bell's vireo are identified nesting within 500 feet of a proposed construction area, work in this area would be rescheduled to avoid the nesting season. The implementation of this measure would mitigate the potential adverse effects to insignificant.

The potential effects to least Bell's vireo as a result of the continued use of herbicides on the Refuge would be the same as those described above for wildlife species, and avoidance of impacts to least Bell's vireo as a result of future research proposals would be provided through the SUP process.

The public has little, if any, access to areas on the Refuge that could support least Bell's vireo; therefore, no adverse effects to this species are anticipated as a result of the current public use program.

### **Southwestern Willow Flycatcher**

The lack of willows and vegetative diversity within the riparian and other wetland areas on the Refuge makes these areas less than preferred habitat for the southwestern willow flycatcher, but some locations may provide marginally suitable nesting habitat for this species. Therefore, the removal of salt cedar on the Refuge has the potential, albeit minimal, to impact nesting southwestern willow flycatchers. To avoid these impacts, invasive species control only occurs outside of the nesting season. In addition, when salt cedar is controlled in an area, the invasive plants are replaced with native willows and mesquite, which improves habitat quality for nesting songbirds. The lack of disturbance during the nesting season and replacement of salt cedar shrub habitat with appropriate native shrub vegetation would avoid adverse effects to southwestern willow flycatcher due to the continued implementation of the habitat management proposals included under Alternative A.

The riparian scrub and aquatic habitat surrounding portions of Bruchard Bay restoration sites are only marginally suitable as nesting and foraging sites for southwestern willow flycatcher. However, to ensure that no adverse effects occur to this species as a result of the proposed restoration, preconstruction focused surveys for this species would be conducted in any areas

located adjacent to the project site that support appropriate nesting habitat. If this species is identified nesting within 500 feet of a proposed construction area, work in this area would be rescheduled to avoid the nesting season. The implementation of this measure would mitigate the potential adverse effects to insignificant.

The potential effects to southwestern willow flycatcher as a result of the continued use of herbicides on the Refuge would be the same as those described above for wildlife species, and avoidance of impacts to flycatchers as a result of future research proposals would be provided through the SUP process.

The public has little, if any, access to areas on the Refuge that could support southwestern willow flycatcher; therefore, no adverse effects to this species are anticipated as a result of the current public use program.

#### **Other State Listed Threatened or Endangered Species**

Potential impacts under Alternative A to bald eagle, Swainson's hawk, Gila woodpecker, greater sandhill crane, and barn swallow would be the same as those described previously for Refuge wildlife.

The potential for adverse effects to California black rail as a result of implementing this alternative would be the same as those described for Yuma clapper rail, and the mitigation measures proposed to minimize impacts to Yuma clapper rail would also minimize impacts to the California black rail. Similarly, the discussion of potential impacts to least Bell's vireo and southwestern willow flycatcher and proposed mitigation related to restoration in Bruchard Bay would also apply to the little willow flycatcher. In addition, this flycatcher has been observed in the New and Alamo River riparian areas during migration, therefore, control of salt cedar in these areas when this species is present would result in disturbance to migrating individuals. To avoid such impacts, invasive species control is timed to avoid peak migration periods.

The potential for disturbance to state listed threatened or endangered bird species would be similar to those described previously for wildlife, with adequate areas of undisturbed habitat available throughout the Refuge to support these species.

#### **California Species of Concern**

The refuge management and public use activities that would continue on the Refuge under Alternative A would have little if any potential for adverse effects to fulvous whistling-duck, American white pelican, wood stork, brant, snowy plover, black tern, gull-billed tern, and black skimmer, as these species occur primarily within and along the margins of the Salton Sea and/or within the Refuge's managed permanent open water areas where the potential for disturbance is low. What little management activity does occur in these areas is implemented outside of the nesting seasons and peak migration periods. In addition, adequate buffers are provided between these areas and areas designated for public use. Management of nesting islands within the Refuge's permanent open water areas provides benefits to gull-billed tern and black skimmer, which annually nest on these islands.

The migratory and resident songbirds identified as California Species of Concern (refer to Table 3-13) that occur on the Refuge utilize many of the managed habitats within the Refuge, including cattail marsh, seasonal wetlands, tree rows, and agricultural fields. The activities that occur in these areas result in short term disturbances related to habitat management, however, the duration of this disturbance is short and the area affected is limited, and no habitat manipulation occurs during the nesting season. Many of these species benefit from the

managed habitats available within the Refuge, as they provide foraging opportunities for migrating birds and nesting opportunities for some Neotropical songbirds.

Current Refuge management practices include actions to benefit burrowing owls including maintenance of nesting boxes and avoidance of known and potential nesting areas. Sandhill cranes benefit from the foraging opportunities provided by the Refuge to support wintering geese. Actions implemented to support Yuma clapper rail on the Refuge also benefit least bittern.

Management of seasonal and permanent wetland habitat benefits redheads, although limited take of this species is permitted as part of the Refuge's hunting program. Current hunting regulations for California limit take of redheads to two per day per hunter. As described previously, these bag limits are established based on current population estimates and are intended to ensure that no adverse effects to the total population of a species would occur as a result of hunting.

The potential for impacts to the other species of concern that occur on the Refuge would be the same as those previously described for Refuge wildlife.

### **Sonny Bono Salton Sea NWR - Alternatives B and C**

#### **Yuma Clapper Rail**

Under Alternatives B and C, a step-down management plan for Yuma clapper rails would be developed and implemented to address the long term management of the rail habitats on the Refuge. Of particular concern is the need for occasional clean out of dense cattail vegetation to maintain high quality habitat for the Refuge's Yuma clapper rail population. The rail management plan would address how best to accomplish this action with the least amount of disturbance to the existing rail population. The plan will address measures to minimize adverse effects to rails that would have to relocate to adjacent habitat areas. Management actions would include establishing high quality freshwater marsh habitat in adjacent seasonal wetland areas in advance of need for relocation. As the habitat quality in aging cattail areas diminishes or when old cattail marshes are allowed to dry out, rails could then move into adjacent higher quality habitat with limited disruption. Once the rails have moved out, the overly dense cattail habitat would be removed and the site would be converted to seasonal wetland habitat. All management activities within cattail habitat would occur outside of the nesting season, and a site survey would be conducted within dried cattail habitat areas before a controlled burn or mechanical removal of dead cattails is implemented. These actions, which would be more fully addressed in the step-down management plan, would minimize the potential for adverse effects to Yuma clapper rails and would benefit the rails by ensuring that appropriate, quality habitat is always available.

Yuma clapper rails do not occupy habitat to be affected by the restoration proposals for Red Hill Bay, therefore, no adverse effects to Yuma clapper rails are anticipated as a result of the implementation of this restoration project.

Under Alternatives B and C, the control of invasive non-native species would be implemented in accordance with the proposal included in the draft IPM Plan (Appendix D). All pesticides considered for use on the Refuge per the IPM Plan would require review and approval through the PUPS process, and Chemical Profiles would be prepared to assess the potential effect of each pesticide on Refuge-specific species, including listed species. This assessment may result in the identification of product specific BMPs that must be implemented during application

and/or requirements for application rates that are lower than those permitted on the product label.

Aerial spraying of herbicides is also proposed in the IPM Plan for agricultural fields and salt cedar dominated riparian areas. As described previously, the potential for impacts to wildlife, including Yuma clapper rail, as a result of aerial spraying would be minimized through the implementation of the BMPs included in the IPM Plan and specific Chemical Profiles, as well as through the adherence to required buffers between treatment areas and adjacent wetland habitats. No significant adverse effects to rails as a result of aerial spraying or the implementation of an IPM Plan are therefore anticipated.

The potential for adverse effects to Yuma clapper rails from the implementation of Alternative B or C would be similar to those described under Alternative A. Measures to ensure the protection of this species in areas open to public access include providing sanctuary areas in Unit 1 to support Yuma clapper rail; provide four non-hunt days within the hunt area to provide rails present in Unit 2 with opportunities for undisturbed foraging and resting; preserve a minimum of 77 acres of cattail habitat within the Hazard Unit to ensure no net loss of habitat for clapper rail major life history requirements (i.e., breeding, feeding, resting cover); and prohibit hunting in proximity to rail occupied territories during the breeding and molting seasons (March 15 to September 1). In addition, Alternatives B and C include proposals to conduct annual protocol surveys of Yuma clapper rail on the Refuge to monitor population size and allow for quantitative comparisons of population size within occupied rail sites on the Refuge both within the Hazard Tract and outside the designated hunting area to discern any potential effects of disturbance on rails occupying the marsh habitat within the Hazard Tract. If declines in the overall rail population are detected, the Refuge would adaptively manage the hunt program to further minimize disturbance in cattail marsh habitats.

### **Desert Pupfish**

Although no habitats on the Refuge would be actively managed to support desert pupfish under Alternatives B and C, these alternatives do propose to actively monitor the presence of desert pupfish on the Refuge. Monitoring activities would not result in any adverse effects to the species. In addition, these alternatives propose to work with CDFW to relocate populations of desert pupfish that may be discovered in managed pond areas to appropriate habitat off or on the Refuge. Relocation as needed and/or minor modifications to water management as appropriate would ensure that adverse effects would be minimized. These actions would be implemented in partnership with CDFW and the Palm Springs Fish and Wildlife Office.

Red Hill Bay Restoration. Alternatives B and C propose the restoration of shallow wetland habitat within the Red Hill Bay portion of the Salton Sea. This proposal has the potential to affect desert pupfish, therefore, conservation measures, as described below, have been incorporated into the proposal to avoid the potential for significant adverse effects to this species.

In preparation for grading and other construction work within the Red Hill Bay area, water from IID drains will have to be diverted from the Red Hill Bay area to allow the playa to dry. Because there is the potential for pupfish to occur in these waters, surveys will be conducted in advance of any diversion and draining. Approximately 1.5 acres of ponded water exists at the southeast corner of the project site where Vail 3 drain water is pumped up to Red Hill Bay. Surveys for pupfish will take place in the spring (between April and June) when pupfish abundance is expected to peak, and will be carried out using 1/8-inch minnow traps. Six baited

traps, spaced throughout the ponded area, will be deployed for one hour and checked for pupfish. This set will be repeated two more times, or until pupfish are detected. If no pupfish are detected, the berm will be breached allowing the water to flow from the impoundment to the new drainage channel. If pupfish are found, the drainage channel will be extended north, parallel to an existing berm. Instead of breaching the berm, the channel will intercept water seeping through the berm, utilizing it as a natural screen to keep pupfish from entering the drainage channel. Water in the playa area will also be surveyed for pupfish prior to any water diversion. This water is shallow and lacks any cover from foraging birds, therefore, desert pupfish are not expected to be present in this area. However, because this area is connected to the Salton Sea and fish are able to freely move back and forth, surveys will be conducted in this area using a ten-foot beach seine (1/8-inch mesh or smaller) pulled across the pooled area ten times or until pupfish are detected. Alternatively, if conditions preclude walking a seine through the pond, minnow traps, as described above, may be used.

Once the supply of drain water is channeled around the playa, a temporary berm will be placed across the mouth of Red Hill Bay to prevent lake water from entering the project site. An excavator working off support mats will be used, and only a short section (exact length will depend on lake elevation) of this work will be in an area with standing water.

Whenever the equipment is working in water, the area will be swept with the 1/8-inch mesh beach seine and any fish present in the area will be directed into the Salton Sea. With the temporary berm in place, lake water will be kept out and any water remaining on the playa can be pumped over the berm and into the lake. A three-foot-deep pumping basin will be excavated on the playa side of the berm into which remaining water can flow via gravity. Surrounding this basin, a fish exclusion fence composed of 1/4-inch mesh netting will be installed. The basin will be cleared of remaining fish prior to pumping water from the basin.

As water in the playa is drawn down, the fish exclusion fence and any pools that form will be further inspected for stranded pupfish. If any are found they will be netted and immediately transported with aeration to the Salton Sea or a CDFW-approved relocation site using the following protocol:

1. Fish will be collected using a 1/8-inch mesh beach seine and/or aquarium dip nets and immediately placed in a five-gallon plastic bucket containing aerated water from the site of their capture. These buckets will be transported to a relocation site as quickly as possible.
2. Relocated fish will be observed for signs of stress and incorporated into their new environment through incremental changes in water sources.
3. A count will be maintained of all fish caught and relocated, and a record will be kept of the disposition of all fish. This relocation data will be provided to CDFW.

The likelihood that pupfish will be present within the footprint of the restoration project's construction site is very limited. However, to minimize the potential for impacts to pupfish during construction, drains entering the site will be intercepted by a small channel to convey drainwater directly to the Sea. Also, the mouth of the bay will be blocked, allowing the playa to dry and permitting the majority of site construction to take place on dry playa. Prior to allowing the area to dry out, surveys for pupfish will be conducted as described in the preceding paragraphs and any pupfish found will be relocated downstream offsite to suitable habitat.

The only other portion of construction that presents a risk to pupfish involves the excavation work associated with the proposed saltwater intake channel. Here, an excavator operating off support mats will be inserting two rows of sheet piling, ten feet apart, into the lakebed. The area between the sheet piling will be excavated approximately two feet deep to create the water conveyance channel, and the excavated material will be deposited alongside creating levees from which future channel maintenance can be done. Pupfish have been trapped in the Salton Sea near this location (pers. comm. S. Keeney, CDFW), so measures will be taken to avoid or minimize adverse impacts to the species. To minimize the risk to pupfish, the work area will be swept with a 1/8 inch mesh beach seine prior to laying excavator mats and inserting sheet piling. Fish are expected to avoid the work activity, but sweeping the area with the seine will ensure the area is clear. The sheet piling will not be inserted fully, and the portion remaining above water will act as a fish exclusion barrier once excavation of the channel begins. Prior to channel excavation, the channel will be swept with the seine and the mouth of the channel will be fenced with 1/8-inch screen. Areas where excavated material is to be deposited will be similarly cleared and fenced to exclude fish from the work area.

The water delivery system from the Alamo River and a basin for blending with Salton Sea water will be constructed in the dry up to the point when water is diverted. Desert pupfish have not been documented in the Alamo River and it is believed to be too swift to provide habitat (pers. comm. J. Crayon, CDFW). Therefore, excavation of a diversion channel west of the Garst Road bridge does not represent a potential threat to this species.

These construction activities will result in minimal destruction of desert pupfish habitat as most of the project area is currently dry playa. The resulting restoration of Red Hill Bay may create several hundred acres of desert pupfish habitat that will need to be maintained and monitored.

The Red Hill Bay Restoration project is intended to restore habitat for migratory birds; however, the potential remains for pupfish to eventually colonize the site and develop a thriving breeding population within the impoundments. Measures will be taken to minimize movement of fish from the Salton Sea to the Red Hill Bay impoundments and allow free passage for fish moving out of the impoundments. A ¼-inch mesh screen will be placed across the mouth of the Sea water intake channel and will be maintained weekly. The use of a ¼-inch mesh exclusion screen rather than a 1/8-inch screen is proposed because of the maintenance issues related to the 1/8-inch screen (e.g., debris collection that can reduce water flow into the system), and precautions taken to ensure that should pupfish enter the intake water system, they will be safely transported into the ponds by the specified water pumping system, as described below.

Although avoidance measures will be incorporated into the project design to keep desert pupfish out of the system, there is a chance that they may become entrained in the water delivery system or the wetland cells. Therefore, project features have been incorporated into the project design to accommodate them and to minimize trauma. The type of water pump proposed for use in this project, the Hidrostral screw centrifugal pump Model H12K-HD, is designed to avoid impacts to fish, fry, or pelagic eggs that may find their way through the screen and into the pump. The pumps are designed to pump live fish, transporting them in a cell of water as the screw of the pump spins and water is elevated up the pump. Hidrostral Ltd. has published a review of the differences between Archimedes screw pumps and vertically suspended axial flow pumps using the Hidrostral screw centrifugal pump (Jackson 2010). Another review of the Hidrostral pump was performed by the Bureau of Reclamation at the Tracy Fish Collection Facility at Tracy, California. In this review, the Hidrostral pump had no

significant effect ( $p$  is less than 0.001) on immediate or latent mortality (96 hours), descaling or body injury rates for all flow rates and densities and sizes of fish tested, except for a 96-hour mortality of Sacramento splittail in June, which was attributed to stress associated with elevated water temperatures at the study site (Helfrich et al. 2000).

Despite actions to keep desert pupfish out of the restored area, there continues to be the potential for pupfish to eventually find their way into the system. As a result, the project design also includes features to support desert pupfish, including the creation of deep pools and swales (up to six feet deep) within the restoration area. In addition, shade structures (concrete culverts) will be installed to provide a thermal buffer and shelters for pupfish. Additional cover will likely develop as wigeongrass (*Ruppia maritima*) and filamentous green alga, such as *Chaetomorpha linum*, is introduced within inflowing water.

The Red Hill Bay restoration project is intended to function as a flow-through system with return flows going back into the Salton Sea. Unless the Salton Sea salinity levels begin to approach a level that is detrimental to pupfish survival (i.e., 68 ppt), fish from the Red Hill Bay will be allowed to exit directly into the Salton Sea with outflow water. As the Salton Sea salinity levels approach 68 ppt, the screening of the intake will no longer be necessary, but screening of the outflow will be provided to prevent access from the impoundments back into the Sea.

Monitoring of basic water quality conditions (e.g., temperature, salinity, dissolved oxygen) will occur weekly at the water intake channels and near the impoundment inlets and outlets. Selenium and pesticide monitoring will be conducted during the early years of operation and may continue if warranted.

If it becomes necessary to dewater the impoundments, pupfish in the system will need to be relocated to a new site, either temporarily or permanently. Relocation sites will be determined through consultation with CDFW and the Palm Springs Fish and Wildlife Office. Fish capture protocols will depend on site conditions at the time of draw down. The impoundments have a natural low point running across the center of Red Hill Bay which can be used to concentrate fish. This will be enhanced during construction by cutting additional swales through the playa; however, the persistence of these features will have to be determined after years of erosion and sedimentation. Whatever the conditions, fish will have to be collected for relocation. This will likely be done using a combination of appropriately sized nets, traps, beach seines, and aquarium dip nets. Captured fish will be immediately placed in five gallon plastic buckets containing aerated water from the site of their capture. These buckets will be transported to a relocation site as quickly as possible. Relocated fish will be incorporated into their new environment through incremental changes in water sources as necessary to minimize stress and/or injury associated with differential water quality characteristics. Relocated fish will be observed for signs of stress during this process. A count will be maintained of all fish caught and relocated, and a record will be kept of the disposition of all fish. This relocation data will be provided to CDFW.

Any construction and maintenance activities proposed within the open waters of the Salton Sea will follow similar protocols to prevent the take of desert pupfish. In addition, the same types of procedures described for relocation of pupfish within the Red Hill Bay restoration area will be followed should desert pupfish be discovered in another water management area or drainage channel on the Refuge that has been scheduled for draining to implement necessary maintenance, vegetation rehabilitation, vegetation removal, or repair work.

**Pest Management.** As described previously, the potential for adverse effects to Refuge wildlife, including desert pupfish, as a result of the implementation of the IPM Plan, including aerial spraying in agricultural fields and salt cedar dominated riparian areas, would be avoided through the implementation of the BMPs described in the IPM Plan and Chemical Profiles, as well as through adherence to specific buffer requirements between treatment areas and adjacent wetland habitats.

**Public Use.** The wildlife-dependent recreational uses proposed on the Refuge under Alternatives B and C would not occur in areas where desert pupfish may exist, therefore, no adverse effects to desert pupfish are anticipated.

Effects to pupfish as a result of future research on the Refuge would be addressed as presented under Alternative A.

### **California Least Tern**

The potential for impacts to California least tern as a result of the wildlife and habitat management actions proposed under Alternatives B and C would be essentially the same as those described for Alternative A. Although these terns are not likely to nest on the Refuge, if they were to breed here, they would benefit from the implementation of the proposed predator management plan. The effects of implementing proposed IPM Plan on nesting and/or foraging least terns would be similar to those described for Refuge wildlife and the Yuma clapper rail.

The mudflats and other open habitat areas found in the vicinity of the Red Hill Bay restoration site are considered to be only marginally suitable breeding habitat for California least terns because of their size and accessibility to predators. If any activities associated with construction are proposed in these areas during the nesting season, preconstruction focused surveys for nesting seabirds would be conducted to ensure that no seabird nesting is occurring in the area that could be impacted by construction activity. If seabird nesting is documented that could be impacted, no activities would occur until after the chicks have fledged or the nests are no longer occupied.

### **Least Bell's Vireo and Southwestern Willow Flycatcher**

The potential for impacts to least Bell's vireo and southwestern willow flycatcher as a result of the wildlife and habitat management actions proposed under Alternatives B and C would be essentially the same as those described for Alternative A. The effects of implementing proposed IPM Plan on nesting and/or foraging least Bell's vireo and southwestern willow flycatcher would be avoided by applying herbicides to potential nesting and foraging habitat outside of the breeding season and peak migration periods.

The riparian scrub and aquatic habitat within and surrounding the Red Hill Bay restoration site are only marginally suitable as nesting and foraging sites for the least Bell's vireo and southwestern willow flycatcher. However, to ensure that no adverse effects occur to these species as a result of the proposed restoration, if construction is proposed during the nesting season, preconstruction focused surveys for these species, as well as little willow flycatcher, would be conducted within or immediately adjacent to potential nesting habitat. If these species are identified nesting within 500 feet of a proposed construction area, work in this area would be rescheduled to avoid the nesting season. The implementation of this measure would mitigate the potential adverse effects to insignificant.

Suitable nesting habitat for these species is very limited within those areas of the Refuge that are open for public use, and nesting by these species has not been observed. Under

Alternatives B and C, if nesting of these species is documented in proximity to public use areas, the nesting area and a suitable buffer zone around the nesting area would be closed to public access during the nesting season.

**Other State Listed Threatened or Endangered Species**

The effects of implementing the wildlife and habitat management actions proposed under Alternatives B and C to bald eagle, Swainson's hawk, Gila woodpecker, greater sandhill crane, little willow flycatcher, and barn swallow would be essentially the same as those described previously for Refuge wildlife. The potential impacts to California black rail would be the same as those described for Yuma clapper rail, as these species utilize the same habitat.

There is no potential for adverse effects to bald eagle, Swainson's hawk, Gila woodpecker, greater sandhill crane, or barn swallow as a result of the restoration of Red Hill Bay or Bruchard Bay, and there is no potential for adverse effects to California black rail as a result of the restoration of Red Hill Bay. The discussion of potential impacts to least Bell's vireo and southwestern willow flycatcher and proposed mitigation related to restoration in Red Hill Bay would also apply to the little willow flycatcher.

As described previously, the potential for adverse effects to Refuge wildlife, including State listed species, as a result of the implementation of the IPM Plan, including aerial spraying in agricultural fields and salt cedar dominated riparian areas, would be avoided through the implementation of the BMPs described in the IPM Plan and Chemical Profiles, as well as through adherence to specific buffer requirements between treatment areas and adjacent wetland habitats. Additionally, herbicide applications in potential foraging habitat for the little willow flycatcher would be avoided during peak migration periods to minimize disturbance.

**California Species of Concern**

The effects to those species identified as California Species of Concern (refer to Table 3-13) as a result of implementing the wildlife and habitat management actions, IPM Plan, and public use activities proposed under Alternatives B and C would be essentially the same as those described under Alternative A.

For gull-billed terns and black skimmers, the implementation of the predator management plan would be expected to provide benefits in the form of improved productivity. Through the control of raccoons and coyotes that prey on chicks and eggs, the successful fledging of gull-billed tern and black skimmer chicks should increase. This in turn could increase the number of gull-billed terns nesting at the Salton Sea, which ultimately could have a regional benefit to California least terns nesting along the San Diego coast.

The restoration of Red Hill Bay could result in temporary disturbance or alteration of shallow shoreline habitat used as foraging areas by gull-billed terns and black skimmers. These short-term disturbances would occur over relatively small areas of potential foraging habitat and are considered less than significant. The potential for these species to nest within proposed construction sites is very low, however, if construction is proposed during the nesting season, preconstruction surveys would be conducted and any nesting sites would be avoided, as described for California least terns. The implementation of these actions would reduce the potential for impacts to nesting seabirds to less than significant. Once restoration in Red Hill Bay is completed, gull-billed terns and black skimmers would benefit from the availability of additional nesting habitat that would be created in association with the restoration proposal.

## 5.5.2 Coachella Valley NWR

### **Coachella Valley NWR - Alternative A (No Action)**

#### **Coachella Valley Fringe-toed Lizard**

Under Alternative A, the primary wildlife and habitat management actions would continue to be protection of the habitats within the Refuge and monitoring of listed species. These actions benefit the fringe-toed lizard, but can also subject lizards to disturbance and potential injury or death from trampling. To avoid significant disturbance and injury, all monitors are well versed in how to minimize potential impacts to lizards that may be buried just below the surface of the sand.

Opportunistic control of invasive weeds, particularly Sahara mustard, which would continue under Alternative A, could result in inadvertent impacts to the fringe-toed lizard from trampling, but this potential is minimized by only relying on individuals familiar with the species and its habits to work within the dune habitat. Spot use of glyphosate to control invasive weed species and salt cedar is not likely to impact this species. The implementation of BMPs during application and adherence to label requirements insures that the potential for adverse effects to the fringe-toed lizard from herbicide use are less than significant.

Public use under Alternative A is limited and is either restricted to existing disturbed habitat (i.e., a trail that extends along the western and northern boundaries of the Refuge) or restricted to guided tours only. To ensure that no significant adverse effects to listed species result from these public use activities, dogs are prohibited on the Refuge, trail users are required to stay on the designated trail, and participants in the guided tours are briefed on how and where to walk within the dune habitat to minimize the potential for trampling lizards or other sensitive species.

With respect to research, the Refuge Manager reviews all research proposed to occur within blow-sand habitats to ensure that there is no potential for adverse effects to fringe-toed lizards or other Refuge resources. All research projects would require a SUP and researchers would be required to adhere to all conditions outlined in the SUP.

#### **Coachella Valley Milk-vetch**

The effects to Coachella Valley milk-vetch of implementing Alternative A are similar to those described for the Coachella Valley fringe-toed lizard. Primary actions include protection of habitat and monitoring. Impacts related to trampling are limited and if they were to occur, it would be when the plant is first emerging in the spring. Monitors are trained to avoid trampling of the sensitive species supported on the dunes.

Opportunistic control of Sahara mustard would benefit this milk-vetch, as the mustard competes with milk-vetch for water, sun, and nutrients. To ensure that the use of herbicides will not result in adverse effects to Coachella Valley milk-vetch, herbicide applications are conducted early in the season when Sahara mustard plants are growing and native plants have not yet emerged. Once again, the implementation of BMPs to avoid spray drift and adherence to label requirements ensures that potential effects are less than significant.

The effects to Coachella Valley milk-vetch of the public uses permitted under Alternative A would be the same as those described for the Coachella Valley fringe-toed lizard.

Potential effects related to research activities are minimized through the SUP approval process and adherence to the conditions outlined in the SUP.

**Birds of Conservation Concern**

Under Alternative A, there are no actions taken specifically to manage for the bird species present on the Refuge, however, actions taken to protect the habitats present on the Refuge do provide benefits to birds. None of the actions that would be implemented under Alternative A, including the use of herbicides and the continuation of current public uses, would result in impacts to sensitive bird species.

**California Species of Special Concern and MSHCP Covered Species**

Impacts to northern harrier, short-eared owl, loggerhead shrike, Le Conte's thrasher, crissal thrasher, summer tanager, yellow-breasted chat, and burrowing owl from implementing Alternative A would be the same as those described for Birds of Conservation Concern.

Coachella Valley Giant Sand Treader Cricket. The potential impacts and benefits to the Coachella Valley giant treader cricket as a result of implementing Alternative A would be similar to those described for the Coachella Valley fringe-toed lizard.

Coachella Valley Jerusalem Cricket. Based on the lack of sighting of this species within the Refuge, it is suspected that it is no longer present on the Refuge. This species, if it did occur on the Refuge, would be subject to the same benefits as the fringe-toed lizard, but would possibly have a low potential for trampling as a result of management actions because it would likely occupy habitat outside of the active dunes beyond the travel of special guided tours. For the most part, however, the potential for adverse effects would be similar to those described for the fringe-toed lizard.

Flat-tailed Horned Lizard. Like the Coachella Valley Jerusalem cricket, the flat-tailed horned lizard prefers the habitats located just beyond the active sand dunes. The potential for adverse effects would be similar to those described for the fringe-toed lizard.

Coachella Valley Round-tailed Ground Squirrel and Palm Springs Pocket Mouse. Both of these species would benefit from the continuation of current management actions, as proposed in Alternative A. Protection of dune habitat and opportunistic control of invasive weeds ensures suitable habitat and foraging opportunities for these species. Glyphosate, the herbicide currently used on the Refuge, is not considered toxic to mammals and proper application of this product would avoid any potential for adverse effects to foraging habitat. Monitoring, public use, and research activities to be implemented under Alternative A would not result in any adverse effects to these species.

**Coachella Valley NWR - Alternative B (Proposed Action)**

**Coachella Valley Fringe-toed Lizard**

Under Alternative B, the proposal to implement an IPM Plan, reestablish mesquite hummocks within the blowsand habitat, develop and implement a sand transport monitoring plan, and increase the Refuge's law enforcement presence on the Refuge would benefit this and other sensitive species endemic to sand dune and sand field habitats.

Pest management under Alternative B would be implemented in accordance with an IPM Plan. Currently, the herbicides that could be used on the site to control invasive weedy plants and/or

invasive shrubs include products with the active ingredients glyphosate, imazapyr, and triclopyr. Glyphosate and imazapyr are not considered toxic to wildlife when applied in accordance with label recommendations. Triclopyr can be slightly toxic to wildlife if treated vegetation is ingested. To avoid any potential for impacts related to the use of triclopyr, application would be limited to spot treatment of invasive plants, applied at low volumes, and applied only in the early spring, prior to the emergence of native annual plants. The implementation of BMPs related to application and spray drift would further reduce the potential for exposure. Other products may be used in the future, provided they are approved in accordance with the procedures described in the IPM Plan.

The reestablishment of mesquite hummocks in and around the dunes would assist in retaining sand on the Refuge, which has become a greater issue now that the County no longer will be relocating sand that blows off the Refuge and onto adjacent streets, back onto the northwestern portion of the Refuge. An increase in law enforcement presence on the Refuge would be expected to reduce unauthorized motorized vehicle activity on sensitive Refuge habitats, reduce trespass onto sensitive habitats, and ensure that trail users stay on the designated trail system.

The effects related to monitoring and public use activities on the Refuge would be the same as those described under Alternative A.

Developing interpretative information related to Refuge resources and importance of protecting those resources that would be displayed off-site would also provide benefits to the lizard.

The Refuge Manager would continue to review research proposals through the SUP process and ensure protection of resources through specific conditions outlined in the SUP.

#### **Coachella Valley Milk-vetch**

The effects to Coachella Valley milk-vetch of implementing Alternative B would be similar to those described for the Coachella Valley fringe-toed lizard. Coachella Valley milk-vetch would derive benefits from the proposal to provide expanded control of invasive weeds and to plant mesquite within the sand dune and sand field habitat. The intent of the mesquite plantings is to develop mesquite hummocks that would trap sand and enhance conditions that support dune species such as Coachella Valley milk-vetch.

#### **Birds of Conservation Concern**

Under Alternative B, a phased enhancement project would be implemented to control invasive weeds and replant native annuals and shrubs. Limited disturbance could occur to birds during the implementation of this action, but phasing would limit amount of disturbance occurring at any one time in this area. When completed, this enhancement program would provide additional opportunities for foraging, nesting, and temporary shelter for migrating birds. The other proposals included under Alternative B would have minimal effects on bird species.

#### **California Species of Special Concern and MSHCP Covered Species**

Impacts to northern harrier, short-eared owl, loggerhead shrike, Le Conte's thrasher, crissal thrasher, summer tanager, yellow-breasted chat, and burrowing owl from implementing Alternative B would be the same as those described for Birds of Conservation Concern.

The potential impacts and benefits to the Coachella Valley giant treader cricket and the Coachella Valley Jerusalem cricket as a result of implementing Alternative B would be similar to those described for the Coachella Valley fringe-toed lizard. The flat-tailed horned lizard would benefit from increased law enforcement, similar to the benefit described for the fringe-toed lizard.

Under Alternative B, the control of non-native invasive weeds would be expanded throughout the Refuge. In addition, habitat enhancement in the form of more aggressive weed control and the planting of native scrubs and annual plants is proposed for the old vineyard site. The proposed enhancement project would result in short term disturbance and some potential for trampling of native species as invasive plants are removed and appropriate native seeds and potted plants are installed.

To more fully understand the potential for disturbance or loss of sensitive native species, prior to conducting habitat enhancement activities in the old vineyard site, a site reconnaissance and survey for sensitive wildlife species (e.g., flat-tailed horned lizard, Coachella Valley Jerusalem cricket, Coachella Valley giant sand treader cricket) would be conducted to determine their presence. If sensitive species are present, measures such as avoiding the use of motorized equipment to control weeds or prepare the site would be incorporated into the scope of the project to avoid significant adverse effects to these species.

Another potential impact related to this enhancement is the introduction of non-native ants during the installation of potted plants. To avoid the introduction of non-native ants or other non-native insects, all soil and potted plants proposed for use on the site would be required to be free of ants and any other potentially invasive insects. This action is intended to protect the site's native ant populations, the primary prey of flat-tailed horned lizards.

The implementation of these measures would reduce the potential for adverse effects to the flat-tailed horned lizard and other sensitive species to less than significant. Once completed, this enhancement project would benefit native species, including the flat-tailed horned lizard.

The activities such as monitoring that are described under Alternative A also would be implemented under Alternative B; therefore, the effects of implementing these activities would be same as those described under Alternative A.

The potential impacts and benefits to the Coachella Valley round-tailed ground squirrel and Palm Springs pocket mouse as a result of implementing Alternative B would be similar to those described for the other sensitive species present on the Refuge.

### **Coachella Valley NWR - Alternative C**

With the exception of how the old vineyard site is treated, the wildlife and habitat management actions described for Alternative B would be essentially the same as those described under Alternative C. Therefore, the effects to Coachella Valley fringe-toed lizard, Coachella Valley milk-vetch, various Birds of Conservation Concern that may be present on the Refuge at some time during the year, Coachella Valley giant sand treader cricket, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse of implementing Alternative C would be same as those described under Alternative B.

The flat-tailed horned lizard and Coachella Valley Jerusalem cricket, if present on the Refuge, would be the most likely sensitive species to be present within the old vineyard site. Under Alternative C, the old vineyard site would be restored to desert scrub habitat. This would

involve restoring the historic landform within the restoration site, removing all non-native vegetation, implementing some initial invasive species control, and then planting and seeding the area with appropriate native vegetation. Each of these steps has the potential for short-term impacts to wildlife, particularly flat-tailed horned lizards. These impacts may be related to ground disturbance, noise, and/or human activity. Prior to any work being conducted on this site, a survey to determine the presence or absence of sensitive species would be conducted. If sensitive species are present, additional analysis in accordance with NEPA would be required to fully assess the potential for adverse effects to these species.

Restoration of this area would ultimately provide benefits to native wildlife in the form of improved habitat quality to support a range of native species.

## 5.6 Effects to Cultural Resources

The NHPA establishes the Federal government's policy on historic preservation and the programs through which that policy is implemented. Relevant policies on historic preservation and associated programs, including the NRHP, were described in Chapter 4. According to the NHPA, historic properties include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places" (16 USC 470w(5)). The criteria used to evaluate eligibility were presented in Chapter 4.

Section 106 (16 USC 470f) of the NHPA requires Federal agencies, prior to taking action, to take into account the effects of their undertaking on historic properties. Specific regulations regarding compliance with Section 106 state that although the tasks necessary to comply with Section 106 may be delegated to others, the Federal agency is ultimately responsible for ensuring that the process is completed according to statute. The four steps in the Section 106 process are:

- Identify and evaluate historic properties;
- Assess adverse effects of the project on historic properties;
- Resolve any adverse effects of the project on historic properties in consultation with the SHPO/Tribal Historic Preservation Officer, and other interested parties, resulting in a Memorandum of Agreement (MOA); and
- Proceed in accordance with the MOA.

An impact to cultural resources would be considered significant if it adversely affects a resource listed in or eligible for listing in the NRHP. In general, an adverse effect may occur if a cultural resource would be physically damaged or altered, isolated from the context considered significant, or affected by project elements that would be out of character with the significant property or its setting. Title 36 CFR Part 800 defines effects and adverse effects on historic resources as follows:

Section 800.5(1) Criteria of Adverse Effects. An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative.

Section 800.5(2) Examples of Adverse Effects. Adverse effects on historic properties include but are not limited to:

- (i) Physical destruction, damage, or alteration of all or part of the property;
- (ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;
- (iii) Removal of the property from its historic location;
- (iv) Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;
- (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- (vi) Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- (vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

### **5.6.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

In accordance with applicable laws and regulations, all proposed actions that involve ground-disturbance in areas that have not been previously disturbed or changes to a structure that was constructed more than 50 years ago must be reviewed to determine the project's potential to affect cultural resources. To initiate this process, the Area of Potential Effects (APE) must be established. The APE is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties. It is not necessary to know that the area in question contains historic properties, or even to suspect that such properties exist, in order to determine the APE. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. In addition, the APE is not always a contiguous area; there may be multiple alternative project sites or multiple areas in which changes are anticipated.

A number of actions on the ground are proposed to implement the CCP. Each action would have its own project-specific APE. As described in Chapter 3, few cultural resource investigations, surveys, or research projects have been conducted within the Refuge, although cultural resources have been identified in the project vicinity.

The potential for archaeological resources to be present within a specific portion of the Refuge varies depending upon the topography, soil types, proximity to water, proximity to food resources, and many other factors. Overall, there is a potential for yet undiscovered buried deposits to be present on the Refuge.

Surveys of those previously unsurveyed areas and determinations of eligibility for any features that have not yet been evaluated would be required prior to the implementation of any ground-disturbing activities necessary to implement wildlife and habitat management, public use, or Refuge operations actions or activities. The potential effect of these activities on cultural resources must be reviewed in accordance with Section 106 and the procedures established by

the Service's Cultural Resources Program to ensure that no adverse effects to known or unknown cultural resources occur as a result of Refuge activities.

To avoid adverse effects to cultural resources under any of the alternatives, when a project is first being considered for implementation that would require ground disturbance, Refuge staff will submit a Request for Cultural Resource Compliance to the Service's Cultural Resources Program. This request is to be submitted as early in the planning process as possible. The Request must include a map, indicating the APE for the project site and any associated access requirements that may involve grading, along with a detailed project description. Based on this information, Cultural Resource staff will determine the appropriate measures to be implemented to protect cultural resources. In instances, such as when a project involving ground disturbance is determined to be located in an area of sensitivity for an archaeological resource, measures may include requiring an archaeological monitor, meeting the Secretary of the Interior's Guidelines, to be present during grading, digging, coring, or any other activity that would affect subsurface materials.

In other instances, it may be determined that the action is a routine undertaking which would have little or no potential to affect historic properties. In this case, the action would fall under the terms of the Service's Programmatic Agreements (PA) with SHPO and the Advisory Council for Historic Preservation (Council) regarding the administration of routine undertakings under the NHPA in the states of California, Idaho, Nevada, Oregon, and Washington.

Through the PA, the Service has identified a process to review in which routine undertakings may fall under the terms of the PA's Appendix A or Appendix B. Appendix A projects are defined as those "types of undertakings requiring consultation with the Regional Archaeologist/Historic Preservation Specialist (Specialist) and otherwise excluded from case-by-case review and consultation with the SHPO and requiring no cultural resource identification effort." Appendix B projects are those "requiring consultation with the Regional Archaeologist/Historic Preservation Specialist and otherwise excluded from case-by-case review and consultation with the SHPO but will be subject to a cultural resource identification effort."

Projects that fall under Appendix A can be cleared by the Specialist with a memo, phone call, or e-mail message and the project can proceed. A project determined to fall under Appendix B requires field reconnaissance. If no historic properties are identified, the Specialist or archaeologist approved by the Specialist can issue clearance and the project can proceed. The Specialist subsequently completes an Appendix B Short Report for the project. All clearances include the stipulation that if cultural resources are discovered during the project, work will halt and the Service's Regional Archaeologist shall be contacted.

The Regional Cultural Resources Team submits an annual report to the SHPO and the Council documenting the number and types of undertakings excluded from case-by-case review under the terms of Appendix A and Appendix B.

If during the course of ground disturbing activities, any cultural resources are discovered, all earthwork on the site must be halted and the Regional Historic Preservation Officer contacted to review the materials and recommend a treatment that is consistent with applicable laws and policies. The treatment plan would likely require the boundaries of the site to be defined before excavation can be reinitiated in an area well away from the discovered resource. In addition, the site would be recorded and evaluated for eligibility to the NRHP. Once this work

is completed, additional measures may be required depending upon the results of the eligibility determination. If any site is encountered that is determined to be eligible to the NRHP, the Service would consult with SHPO, federally recognized tribes, and interested parties.

To identify and preserve traditional cultural properties and sacred sites and to determine the level of confidentiality necessary to protect them, the Refuge would work with interested tribal groups to establish government-to-government relationships that would ensure meaningful consultation with tribal governments during the planning phase of projects. The Refuge Complex should initiate discussions with interested tribal groups to create a Memorandum of Understanding (MOU) to implement the inadvertent discovery clause of NAGPRA. Development of this MOU would involve identifying the Native American tribes, groups, and direct lineal descendants that may be affiliated with Refuge lands, initiating consultation with the affiliated parties, developing procedures to follow for intentional and inadvertent discoveries, and identifying the persons to contact for the purposes of NAGPRA.

With respect to the Salton Sea SCH project, if the restoration location that is ultimately adopted includes lands within the Refuge boundary, the Service, as a cooperating agency, would approve the project location and evaluate the potential presence of cultural resources in the same manner as is described above for other refuge ground-disturbing activities.

Compliance with the procedures described in this section would avoid adverse effects to cultural resources.

#### **Sonny Bono Salton Sea NWR - Alternatives B and C**

The procedures described under Alternative A would also be implemented under Alternatives B and C. In the case of the Red Hill Bay Restoration project, proposed under Alternatives B and C, the potential for impacts to cultural resources has already been evaluated by the Service's Cultural Preservation Officer. An Appendix A determination has been made. This determination indicates that the Service has evaluated the potential impact of the proposed project on cultural resources and no impacts are anticipated. No further cultural resource identification effort is necessary for the project. However, the existence of cultural resources can never be predicted with certainty, therefore, in the event that cultural resources are discovered during project implementation, any ground disturbing activity would be halted. The Service's Regional Archaeologist would be notified and additional consultation would be required. In compliance with the terms of the PA, the project was reported to the SHPO in the annual report, prepared and submitted at the end of fiscal year 2011.

Compliance with the procedures described in this section would avoid adverse effects to cultural resources.

### **5.6.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternatives A, B, and C**

The procedures described under Alternative A for the Sonny Bono Salton Sea NWR would also be implemented for any projects described under Alternatives A, B, or C for the Coachella Valley NWR. Compliance with these procedures would avoid adverse effects to cultural resources.

## 5.7 Effects to the Social and Economic Environment

This section examines the effects of the management alternatives to the social and economic environment in which the two Refuges are located, including effects related to land use, public utilities/easements, economics/employment, and environmental justice. Initial review of potential impacts related to recreational opportunities and transportation facilities/parking indicate that the activities currently occurring on or proposed for these Refuges have no potential to adversely affect existing or planning recreational opportunities or transportation facilities. In addition, the proposed activities would not result in the need to provide off-site parking, nor would they result in impacts to adjacent on or off-street parking.

With regard to land use, this section analyzes the potential land use conflicts between the habitat management and public use proposals presented in each alternative and the existing and planned land uses in the immediate vicinity of the Refuge. Adverse effects related to land use would be considered significant if:

- Substantial incompatibility between proposed uses or activities and adjacent existing uses and uses proposed in approved general plans would occur; or
- Changes in use or the intensity of use are proposed where the resulting activity or use pattern would create substantial increases in noise, traffic, public safety, or similar environmental impacts that would alter community character or conflict with existing uses in the area.

With regard to public utilities/easements, this section analyzes the potential effects of the various management alternatives on existing public utilities and easements in the immediate vicinity of the Refuge. Adverse effects to public utilities and easements would be considered significant if:

- Direct or indirect damage to utilities, utility service, or other public facilities would occur as a result of a proposed action; or
- Disruption of access to a public utility or other facility would occur during implementation of a proposed action.

With regard to economics and employment, this section evaluates the effect of implementing the various alternatives on the regional economy and employment level. Economic or social changes resulting from an action are considered to produce significant effects if they result in a substantial adverse physical change in the environment (e.g., urban blight).

With regard to environmental justice, this section evaluates the potential for adverse human health or environmental effects to minority populations or low-income populations living in the vicinity of the Refuge as a result of implementing the various actions proposed in each alternative. Impacts related to environmental justice would be considered significant if:

- A proposed action would result in disproportionate adverse human health impacts or environmental effects to low-income or minority populations.

## **5.7.1 Effects to Land Use**

### **5.7.1.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

Under Alternative A, the current uses occurring on the Refuge would continue over the next 15 years. These uses, which include wildlife management, crop production intended to reduce depredation of adjacent private farmlands by geese and other waterfowl, and opportunities for public use, are consistent with the land use designations applied to the Refuge lands by the Imperial County General Plan. The designated uses, as shown on the Land Use Plan Map, include Government/Special Public, which cover a majority of Unit 1, Recreation/Open Space, which covers the majority of Unit 2, and Agriculture, which includes a small portion of Unit 1 and portions of the Hazard Tract and Union Tract in Unit 2 (Imperial County 2007b).

The uses occurring on the Refuge are consistent with the land use goals of the Imperial County General Plan. These goals focus on:

- Preserving commercial agriculture, which the Refuge supports through its efforts to minimize depredation of commercial crops;
- Diversifying employment and economic opportunities, which the Refuge supports by providing employment opportunities that require a range of skill sets and providing recreational opportunities, such as hunting and bird watching, which attract out-of-town visitors to the area;
- Achieving balanced economic and residential growth while preserving the unique natural, scenic, and agricultural resources of Imperial County, which the Refuge contributes to by managing habitats to support a significant range of migratory birds, restoring and preserving natural habitat areas along the Salton Sea, and protecting adjacent agricultural fields from depredation by geese;
- Coordinating planning activities among all local jurisdictions and State and Federal agencies, which the Refuge supports through the CCP public outreach process, as well as through routine interactions with the various jurisdictions and agencies in the area; and
- Identifying and preserving significant natural, cultural, and community character resources and the County's air and water quality, which the Refuge supports through its management actions and adherence to Federal, State, and local regulations, ordinances, and mandates.

As described in the draft EIS/EIR, the effects of the Salton Sea SCH project on land use in the immediate vicinity of the project site would include a combination beneficial effects to recreational uses and temporary minimal adverse effects to agricultural uses during construction.

Based on this analysis, the implementation of Alternative A would not conflict with the County's land use goals or designated uses for the current Refuge lands.

The existing uses surrounding the Refuge include commercial agricultural fields, vacant disturbed and undisturbed lands, geothermal power plants, County recreation areas, public roads, irrigation channels and drainage ditches, and the open waters and recently exposed

margins of the receding Salton Sea. The activities proposed under Alternative A would not conflict with these adjacent uses.

Under Alternative A, the areas of the Refuge that until recently were inundated by the Salton Sea would remain exposed for the foreseeable future. Having been inundated by the Salton Sea, the soils are extremely salty and would require intensive reclamation before these areas could be used for purposes such as agriculture. In addition, these areas could become a source of dust, which would contribute to the air basin's existing air quality problems. If dust from these areas becomes an issue, the situation would be inconsistent with one of the land use goals of the General Plan, as described above, and could result in land use conflicts with adjacent properties, particularly if the problem of dust emissions from the site becomes chronic. Such impacts would likely require future mitigation such as the planting salt tolerant tree rows in these areas to create wind breaks, spraying the ground with an environmentally acceptable soil binding agent, or returning water to the site.

Overall, the implementation of the actions proposed under Alternative A would not result in significant adverse effects related to land use, however, the lack of action related to the receding Salton Sea could at some point result in adverse land use effects requiring mitigation.

#### **Sonny Bono Salton Sea NWR - Alternatives B and C**

With the exception of the proposed uses for areas of the Refuge that until recently were submerged beneath the Salton Sea, the wildlife and habitat management actions and public uses proposed under Alternatives B and C would not be substantially different from those proposed under Alternative A. The proposals for minor changes to the public use and expansion of existing management practices intended to improve conditions for wildlife changes would not result in any significant adverse effects to adjacent land uses, nor would these proposals be inconsistent with the land use goals of the Imperial County General Plan (Imperial County 2008a).

The proposal to restore wetland habitat to Red Hill Bay would minimize the potential for future air quality impacts associated with leaving these areas exposed for the foreseeable future. The Red Hill Bay project would occur adjacent to County parkland, therefore, coordination with County Parks is proposed to ensure that the project does not impact existing and future uses within the park.

Geothermal energy exploration and development activities are occurring in the general vicinity of Red Hill Bay, and these uses may ultimately occur along the perimeter of the restoration area; however, no such activities are planned at this time. The restoration proposal is not expected to preclude geothermal production in the general vicinity of the restoration site.

No impacts related to land use are therefore anticipated as a result of implementing Alternative B or C.

### **5.7.1. Coachella Valley NWR**

#### **Coachella Valley NWR - Alternatives A, B, and C**

All of the management alternatives evaluated for implementation on the Coachella Valley NWR would be consistent with the intent, goals, and objectives of the Coachella Valley MSHCP. According to the Final Recirculated Coachella Valley MSHCP EIR/EIS (CVAG 2007b), the MSHCP, having been developed in coordination with the affected local, State, and Federal jurisdictions, does not conflict with any General Plan land use designations, nor does it

conflict with any applicable habitat conservation plan or natural community conservation plan. In addition, implementation of the Coachella Valley MSHCP does not result in the physical separation of a community because the distribution of the Conservation Areas accommodates the physical integrity of the communities.

The management actions to be implemented on the Refuge, including the proposals for habitat enhancement and restoration, presented in Alternatives B and C, respectively, would not result in any conflicts with existing or proposed land uses in the vicinity of the project.

## **5.7.2 Effects to Recreational Opportunities**

### **5.7.2.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternative A (No Action)**

Wildlife and habitat management actions currently implemented on the Refuge provide indirect benefits to the region's recreational opportunities. Specifically, the Refuge provides foraging and resting opportunities for a variety of migratory birds, including waterfowl, which support wildlife observation and hunting activities within and beyond the Refuge boundaries. Under Alternative A, these management activities would continue.

As described in the draft EIS/EIR for the Salton Sea SCH project, the project would increase opportunities for passive recreational activities such as birdwatching and photography.

No changes to the recreational opportunities or public access to recreational opportunities provided in the vicinity of the Refuge would occur as a result of this alternative. Public access onto the Refuge would continue to be restricted to designated roadways and all existing public uses currently permitted on the Refuge would continue as currently implemented. As a result, implementing this alternative would have no adverse effects on the region's recreational opportunities.

#### **Sonny Bono Salton Sea NWR - Alternative B (Proposed Action)**

Alternative B proposes modifications to the existing wildlife and habitat management actions currently implemented on the Refuge. These modifications are intended to improve habitat quality for migratory and resident birds, which would increase to some extent the indirect benefits to the region's recreational opportunities that are described under Alternative A. Waterfowl numbers on and adjacent to the Refuge appear to have decreased in recent years, therefore, the proposals to restore open water habitat in Red Hill Bay, which would improve foraging and loafing opportunities for migratory birds, may result in an increase in waterfowl abundance and potentially improve the quality of the hunt on and adjacent to the Refuge.

Proposals to improve existing public use facilities (e.g., restrooms, trails, interpretative signs) and expand opportunities for wildlife observation by opening two new trails would expand recreational opportunities within the Refuge. No actions proposed under this alternative would adversely affect adjacent recreational opportunities.

#### **Sonny Bono Salton Sea NWR - Alternative C**

Modifications to the existing wildlife and habitat management actions currently implemented on the Refuge, as described under Alternative B, would also be implemented under Alternative C. Therefore, the potential for benefits to the region's recreational opportunities would be the same as those described under Alternative B.

Changes to the existing hunting program in Unit 2's Union Tract are proposed to improve the quality of the goose hunt in this area. Under this proposal, geese would have five days of undisturbed foraging, potentially improving the success of the hunts conducted on Saturdays and Sundays. Further, an additional blind would be constructed, providing the opportunity for four additional hunters to participate in the hunt on Saturdays and Sundays. These actions would not adversely affect hunt programs occurring outside Refuge boundaries.

Opportunities for expanding wildlife observation under this alternative would be limited to Unit 1, with no new birding trails proposed for Unit 2.

The proposal to work with other agencies to develop an auto tour route through the northern portion of the Imperial Valley to interpret the biological, agricultural, water, and energy resources of this region could be designed to support the area's recreational opportunities as well.

### **5.7.2.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternatives A, B, and C**

Wildlife and habitat management actions currently implemented on the Refuge, as well as those proposed under Alternatives B and C would have little if any effect on the region's recreational opportunities. Equestrian and hiking access through the Refuge on a previously designated trail would continue under all alternatives; the remainder of the Refuge would be closed to general public access. Only occasional guided tours of the Refuge's dune habitat would be permitted. These conditions would result in no adverse effects to the region's recreational opportunities, and would provide some benefits to the regional trail system.

### **5.7.3 Transportation/Traffic Circulation**

#### **5.7.3.1 Sonny Bono Salton Sea NWR**

##### **Sonny Bono Salton Sea NWR - Alternatives A, B, and C**

With the exception of increased vehicular traffic during the construction of the proposed wetland restoration projects (i.e., Red Hill Bay, Bruchard Bay [Salton Sea SCH project]), none of the actions proposed under any of these alternatives would generate noticeable increases in traffic volume on the roadways in the general vicinity of the Refuge. The Red Hill Bay and Salton Sea SCH projects would result in some increases in vehicular traffic associated with the transport of people, equipment, and materials to and from the restoration sites during construction, operations, monitoring, and maintenance. The largest increases in traffic would occur during construction, while vehicle use by refuge staff and others during operations, monitoring, and maintenance would be minimal. Based on the existing low traffic volumes on the streets that provide access to these restoration sites, the additional trips that would be generated during peak construction are not anticipated to reduce the level of service on any streets to below LOS C, the accepted standard for Imperial County.

#### **5.7.3.2 Coachella Valley NWR**

##### **Coachella Valley NWR - Alternatives A, B, and C**

The Refuge's consistency with the Coachella Valley MSHCP would ensure that none of the actions proposed under any of the alternatives would result in impacts to the regional

transportation system. In addition, none of the alternatives would generate trips that would impact current capacity levels on existing roads.

## **5.7.4 Effects to Public Utilities/Easements**

### **5.7.4.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternatives A, B, and C**

The effects to public utility easements as a result of the Refuge management and public use proposals included within any of the alternatives would be less than significant. No actions are proposed that would adversely affect existing utilities, IID irrigation/drainage channels, or access easements. Any grading or restoration proposed on the Refuge that could temporarily affect existing easements or access to an existing utility would be coordinated with the appropriate utilities during the project design phase to avoid any temporary access conflicts.

In addition, the proposals presented in the CCP, including restoration at Red Hill Bay and Bruchard Bay, would not preclude the potential for the extension of utility easements through the Refuge. However, the extension of utility easements through the Refuge would require evaluation of potential impacts to the environment, including sensitive Refuge resources, in accordance with NEPA and—because of the presence of listed species on the Refuge—consultation under the Endangered Species Act may also be required. All proposals for a right-of-way on or over lands included within the NWRS would be required to comply with the Rights-of-Way General Regulations included in Title 50, Part 29, Subpart B of the Code of Federal Regulations. Section 29.21 includes the procedures for filing applications and the terms and conditions under which rights-of-way over and across the lands administered by the Service may be granted. No right-of-way will be approved unless it is determined by the Regional Director to be compatible with the purposes for which the Refuge was established.

No significant impacts to public utilities (e.g., water, sewer, electricity, solid waste disposal) would result from implementing any of the proposed management alternatives for the Sonny Bono Salton Sea NWR. Water needs would vary depending upon the alternative, with potentially less irrigation water needed to implement Alternatives B and C once water saving measures (e.g., laser leveling of fields, improved drainage in seasonal wetland area) are implemented, but the overall needs to achieve Refuge purposes would be similar to current usage. The restoration of Red Hill Bay would require additional water, but this water would be diverted from the Alamo River near the northern terminus of the River, therefore, no adjacent lands would be affected.

Management of the Refuge requires irrigation water for its agricultural fields, which are irrigated during the fall/winter growing season to produce forage, currently rye grass, for wintering geese. In addition, water is needed to maintain adequate water levels in managed cattail marshes, and to prepare seasonal wetland areas. Although the Refuge has been receiving water from IID since it was created in 1930, reliable water delivery to meet all of the Refuge's needs in the future is uncertain. In years when the expected water consumption within the entire IID is above its legal allocation, an Equitable Distribution policy will be implemented which will limit IID customers to approximately 5.25 acre-feet per acre. Under this scenario some wetlands or farm fields within the Refuge may not receive needed water late in the calendar year, although the Refuge would attempt to budget its water use throughout the year to avoid this condition. The Service does not have a contract with IID for Refuge water use and, as discussed in Chapter 3, limitations on water use by the District's customers are increasing. In addition, the cost of delivered water could increase significantly

for each acre-foot beyond what the Refuge may afford in the future. Therefore, the Service will continue to work with IID to ensure adequate water is available for the Refuge to meet its wildlife purposes.

#### **5.7.4.2 Coachella Valley NWR**

##### **Coachella Valley NWR - Alternatives A, B, and C**

The effects to public utilities and public utility easements as a result of the management and public use proposals included within the alternatives would be less than significant. No actions are proposed that would adversely affect existing utilities, utility easements, or access easements. Any enhancement or restoration proposed on the Refuge that could temporarily affect access to existing easements or utilities would be coordinated with the appropriate utilities during the project design phase to avoid any temporary access conflicts.

The process and requirements for any potential extension of utility easements through the Refuge would be the same as described above for the Salton Sea NWR.

#### **5.7.5 Health and Safety**

##### **5.7.5.1 Sonny Bono Salton Sea NWR**

##### **Sonny Bono Salton Sea NWR - Alternatives A, B, and C**

Although health and safety issues have been identified for the areas in and around the Salton Sea, including fish advisories and air and dust-borne disease, the actions proposed under any of the alternatives, including restoration proposals, would not exacerbate in the potential for exposure to these existing safety issues by either the public or Refuge personnel. Also, under all alternatives, the Refuge would continue to cooperate with others in year-round monitoring for evidence of avian disease at the Salton Sea, and when necessary to implement actions to minimize the spread of the disease.

Mosquito control is not currently conducted on the Refuge and is not proposed under any of the alternatives. The Refuge has cooperated with Imperial County's Vector Control District in the past, when mosquito surveillance was conducted on the Refuge. No surveillance is currently deemed necessary in this portion of the Imperial Valley. If the situation changes and surveillance and/or control are determined to be necessary, a Special Use Permit along with appropriate NEPA review would be conducted at that time. No actions are proposed on the Refuge under any alternative that would significantly increase available breeding habitat for mosquitoes.

##### **5.7.5.2 Coachella Valley NWR**

##### **Coachella Valley NWR - Alternatives A, B, and C**

No health or safety hazards have been identified for this Refuge. The habitats on the Refuge provide little if any potential breeding habitat for mosquitoes and no surveillance or control of mosquitoes occurs or is proposed on the Refuge.

## **5.7.6 Effects to Population and Employment**

### **5.7.6.1 Sonny Bono Salton Sea NWR**

#### **Sonny Bono Salton Sea NWR - Alternatives A, B, and C**

Contributions to the local economy from the Refuge under any of the alternatives include local employment opportunities with the Service, the purchase of goods and equipment from local businesses to manage wildlife habitats and public use program supported on the Refuge, occasional hiring of contractors to implement actions on the Refuge in support of Refuge purposes, and the economic benefits derived from an estimated 15,000 to 20,000 visitors annually, the majority of whom are considered non-resident visitors living more than 50 miles away from the Refuge. Implementing the Red Hill Bay and Salton Sea SCH restoration projects would also generate a temporary increase in the demand for construction workers and truck drivers. Although these contributions represent a benefit to the region, the total benefit is relatively small in the context of the overall regional economy.

Studies indicate that non-resident visitors to an area (i.e., tourists) usually buy a wide range of goods and services during their visit. Major expenditures may include lodging, food, supplies, and gasoline. Spending associated with refuge visitation has the potential to generate considerable economic benefits for the local communities (Sexton et al. 2011). For example, more than 34.8 million visits were made to national wildlife refuges in fiscal year 2006; these visits generated \$1.7 billion in sales, almost 27,000 jobs, and \$542.8 million in employment income in regional economies (Carver and Caudill 2007).

In 2004, as part of a larger analysis of the economic benefits of national wildlife refuges, an analysis of the economic benefits to Imperial County as a result of visitation to the Sonny Bono Salton Sea NWR was conducted (Caudill and Henderson 2005). The results of this analysis indicated that the 24,728 visitors to the Refuge in 2004, of which about 73 percent were non-residents, generated seven jobs (both full-time and part-time) with a total job income of \$182,200. In addition, visitor expenditures in 2004 were \$489,200 with non-residents accounting for \$460,000 (94 percent of total expenditures), and the total monetary value of economic activity generated in the county by refuge visitor spending was \$622,700 (Caudill and Henderson 2005). Visitation is somewhat lower today, around 16,000 visitors in 2010, therefore, the economic benefits, albeit positive, would be slightly lower as well.

Another economic benefit of refuge management under any of the alternatives relates to the benefits to surrounding farmers of providing foraging opportunities for geese and other waterfowl on the Refuge and reducing the potential for crop loss to surrounding commercial fields.

### **5.7.6.2 Coachella Valley NWR**

#### **Coachella Valley NWR - Alternatives A, B, and C**

A fiscal impact analysis was prepared to quantify the potential impacts of the build out of the Coachella Valley MSHCP on the Coachella Valley's regional economy. The results of this analysis, which demonstrated that the overall impacts to the regional economy are less than significant, are summarized in the Final Recirculated Coachella Valley MSHCP EIR/EIS (CVAG 2007b). The EIR/EIS states that discussion of impacts was directed toward aggregate or average impacts in the region, rather than impacts on an individual, firm, or property

(CVAG 2007b). The EIR/EIS concludes that overall, the implementation of the MSHCP, which includes the preservation of the habitats included within the Coachella Valley NWR, would not significantly constrain development potential within the larger MSHCP Plan Area.

Because visitation to the Refuge is limited, the Refuge generates little, if any, economic benefits from visitors to the Refuge.

The effects to the regional economy and employment base of implementing any of the management alternatives for the Coachella Valley NWR are nominal. Therefore, the implementation of the CCP would have no measurable benefit or impact to the local economy.

## **5.7.7 Effects to Environmental Justice**

### **5.7.7.1 Sonny Bono Salton Sea NWR and Coachella Valley NWR**

On February 11, 1994, the President issued Executive Order 12898 (“Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”) requiring that all Federal agencies achieve environmental justice by “identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.” Environmental justice is defined as the “fair treatment for peoples of all races, cultures, and incomes, regarding the development of environmental laws, regulations, and policies.”

The mission of the Service is working with others to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people. The developing environmental justice strategy of the Service extends this mission by seeking to ensure that all segments of the human population have equal access to America’s fish and wildlife resources, as well as equal access to information that will enable them to participate meaningfully in activities and policy shaping. Within the spirit and intent of Executive Order 12898, no minority or low-income populations would be impacted by any Service action proposed for any alternative on either the Sonny Bono Salton Sea NWR or the Coachella Valley NWR.

## **5.8 Unavoidable Adverse Impacts**

### **Sonny Bono Salton Sea NWR and Coachella Valley NWR**

None of the alternatives considered for either Refuge are expected to result in unavoidable adverse impacts on the environment. Where the potential for such effects has been identified, appropriate mitigation measures have been incorporated into the project scope to avoid or minimize adverse effects. In addition, monitoring of the Refuges’ resources would be conducted as part of any proposed management action to enable Refuge staff to identify and analyze management results and adapt management policies should any unforeseen problems arise.

## **5.9 Irreversible and Irretrievable Commitments of Resources**

### **Sonny Bono Salton Sea NWR and Coachella Valley NWR**

Most management actions identified in this document would require a commitment of funds that would then be unavailable for use on other Service projects. At some point, commitment of funds to these projects would be irreversible, and once used, these funds would be irretrievable. Non-renewable or non-recyclable resources committed to projects identified in the CCP would represent irreversible and irretrievable commitments of resources, such as fuel for Refuge vehicles and construction equipment; electricity for office and maintenance operations; supplies used in

management or maintenance activities (e.g., herbicide, fencing, building material, signs); and construction materials needed for improvements to and/or construction of trails and parking areas.

## **5.10 Short-term Uses versus Long-term Productivity**

### **Sonny Bono Salton Sea NWR and Coachella Valley NWR**

An important goal of the System is to maintain the long-term ecological productivity and integrity of the biological resources on refuges. This system-wide goal is the foundation for the goals presented in the CCP for each Refuge. The implementation of Alternatives B and C for both Refuges would involve increased management of wildlife and habitats and, in the case of the Sonny Bono Salton Sea NWR, improvements to and limited new development of facilities and programs to support visitors. The resulting long-term productivity would include increased protection and survival of listed and sensitive species, as well as a myriad of other native plant and animal species. The public also would gain through long-term opportunities for wildlife-dependent recreational activities that would be provided on the Sonny Bono Salton Sea NWR.

## **5.11 Cumulative Effects**

Cumulative effects (impacts) are those effects on the environment resulting from incremental consequences of the Service's proposed actions when added to other past, present, and reasonably foreseeable future actions, regardless of who undertakes these actions. Cumulative effects can be the result of individually minor impacts, which can become significant when added over time.

Accurately summarizing cumulative effects is difficult in that while one action increases or improves a resource in an area, other unrelated actions may decrease or degrade that resource in another area. As stated in the Service Manual (550 FW 1), in an EA, a cumulative impact assessment should be conducted if it is determined necessary through scoping to make a determination of significance of the proposed action. When a cumulative effects analysis is included in an EA, the analysis need only be sufficient for the decision maker to reach a conclusion on the significance of the impact in order to determine if the preparation of an EIS is required.

### **5.11.1 Sonny Bono Salton Sea NWR**

In conducting this analysis, the interaction of activities at the Sonny Bono Salton Sea NWR with other actions occurring over a larger spatial reference and a temporal reference of about 15 years (the intended life of this CCP) has been considered. For purposes of this analysis, a list of recently approved, currently proposed, and reasonably foreseeable future projects within the vicinity of the Refuge has been compiled and is presented below.

Salton Sea Ecosystem Restoration Program. The State of California Natural Resources Agency, through the Departments of Water Resources and CDFW, has been charged with undertaking a restoration study to determine a preferred alternative for restoration of the Salton Sea ecosystem and the protection of wildlife dependent on that ecosystem. The objectives of the restoration are: 1) restore long-term stable aquatic and shoreline habitat for the historic levels and diversity of fish and wildlife that depend on the Salton Sea; 2) eliminate air quality impacts from restoration projects; and 3) protect water quality through control of salinity, nutrient, and selenium levels. The Salton Sea Ecosystem Restoration Program is coordinating efforts between the Legislature, various Federal, State, and local agencies, stakeholders, and the general public to implement restoration activities at the Salton Sea in conformance with these objectives. In addition, infrastructure must be developed to manage available water supplies to accomplish the restoration objectives. Such infrastructure may

include barriers to partition the Salton Sea, potential water conveyance structures (pipelines, canals), and water treatment facilities.

Alamo and New River Wetlands Sites. There are four functioning constructed wetlands and sedimentation ponds along the New and Alamo rivers. These wetlands were constructed to help improve water quality of drainage water flowing to the Salton Sea by directing water through functioning freshwater basins where natural biologic processes could help reduce nutrient loads. Water quality is improving in these pilot projects which, if expanded, could help improve water quality used from the Alamo River at Red Hill Bay.

Water Conservation Agreement. A water conservation agreement was signed in 1988 between IID and the Los Angeles Metropolitan Water District (MWD) to transfer 100,000 acre feet of water from the Imperial Valley to MWD. This loss of water to the Imperial Valley is being realized at the Sea today. Ongoing farm water conservation practices continue to be implemented in the Imperial Valley. Reduced water flows in the Alamo River may increase nutrients and selenium in the drainage water in the future.

Quantification Settlement Agreement (QSA). The QSA is a multi-party agreement that quantifies the IID and CVWD rights to Colorado River water and allows for transfers of up to 300,000 acre-feet of conserved water from IID to other California users. The QSA was signed in 2003 and is expected to be fully implemented by 2016.

Salton Sea SCH Project. The State of California, in partnership with the USACOE, is proposing to implement a SCH project at the south end of the Salton Sea as an early-start habitat restoration project that could be accomplished sooner than a full Salton Sea restoration project. The project concept is to create habitat suitable for sustaining a Salton Sea fish population in the event that the Salton Sea fishery collapses due to declining habitat conditions. Potential project sites include approximately 2,000 to 4,000 acres near the Alamo, New, or Whitewater River deltas. In 2011, the State identified restoration in the New River/Bruchard Bay area as their preferred location for restoration, although as of December 2012, the draft EIS/EIR has not been finalized. The Service is a cooperating agency on this proposed project and would use the EIS/EIR to authorize construction activities on Refuge-managed land.

The projects included in the cumulative effects analysis range from actions that would result in a decline in the volume of water entering the Salton Sea to actions seeking to restore open water habitat within the Sea with adequate water quality to support fish and fish-eating birds. Of the five projects listed above, three of the projects have already been implemented and the project effects are ongoing (Alamo and New River wetland sites, Water Conservation Agreement, Quantification Settlement Agreement). We have considered the ongoing effects of these three projects in the chapter describing the Refuge Environment and have also considered these effects in developing a range of management alternatives, particularly, the effect of ongoing loss of inflow to the Salton Sea. The Salton Sea Ecosystem Restoration Program is still in the planning phase and no specific restoration projects have been identified for implementation. Therefore, the discussion below focuses primarily on the cumulative effects of the management alternatives identified in the CCP with the potential implementation of the Salton Sea SCH Project.

### **Cumulative Effects to the Physical Environment**

Alternative A: Under the No Action Alternative, management activities that would disturb the physical environment would be very limited. Our work under this alternative is focused on continuing to manage agricultural areas, monitoring various species, general refuge maintenance, and coordinating with neighbors and other partners. Under Alternative A, as well as under the

action alternatives, the Salton Sea SCH project may be implemented. The potential environmental effects of the Salton Sea SCH project are thoroughly described in the draft EIS/EIR for that project. Generally, the environmental effects to the physical environment, particularly water and air quality, can be sufficiently minimized during implementation by using best management practices. The exact best management practices to be adopted will be described in the final EIS/EIR and the subsequent Record of Decision. However, the draft EIS/EIR does identify impacts to air quality that, although temporary, are significant and unavoidable. Implementation of Alternative A would not measurably degrade short-term or long-term air quality in the region and therefore would have no cumulative impacts to air quality. Implementation of Alternative A would have minimal effects to other physical resources such as topography, GHG emissions, hydrology, and agricultural resources and would not contribute to cumulative impacts to these resources.

Alternatives B and C: Refuge management activities would increase under both of these action alternatives by improving interpretive trails, improving habitat for listed species, implementing predator management, implementing an integrated approach to pest management, improving management of agricultural fields, and implementing the phased restoration of 420 acres of shallow water habitat in Red Hill Bay. The direct and indirect impacts of the action alternative, including the Red Hill Bay project are discussed in sections 5.1 through 5.10 of this chapter. As discussed above, we have identified best management practices that will minimize effects to the physical environment while increasing refuge management activities and implementing the Red Hill Bay project. Best management practices are sufficient to fully mitigate the temporary increases in GHG emissions and particulate matter during construction of the Red Hill Bay project. In addition, best management practices have been incorporated in to the Red Hill Bay project and the Integrated Pest Management Plan that when implemented will minimize the potential for impacts to water quality. The Salton Sea SCH project also proposes to implement best management practices to protect water quality.

Impacts from the operation of construction equipment associated with restoration and facilities improvements or maintenance, although relatively short in duration, would contribute incrementally to the overall concentration of fugitive dust and particulate matter in the air, as well as incrementally contribute to temporary increases in ozone levels within the Region. In addition, these operations would result in the generation of GHG emissions. The cumulative effect of these temporary increases in air emissions is difficult to quantify because the projects would be implemented at different times, with only a portion of the projects occurring at any given time. The Red Hill Bay project is likely to be constructed prior to the Salton Sea SCH project; therefore, the increased construction related emissions would not contribute to cumulative adverse air quality. Should both the Red Hill Bay and the Salton Sea SCH project be approved and the construction schedules converge, we would work with partners to ensure that both are staged to minimize cumulative air quality impacts. Therefore, the cumulative contributions from this project to the local, regional, and global environment are not considered significant.

### **Cumulative Effects to Biological Resources**

Alternative A: We would maintain the current management practices and public use program under Alternative A. This alternative would have long-term benefits for native wildlife species and habitats within the Refuge. Construction activities would be very limited under this alternative. Implementation of the Salton Sea SCH project would result in construction-related impacts to vegetation and wildlife. These impacts would be mitigated during and after construction. The federally listed desert pupfish could be adversely affected by the Salton Sea SCH project, and consultation under section 7 of the ESA is proceeding independently of the CCP to identify conservation measures that would reduce the potential for adverse effects to this species.

Implementation of Alternative A of the CCP would not result in any cumulative adverse effects to vegetation or wildlife.

Alternatives B and C: The proposals to improve habitat management techniques and restore wetland and upland habitat quality, as described under Alternatives B and C, would result in benefits to vegetation and wildlife. Both the Salton Sea SCH project and the Red Hill Bay project would restore important migratory bird foraging habitat that has been lost to a receding Salton Sea. Potential effects to desert pupfish as a result of the restoration work proposed in the Red Hill Bay area have been minimized through a combination of conservation measures and project design features, and measures to avoid impacts to desert pupfish in other management areas within the Refuge would be implemented in consultation with CDFW to avoid or minimize adverse effects during Refuge maintenance projects.

Disturbance to wildlife from the operation of construction equipment associated with restoration in Red Hill Bay and Bruchard Bay, as well as with facilities improvements or maintenance, would be short in duration and would be scheduled to avoid the avian breeding season. In addition, disturbance, particularly disturbance related to the major restoration projects, would occur at different times and at locations that are separated by many miles, therefore, cumulative effects to wildlife as a result of these operations are not anticipated. Because the Red Hill Bay project is not in the same physical area as the Salton Sea SCH project, no cumulative adverse impacts to vegetation from construction activities are anticipated. Implementation of both projects should however provide synergistic benefits to the wildlife support at the Salton Sea.

#### **Cumulative Effects to Cultural Resources**

Under any of the alternatives, activities on the Refuge would be implemented in accordance with policies and regulations pertaining to the protection of cultural resources. Neither the Salton Sea SCH project nor the Red Hill Bay project are expected to result in any adverse effects to cultural resources and measures are incorporated into the project design for these projects, as well as in the CCP for other Refuge projects to address the inadvertent discovery of cultural resources. Therefore, no cumulative effects to cultural resources from the implementation of the CCP under any alternative are anticipated.

#### **Cumulative Effects to the Social and Economic Environment**

The proposals included under Alternatives A, B, or C would have little if any effect on issues related to land use, transportation, public services, or environmental justice; therefore, the cumulative contributions from this project to the local and regional social environment are not considered significant.

The economic effects to the region of implementing the CCP under any of the alternatives are insignificant and would not have any cumulative effect either positively or negatively on the regional or local economy.

#### **5.11.2 Coachella Valley NWR**

The management proposals included in the CCP for the Coachella Valley NWR under any of the three alternatives would have such a minimal effect on the environment, that there is no potential for the actions to contribute directly or cumulatively to adverse effects related to the physical, biological, or social and economic environment. In addition, adherence to the State and Federal policies and regulations pertaining to the protection of cultural resources would avoid or mitigate any significant adverse effects as a result of implementing the limited actions proposed in the CCP. Therefore, in accordance with Service Manual (550 FW 1), a cumulative impact assessment will not

be conducted for the actions proposed for this refuge, as it has not been deemed necessary to make a determination of significance.

### 5.12 Summary of Effects

Provided in Table 5-6 is a summary of the potential effects associated with each of the alternatives evaluated for the Sonny Bono Salton Sea NWR.

<b>Table 5-6                      Summary of Potential Effects of Implementing Management Alternatives A, B, or C                      for the Sonny Bono Salton Sea NWR</b>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
<b>Physical Environment</b>			
Topography/ Visual Quality	Proposed actions would involve minimal changes to the landform; therefore, no adverse effects to the Refuge’s topographic or visual character are anticipated.	New management practices, habitat restoration, and public use and facilities improvements would not significantly impact the topographic or visual character of the area.	The effects of implementing Alternative C would be essentially the same as described for Alternative B.
Geology/Soils	The management actions and public uses that occur on the Refuge would not trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion that would adversely affect on-site or adjacent resources or facilities.	Expanded wildlife and habitat management would not increase erosion; BMPs to be implemented during restoration in the historical footprint of the Salton Sea would minimize the potential for soil and wind erosion during grading. Berms have been designed to reduce the potential for failure due to ground shaking or liquefaction.	Same as Alternative B
Paleontological Resources	No adverse effects to paleontological resources are anticipated. Protection of these resources, should they be inadvertently discovered, would occur in compliance with all applicable policies and regulations. Prohibitions on collecting paleontological resources would be enforced.	To avoid any significant impacts to paleontological resources, where excavation is proposed that would exceed five feet in depth, a paleontological monitoring plan would be prepared and implemented.	Same as Alternative B
Alternative Energy Resources	Unit 2 includes lands designated as a geothermal resource area; continued coordination with IID on proposals effecting lands currently leased to the Service would avoid conflicts with geothermal energy proposals.	Same as Alternative A	Same as Alternative A

**Table 5-6  
Summary of Potential Effects of Implementing Management Alternatives A, B, or C  
for the Sonny Bono Salton Sea NWR**

<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Agricultural Resources	Although lands managed in Units 1 and 2 are designated as Prime Farmland or Farmland of Statewide Importance, current refuge management does not alter the existing quality of these farmlands. In addition, the Refuge is managed to protect adjacent commercial crops from depredation by geese.	Same as Alternative A	Same as Alternative A
Hydrology	Although Units 1 and 2 are located in areas of possible flood hazard, the habitats and facilities maintained in these areas have limited potential for catastrophic damage as a result of a flood event. No impacts to upstream properties are anticipated as a result of Refuge actions.	Effects described under Alternative A would also apply to Alternative B. The proposed restoration in Red Hill Bay would divert a limited amount of water (10 cubic feet/second) from the Alamo River into the proposed restoration site. This diversion would not affect downstream water rights, nor would it significantly alter the existing hydrology in the area. Proposed berms would not impede or alter existing drainage patterns.	Same as Alternative B
Water Quality	BMPs are implemented to reduce the potential for pollutants and excessive siltation to enter wetlands or irrigation/drainage channels. All pesticide use is approved via the Service's PUPS to ensure that only those products that pose the lowest toxicity-related threat to non-target species are applied.	BMPs for pesticide use would be implemented per the IPM Plan. In addition, a variety of BMPs would be implemented during the restoration of Red Hill Bay. With the implementation of appropriate BMPs and adherence to the measures outlined in the SWPPP, no adverse effects to water quality are anticipated.	Same as Alternative B
Climate Change	The actual effects to Refuge resources as a result climate change are difficult to predict; under Alternative A, management would continue as currently implemented.	Future management actions, as proposed in Alternative B would attempt to measure and address the effects of climate change on Refuge resources through monitoring and adaptive management.	Same as Alternative B

<p align="center"><b>Table 5-6</b>  <b>Summary of Potential Effects of Implementing Management Alternatives A, B, or C</b>  <b>for the Sonny Bono Salton Sea NWR</b></p>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Air Quality	Proper maintenance of vehicles, minimizing the generation of fugitive dust during refuge operations, minimizing the need to burn fields, and implementing BMPs when applying herbicides reduce the effects of Refuge operations on air quality to below a level of significance.	Incorporation of BMPs to reduce emissions and fugitive dust during open water restoration would minimize air quality impacts. In addition, BMPs to reduce the effects of herbicide application on air quality would be implemented per the requirements of the IPM Plan and Chemical Profiles.	Same as Alternative B
Greenhouse Gas Emissions	GHG emissions associated with Refuge management and operations would not represent a significant direct or indirect impact on the environment.	Same as Alternative A	Same as Alternative A
Contaminants	Refuge staff would continue to work with the Service's Contaminants Program to evaluate potential sources of environmental contaminants on the Refuge and to ensure that contaminants issues are appropriately addressed.	Same as Alternative A	Same as Alternative A
<b>Biological Resources</b>			
Habitat/ Vegetation Resources	No adverse impacts to managed habitats or native vegetation would result; invasive plant control would be implemented to avoid non-target habitat areas and control of invasive plants would likely improve overall habitat quality.	Improved management of the agricultural fields and the restoration of Red Hill Bay would improve habitat quality and would result in limited, if any, adverse effects to native habitat. Implementing BMPs during herbicide application would avoid impacts to non-target vegetation.	Same as Alternative B
Wildlife	Measures are implemented to minimize disturbance to wildlife due to management actions and non-consumptive public use; hunting is restricted to designated areas in Unit 2, providing undisturbed habitat in Unit 1 for waterfowl, shorebirds, and geese during migration and overwintering.	Same as Alternative A, along with additional measures (e.g., BMPs, minimizing activities during the breeding season) to reduce disturbance during restoration of open water habitat. Predator management would not adversely affect the local or regional population of coyotes or raccoons.	Same as Alternative B

**Table 5-6  
Summary of Potential Effects of Implementing Management Alternatives A, B, or C  
for the Sonny Bono Salton Sea NWR**

<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Federally Listed Species	Current activities on the Refuge do not adversely affect Yuma clapper rail or its habitat; desert pupfish are not actively managed on the Refuge, but BMPs are implemented to protect water quality in potential habitat areas; potential impacts from the Salton Sea SCH project are being addressed by the State; and BMPs and actions such as minimizing activities during the breeding season are implemented to avoid impacts to any California least tern, southwestern willow flycatcher, and least Bell's vireo should they be present.	Same as Alternative A plus a step-down Yuma clapper rail habitat management plan will be prepared to address long term management of clapper rail habitat on the Refuge and measures to minimize impacts to rails associated with habitat management actions will be addressed. Monitoring to determine if desert pupfish are present on the Refuge will be implemented in coordination with CDFW and measures have been incorporated into the Red Hill Bay restoration project to avoid take of this species.	Same as Alternative B.
State Listed Species	BMPs and actions such as closing portion of the Refuge to public access and minimizing activities during the breeding season and peak migration periods are implemented to minimize impacts to state listed species.	Same as Alternative A plus the implementation of additional BMPs as part of the IPM Plan and proposed restoration projects.	Same as Alternative B
Other Species of Concern	Same as described for federally and State listed species.	Same as described for federally and State listed species.	Same as described for federally and State listed species.
<b>Cultural Resources</b>			
Historical and Archaeological Resources	Adherence to existing regulations/policies would minimize the potential for impacts to cultural resources.	Same as Alternative A; no potential for adverse effects due to restoration in Red Hill Bay were identified.	Same as Alternative B
<b>Social and Economic Environment</b>			
Land Use	Uses occurring on the Refuge are consistent with the Imperial County General Plan and no adverse effects to adjacent land use would occur as a result of continued Refuge management and operations.	Expansion of wildlife and habitat management activities and expanded opportunities for wildlife dependent recreational use would have no effect on existing or planned land uses in the vicinity of the Refuge.	The changes in habitat management and public use activities proposed under Alternative C would have no effect on existing or planned land uses in the vicinity of the Refuge.

<b>Table 5-6                      Summary of Potential Effects of Implementing Management Alternatives A, B, or C                      for the Sonny Bono Salton Sea NWR</b>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Recreational Opportunities	Current Refuge operations result in no adverse effects to the existing recreational opportunities in the vicinity of the Refuge and the public uses permitted on the Refuge benefit the region.	Improvements to existing public use facilities on the Refuge and the expansion of bird watching opportunities will provide moderate benefits to the region.	Eliminating Wednesday hunting on the Union Tract is intended to improve the quality of goose hunting on Saturdays and Sundays.
Transportation/Traffic Circulation	No impacts to the regional transportation system or local or regional traffic circulation are anticipated.	Same as Alternative A	Same as Alternative A
Public Utilities/Easements	No adverse effects to existing public utilities and easements in the immediate vicinity of the Refuge are anticipated.	Same as Alternative A	Same as Alternative A
Health/Safety	Health or safety issues identified in and around the Refuge would not represent a significant adverse effect to the public or Refuge personnel.	Same as Alternative A	Same as Alternative A
Population/Employment	Although the Refuge provides some economic benefits related to visitation and protection of commercial crops, these benefits are relatively minor from a regional perspective.	Same as Alternative A	Same as Alternative A
Environmental Justice	No disproportionate adverse impacts on minority or low-income residents in the region have been identified.	Same as Alternative A	Same as Alternative A

Table 5-7 provides a summary of the potential effects associated with each of the alternatives evaluated for the Coachella Valley NWR.

<b>Table 5-7 Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR</b>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
<b>Physical Environment</b>			
Topography/ Visual Quality	Management and public use activities currently implemented on the Refuge require minimal, if any, alteration of the existing landform; therefore, no adverse effects to the existing topographic or visual character of Refuge lands are anticipated.	Expanded management actions would have limited effects on the existing landform and visual quality of the site; therefore, no adverse effects to the Refuge's existing topographic or visual character are anticipated.	Effects to topography and visual quality would be essentially the same as those described under Alternative B. Restoration of the old vineyard site would not significantly alter the site's landform or visual quality.
Geology/Soils	The management actions and public uses that occur on the Refuge would not trigger or accelerate substantial slope instability, subsidence, ground failure, or erosion that would adversely affect on-site or adjacent resources or adjacent facilities. There are no buildings on this Refuge.	Increased invasive species control would not result in adverse effects related to soil stability or geological hazards. No structures are proposed for construction on the Refuge under this alternative.	To reduce the potential for impacts associated with erosion and sedimentation to less than significant, plans to restore the old vineyard site to native habitat would include the implementation of BMPs such as dust control measures, silt fencing, and fiber rolls. No structures are proposed.
Paleontological Resources	No adverse effects to subsurface paleontological resources are anticipated under this alternative. Protection of these resources, should they be inadvertently discovered, would occur in compliance with all applicable policies and regulations. In addition, Federal regulations that prohibit the collection of paleontological resources will be enforced on lands managed by the Service.	Same as Alternative A	Same as Alternative A

**Table 5-7  
Summary of Potential Effects of Implementing Management Alternatives A, B, or C  
for the Coachella Valley NWR**

<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Alternative Energy Resources	The Refuge is managed consistent with the Coachella Valley MSHCP, which was developed to ensure a balance between habitat protection and economic development. Projects such as alternative energy plants would be constructed on lands located outside of core habitat areas; therefore, the potential impacts to alternative energy resources as a result of implementing any of the management alternatives considered for this Refuge would be less than significant.	Same as Alternative A	Same as Alternative A
Agricultural Resources	Although about 400 acres of the Refuge are classified by the State as Farmland of Local Importance, this classification was applied prior to Refuge establishment when the land was under cultivation by a private entity. Today, the Refuge is managed consistent with the Coachella Valley MSHCP, which was developed to ensure a balance between habitat protection and economic development. Agricultural uses are to be located outside of core habitat areas in areas designated for future development. The potential impacts to agricultural resources as a result of implementing any of the alternatives are therefore considered less than significant.	Same as Alternative A	Same as Alternative A

<b>Table 5-7 Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR</b>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Hydrology	The actions proposed under all alternatives would have no measurable effect on the rate or amount of surface runoff from the site. Groundwater overdraft in the area has adversely affected Refuge vegetation. Coordination with CVWD is necessary to ensure that adequate groundwater levels are maintained in the vicinity of the Refuge and that no adverse effects to groundwater levels would occur as a result of future flood control projects.	Same as Alternative A	Same as Alternative A
Water Quality	Periodic application of herbicides to control invasive plants would be conducted in accordance with label requirements and the BMPs required as part of PUPS approval. As a result, no significant adverse effects to water quality are anticipated.	Adherence to label requirements and implementation of BMPs presented in the IPM Plan and Chemical Profiles would reduce the potential for adverse effects to water quality to below a level of significance.	Same as Alternative B
Climate Change	The actual effects to Refuge resources as a result climate change are difficult to predict; under Alternative A, management would continue as currently implemented.	Future management actions, as proposed in Alternative B would attempt to measure and address the effects of climate change on Refuge resources through monitoring and adaptive management.	Same as Alternative B
Air Quality	Current refuge management results in minimal air emissions, therefore, the effects of current operations are insignificant.	Impacts to local air quality from herbicide use would be mitigated through the implementation of the BMPs in the IPM Plan and Chemical Profiles; dust control would be implemented as a part of habitat enhancement.	Same as Alternative B

<b>Table 5-7                      Summary of Potential Effects of Implementing Management Alternatives A, B, or C                      for the Coachella Valley NWR</b>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Greenhouse Gas Emissions	GHG emissions associated with Refuge management and operations would not represent a significant direct or indirect impact on the environment.	Same as Alternative A	Same as Alternative A
Contaminants	No contaminant issues have been identified on the Refuge.	Same as Alternative A	Same as Alternative A
<b>Biological Resources</b>			
Habitat/Vegetation Resources	No adverse impacts to existing native habitats or vegetation would occur as a result of continued habitat management.	Increased control of invasive plants and establishment of mesquite hummocks would improve habitat quality.	Same as Alternative B
Wildlife	Habitat management, species monitoring, and limited public use are conducted in a manner that avoids significant adverse effects to wildlife.	Expanded invasive plant control, species monitoring, and habitat enhancement are not expected to significantly affect sensitive wildlife species.	Habitat restoration on the old vineyard site could impact sensitive species such as the flat-tailed horned lizard. Site surveys and additional measures would be required to ensure that no adverse effects to sensitive species would occur.
Federally Listed Species	To avoid significant disturbance and injury, all monitors are well versed in how to minimize potential impacts to the Coachella Valley fringe-toed lizard and Coachella Valley milk-vetch during monitoring. BMPs are implemented in association with herbicide application to avoid impacts to listed species.	Actions proposed under Alternative B would improve habitat conditions for federally listed species; no significant adverse effects are anticipated.	Same as Alternative B
State Listed Species	The only State listed species known to occur on the Refuge is the Coachella Valley fringe-toed lizard, which is addressed under federally listed species.	Same as described under federally listed species.	Same as described under federally listed species.

<b>Table 5-7 Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR</b>			
<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Other Species of Concern	Same as described under federally listed species.	Prior to conducting habitat enhancement activities on the old vineyard site, a site reconnaissance and survey for sensitive wildlife species would be conducted; if sensitive species are present, measures to avoid impacts to these species would be implemented. In addition, container plants to be installed must be free of all non-native insects, particularly ants.	Same as Alternative B
<b>Cultural Resources</b>			
Historical and Archaeological Resources	Adherence to existing regulations/policies would minimize the potential for impacts to cultural resources.	Same as Alternative A	Same as Alternative A
<b>Social and Economic Environment</b>			
Land Use	Management actions occurring on the Refuge are consistent with the Coachella Valley MSHCP and no adverse effects to adjacent land use would occur as a result of continued Refuge management and operations.	Proposed modifications to current habitat management and Refuge operations under Alternative B would have no effect on existing or planned land uses in the vicinity of the Refuge.	Proposed modifications to current habitat management and Refuge operations would have no effect on existing or planned land uses in the vicinity of the Refuge.
Recreational Opportunities	Current refuge management would result in no adverse effects to the region's recreational opportunities, and would provide some benefits to the regional trail system.	Same as Alternative A	Same as Alternative A
Transportation/ Traffic Circulation	No impacts to the regional transportation system or local or regional traffic circulation are anticipated.	Same as Alternative A	Same as Alternative A
Public Utilities/ Easements	No adverse effects to existing public utilities and easements in the immediate vicinity of the Refuge are anticipated.	Same as Alternative A	Same as Alternative A

**Table 5-7**  
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C**  
**for the Coachella Valley NWR**

<b>Resource</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>
Health/Safety	No health or safety issues have been identified.	Same as Alternative A	Same as Alternative A
Population/ Employment	Effects to economics and employment both locally and regionally would be negligible.	Same as Alternative A	Same as Alternative A
Environmental Justice	No disproportionate adverse impacts on minority or low-income residents in the region have been identified.	Same as Alternative A	Same as Alternative A

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