# *Appendix F*

# *Finding of No Significant Impact and Environmental Assessment*

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## *Sonny Bono Salton Sea National Wildlife Refuge Complex Comprehensive Conservation Plan*

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**U. S. Department of the Interior**
**Fish and Wildlife Service**
**Region 8 - Pacific Southwest Region**

# FINDING OF NO SIGNIFICANT IMPACT (FONSI)

**Environmental Assessment for the**
**Sonny Bono Salton Sea National Wildlife Refuge Complex**
**(Sonny Bono Salton Sea NWR and Coachella Valley NWR)**
**Comprehensive Conservation Plan**
**Imperial County and Riverside County, California**

The U.S. Fish and Wildlife Service (Service) has completed the Comprehensive Conservation Plan (CCP) and environmental assessment (EA) for the Sonny Bono Salton Sea National Wildlife Refuge Complex (NWRC). The CCP will guide the management of the Sonny Bono Salton Sea National Wildlife Refuge (NWR) and Coachella Valley NWR for the next fifteen years. The CCP/EA (USFWS 2013), herein incorporated by reference, describes the Service's proposals for managing the refuges included within the Sonny Bono Salton Sea NWRC (Sonny Bono Salton Sea NWR and Coachella Valley NWR) and the associated effects of this management on the human environment under three alternatives for each Refuge, including the no action alternative.

## Decision

Following a comprehensive review and analysis of the three alternatives evaluated for each refuge within the Sonny Bono Salton Sea NWRC, as presented in the draft CCP/EA, and considering all public comments and our responses to them, the Service has determined that the analysis in the EA is sufficient to support:

1) Selection of Alternative B (Restore and Enhance Habitat Quality; Expand Opportunities for Wildlife Observation, Environmental Education, and Interpretation) as the preferred alternative or selected plan for the Sonny Bono Salton Sea NWR;

2) Selection of Alternative B (Expand Management Actions to Support Listed and Sensitive Species; Expand Public Outreach) as the preferred alternative or selected plan for the Coachella Valley NWR;

3) Approval of the Integrated Pest Management Plan for the Sonny Bono Salton Sea NWRC;

4) Approval of the Predator Management Plan for the Sonny Bono Salton Sea NWR; and

5) Approval of the Red Hill Bay Restoration Project, as described in Alternative B for the Sonny Bono Salton Sea NWR.

The preferred alternative or "selected plan" for each Refuge was determined to best meet the following criteria:

- achieves the mission of the National Wildlife Refuge System (Refuge System);
- ensures that each Refuge will be administered in accordance with the Refuge System Administration Act of 1966, as amended;
- achieves the purposes for which each Refuge was established;
- will be able to achieve the Service's vision and goals for each Refuge;
- maintains and, where applicable, restores the ecological integrity of each Refuge's habitats and populations;
- addresses the important issues identified during the scoping process;
- addresses the legal mandates of the Service and each Refuge;
- is consistent with the scientific principles of sound fish and wildlife management; and
- facilitates priority public uses that are compatible with each Refuge's purposes and the mission of the Refuge System.

## Alternatives Considered

**Sonny Bono Salton Sea NWR**. Following is a brief description of the three alternatives evaluated for managing the Sonny Bono Salton Sea NWR, including the selected plan (Alternative B). For a complete description of each alternative, see the EA.

**Alternative A - No Action**
Under the No Action Alternative, the management activities currently being implemented on the Refuge would continue. Therefore, this alternative represents the baseline from which other "action" alternatives were evaluated.

Wildlife and habitat management actions, the majority of which involve highly managed systems with specific wildlife species and habitat purposes, would continue at current levels under Alternative A. These actions include:

- cultivating green forage in managed agricultural fields to support wintering waterfowl;
- providing seasonal shallow water wetlands with alkali bulrush and other vegetation to provide additional forage for waterfowl;
- managing freshwater cattail marsh in various impoundments on the Refuge to support the endangered Yuma Ridgway's rail (*Rallus obsoletus yumanensis*);

- providing permanent open water areas to support nesting and foraging seabirds, as well as foraging shorebirds and other waterbirds;

- preserving tree rows and areas of native desert scrub vegetation to support native wildlife; and

- controlling invasive vegetation in the Refuge's riparian areas.

Additionally, the Refuge would continue to cooperate with other agencies on issues related to habitat restoration in the Salton Sea, and monitoring of avian disease on the Salton Sea would continue per available funding. The public use programs occurring on the Refuge, including hunting, fishing, wildlife observation, photography, environmental education, and interpretation, would continue at current levels.

*Alternative A was not selected because it does not include proposals to:*

- *change current irrigation and soil preparation practices in managed agricultural fields to increase the annual yield of forage crops for wintering geese, while also improving water use efficiency and reducing dust generation and carbon emissions;*

- *address the need for the continued availability of high quality cattail marsh habitat to support the Refuge's current population of endangered Yuma Ridgway's rails;*

- *restore shallow saline water habitat in Red Hill Bay to support migratory and resident waterbirds and minimize the potential for wind-generated soil erosion associated with the currently exposed playa within Red Hill Bay;*

- *implement a range of management actions to improve gull-billed tern (Gelochelidon nilotica vanrossemi) and black skimmer (Rynchops niger) fledgling success on the Refuge;*

- *implement an Integrated Pest Management Plan; and*

- *enhance opportunities for wildlife observation, environmental education, interpretation, and photography.*

**Alternative B (Selected Plan)**

In addition to the management activities currently being implemented on the Refuge, this alternative includes proposals to enhance and restore habitat quality within the Refuge to better achieve Refuge purposes, as well as improve opportunities of wildlife-dependent recreational uses. These proposals include:

- implementing management practices (e.g., laser leveling of fields, no till farming) intended to increase the total crop yield within managed agricultural fields to support wintering geese, while also reducing costs, improving water use efficiency, and lowering carbon emissions;

- improving water use efficiency throughout the Refuge's management habitat areas without compromising habitat quality;

- periodically rotating managed cattail marsh habitat to ensure continued availability of high quality habitat to support the endangered Yuma Ridgway's rail;
- improving habitat quality in riparian areas to support resident and migratory songbirds and other native wildlife;
- in partnership with others, implementing the phased restoration of Red Hill Bay to provide shallow saline water habitat for shorebirds, seabirds, and other waterbirds;
- continuing to provide quality waterfowl hunting opportunities and enhancing opportunities for wildlife observation, environmental education, interpretation, and photography;
- implementing monitoring and management actions (including a Predator Management Plan) to conserve listed and sensitive species, including ground-nesting seabirds of conservation concern; and
- implementing an Integrated Pest Management Plan.

*Alternative B was selected for implementation because it is considered the alternative that would most effectively achieve the Refuge's migratory bird purposes, as well as Refuge goals and objectives related to the protection of habitat to support migratory and resident birds and other native wildlife; conservation of the endangered Yuma Ridgway's rail and desert pupfish; coordination with other agencies to meet Refuge purposes; and enhancement of public appreciation, understanding, and enjoyment of Refuge resources.*

**Alternative C**

The actions related to wildlife and habitat management, habitat restoration, and general refuge operations included in Alternative C are identical to those presented in Alternative B. The primary difference between the two alternatives relates to public use, with Alternative C focused on improving existing facilities, as well as the overall public use experience.

*Although the implementation of Alternative C would ensure achievement of most of the Refuge purposes, goals, and objectives, this alternative was not selected for implementation because the public use proposals included under Alternative B are more likely to achieve the Refuge's public use goal of enhancing public appreciation, understanding, and enjoyment of Refuge resources.*

**Coachella Valley NWR.** Following is a brief description of the three alternatives evaluated for managing the Coachella Valley NWR, including the selected plan (Alternative B). For a complete description of each alternative, see the EA.

**Alternative A - No Action**

Under the No Action Alternative, the management activities currently being implemented on the Refuge would continue. Therefore, this alternative represents the baseline from which other "action" alternatives were evaluated.

Of the actions currently implemented on the Coachella Valley NWR, those associated with the protection of the Refuge's sensitive sand dune and sand field habitats are most critical to achieving Refuge purposes. Such actions include surveillance conducted in partnership with other agencies to deter unauthorized access onto sensitive habitat areas; maintenance of fencing and signs to deter off-highway vehicle activity; and sporadic, local control of Sahara mustard (*Brassica tournefortii*) and other invasive plant species. Surveys for Coachella Valley milk-vetch (*Astragalus lentiginosus var. coachellae*), a federally listed endangered plant, and Coachella Valley fringe-toed lizard (*Uma inornata*), a federally listed threatened reptile, are also conducted annually on the Refuge.

Occasional guided tours of the Refuge for environmental education purposes would continue and an existing public equestrian and hiking trail extending along portions of the Refuge's western and northern boundary would remain.

*Alternative A was not selected for implementation because it does not include proposals to:*

- *improve habitat quality for the Refuge's listed species through expanded invasive plant species control;*
- *expand listed and sensitive species monitoring on the Refuge;*
- *enhance existing disturbed habitat to support the flat-tailed horned lizard (Phrynosoma mcallii);*
- *implement an Integrated Pest Management Plan; and*
- *expand public outreach through the development of off-refuge interpretation.*

**Alternative B (Selected Plan)**

Under this alternative, wildlife and habitat management would be expanded to include a more defined role for Refuge staff in species monitoring; implementation of an Integrated Pest Management Plan to address invasive plant species control; habitat enhancement of an old agricultural site to the west of Washington Street; and development and implementation of a long-term sand transport monitoring plan. Occasional guided tours of the Refuge would continue and an off-Refuge interpretive program would be developed per available funding.

*Alternative B was selected for implementation because it is considered the alternative that would most effectively achieve Refuge purposes, goals, and objectives, particularly those related to the recovery and protection of federally listed species.*

**Alternative C**

Alternative C includes the same wildlife and habitat management actions as those described in Alternative B with the exception of the treatment of the old agricultural site to the west of Washington Street. Under Alternative C, this area would be recontoured and fully restored to creosote bush scrub habitat. In addition to the public use program described in Alternative B, Alternative C proposes to install some interpretative signage along a portion of the existing trail corridor on the Refuge.

*Although the implementation of Alternative C would result in the achievement of many Refuge goals and objectives, when considering the current staffing levels for the Refuge Complex, the restoration of creosote bush scrub habitat on the old agricultural site could impact the Refuge staff's ability to maintain both the primary actions needed to support the Refuge's listed and sensitive species and maintain and monitor the newly restored habitat area. Should circumstances change, the CCP could be revised in the future to incorporate this restoration proposal.*

## Effects of Refuge Management on the Human Environment

As described in the EA, implementing the selected alternatives for each Refuge will have no significant impacts on any of the environmental resources identified. A summary of the impacts analysis and conclusions is provided below. A more in-depth analysis is provided in the EA.

### Sonny Bono Salton Sea NWR

**Topography/Visual Quality**. Proposed changes in management practices for the managed habitat areas on the Refuge would result in only minor alterations to already disturbed topography and these changes would have no effect of the existing visual quality of the area.

For the Red Hill Bay restoration proposal, water conveyance channels and three-foot-high berms would be constructed to facilitate the project. Much of the project area has been disturbed in the past; therefore, the creation of these channels and earthen berms would have little effect on the existing topographic or visual character of the area. Solar panels would be erected on poles at the project site to provide energy for water pump operation. These structures would not block views, nor would they impair views of the immediate or distant surroundings. The extension of necessary utilities and other components of the water management system for this restoration project would not substantially alter the existing visual character or quality of the site and its surroundings, and the proposed project would not create a new source of light or glare, nor would it affect day or nighttime views in the area.

Public use construction projects would include improving existing trails, developing new trails on existing access ways, and installing a trail on one of the proposed berms for the Red Hill Bay project. None of these proposals would require any significant alteration of the landform, nor would they alter the current visual quality of the area.

Therefore, the implementation of the selected plan would not result in any significant adverse effects to topography or the visual character of the area.

**Geology/Soils**. The implementation of new and expanded management practices within the managed habitat areas of the Refuge, as proposed in the selected plan, would have mixed effects with respect to geology and soils. Expanding no till practices and/or laser leveling the fields would reduce surface manipulation minimizing the potential for erosion. On the other hand, cooperative farming, which could be implemented on the Refuge in the future under this proposal, could result in additional soil manipulation due to field preparation requirements or cattle or sheep grazing activities. 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.

The potential for ground shaking and rupture within the Refuge boundary is high, and a significant 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. To minimize the potential for berm failure, the berms have been designed to maximize stability, with internal berm slopes (those that would be inundated) to be constructed with an 8:1 slope gradient and the outer slopes constructed at 4:1. If however the berms were to fail, no associated safety issues are 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 impoundments due to 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.

Some water-generated erosion could occur at the Red Hill Bay restoration site 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 Storm Water Pollution Prevention Plan (SWPPP). 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. A benefit of reintroducing water to Red Hill Bay, an area of recently exposed Salton Sea seabed, is the reduction in the potential for wind-generated soil erosion.

The various improvements and new construction projects 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., new trails, 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, appropriate BMPs would be implemented during construction 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, no actions are proposed that would increase the potential for geological hazards, and the potential for flooding due to a seiche would be low.

**Paleontological Resources**. Although there is the potential for paleontological resources to be present within the Sonny Bono Salton Sea NWR, the actions to be implemented within the managed habitat areas and the construction activities associated with public use and Refuge operation proposals would not result in any significant disturbance to previously undisturbed soils. Therefore, there is little, if any, potential for significant adverse effects to the paleontological resources from these activities.

Although limited, there is a potential for impacts to paleontological resources during excavation for the Red Hill Bay Restoration project. An 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 avoid the potential for such significant adverse effects, final construction drawings for the project would be reviewed to determine if excavation would be required at depths greater than five feet from the current surface

elevation. If so, a paleontological monitoring plan would be prepared in consultation with the Service's 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. 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. The implementation of these measures would avoid any significant adverse effects to paleontological resources.

**Alternative Energy Resources**. Some of the Refuge lands that are owned by the Imperial Irrigation District (IID) and leased to the Service along the southeastern edge of the Salton Sea are located within the Salton Sea geothermal field. CalEnergy Operating Corporation has mineral interest leases on these subsurface lands, which grants them the right to pursue geothermal energy development. If geothermal energy development or facilities associated with geothermal energy development require access over any of these areas in the future, adjustments would be made to the Refuge lease as energy development and infrastructure is likely not compatible with the purposes for which the Refuge was established.

The site of the proposed Red Hill Bay Restoration project is also located on IID land within the Salton Sea geothermal field. The boundaries of the restoration project have been established based on discussions with CalEnergy to ensure that the proposal will not adversely affect subsurface development of their mineral interests.

Continued coordination with IID and CalEnergy on Refuge projects proposed within the Salton Sea geothermal field will avoid the potential for conflicts between Refuge actions and geothermal energy development in the area.

**Agricultural Resources**. Approximately 1,100 acres of land within the Refuge 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. 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.

The Red Hill Bay Restoration site would occupy an area that was previously submerged below the Salton Sea and is not designated as important farmland; therefore, shallow water restoration in this area would have no effect on agricultural resources.

**Hydrology**. New and expanded management actions within the managed habitat areas will have a nominal effect on the existing hydrologic conditions within and surrounding the Refuge. 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.

As part of the Red Hill Bay Restoration project, some water would be diverted from the Alamo River into the project's water impoundment area. The proposal would represent a relatively insignificant reduction in water flow within the Alamo River (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. No downstream water rights holders and/or users would be affected by the proposed diversion. The anticipated

reduction in flows within the Alamo River north of the future diversion channel would not significantly alter the existing hydrology in the area. In addition, 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.

The public uses and improvements to existing refuge operations and facilities proposed under the selected plan would not result in any substantive changes to existing drainage patterns, flood flow routes, or drainage and irrigation channels; therefore, no significant adverse effects related to hydrology are anticipated.

**Water Quality.** Improvements to current management actions, including the expansion of no till practices and laser leveling of agricultural fields, would result in less soil manipulation in the Refuge's managed agricultural fields. This would reduce the potential for erosion and siltation into adjacent waterways. Other actions proposed in managed habitat areas include invasive plant species control, which would be implemented through an integrated approach to pest management. A number of BMPs intended to protect surface water and groundwater quality would be implemented as part of the pesticide application process, which will include both ground and aerial applications. These BMPs are described in detail in the Integrated Pest Management (IPM) Plan that has been prepared for the Sonny Bono Salton Sea NWRC. Through the implementation of these BMPs, impacts to water quality from herbicide applications would be minor, temporary, or localized in nature.

Implementation of the Red Hill Bay Restoration project could result in short-term impacts to surface water quality by increasing the amount of sediment entering the Alamo River, Salton Sea, and other watercourses in the area during construction. There is also a potential for introducing pollutants into these surface water areas. To minimize such impacts, BMPs would be incorporated into the scope of the project to ensure 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 long-term erosion. The potential for impacts to water quality would be further reduced by the implementation of a SWPPP during construction. With the implementation of appropriate BMPs and adherence to the measures outlined in the SWPPP, no significant adverse effects to water quality are anticipated.

Another potential effect to water quality from the excavation of portions of the Red Hill Bay area is short-term increases 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 help inform the Service of the potential hazards, twenty sediment samples from the site would be collected and analyzed by the United States Geological Survey Pesticide Fate Research Group for current-use and legacy pesticides. The data obtained from this process would then provide guidance for implementing construction methods that can limit the mobilization of pesticides.

**Climate Change**. Predictions of increased temperatures and longer periods of excessively high temperatures during the summer months are likely to impact wildlife distribution and abundance on the Sonny Bono Salton Sea NWR, particularly if temperatures exceed thermal tolerances or result in severe water stress (PRBO Conservation Science 2011). Because the actual effects to Refuge resources due to climate change are difficult to predict, future management actions include proposals to measure and address the effects of climate change on Refuge resources through monitoring and adaptive management.

**Air Quality**. The wildlife and habitat management activities to be implemented under the selected plan are not expected to result in any adverse effects to air quality. Actions such as laser leveling, the expanded practice of no till farming, and improved water distribution across fields would reduce the extent of soil manipulation required in the managed agricultural fields, decreasing the already low levels 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 above existing conditions because all 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 (Conservation Management Practices).

The effects of aerial and ground applications of herbicides on air quality would be minimized through adherence to pesticide label requirements and the implementation of product-specific BMPs outlined in the IPM Plan for the Refuge Complex.

Because the total number of miles traveled to implement the selected plan would not substantively change over existing levels, no significant air quality impacts related to gasoline engine operation would occur.

Construction activities associated with the restoration of Red Hill Bay 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 by the Imperial County Air Pollution Control District in Rule 800 (General Requirements for Control of Fine Particulate Matter [PM-10]) and Rule 801 (Construction and Earthmoving Activities) would be incorporated into the scope of the project. Following restoration, air quality impacts related to fugitive dust generated by winds blowing across the exposed seabed in Red Hill Bay would be avoided.

**Greenhouse Gas Emissions**. The activities associated with wildlife and habitat management, public use, and Refuge operations proposed under the selected plan would result in only minor increases in greenhouse gas emissions (GHGs). Some or all of the increases in GHGs associated with expanded opportunities for wildlife observation would be offset by reductions in GHGs realized from changes in agricultural field management. Construction activities associated with restoration at Red Hill Bay would result in an increase in the emission of GHGs, but these increases would be limited and temporary.

To reduce the total GHG emissions generated from the operation and maintenance of the Refuge, as vehicles are replaced, new vehicles will be selected that have better fuel economy. In addition, 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.

**Contaminants**. Continued coordination with the Carlsbad Fish and Wildlife Office Contaminants Program in the review and evaluation of potential sources of environmental contaminants on the Refuge will ensure that 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 be properly maintained and spill plans and training would continue to be updated as necessary. Appropriate BMPs would be implemented for all aerial and ground application of herbicides.

A Contaminants Assessment Process (CAP), completed for the Refuge Complex in 2012, identified selenium and DDE levels in the Salton Sea as important issues to be considered in conducting habitat and wildlife management actions. 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.

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, but these effects are expected to be limited. Additional information related to contaminants is provided in the wildlife discussion.

**Habitat and Vegetation Resources**. The selected plan includes proposals intended to benefit habitat quality for resident and migratory birds and other wildlife. No adverse effects to native vegetation or managed habitat areas are anticipated from proposed management actions, potential implementation of cooperative farming agreements, or the expansion of opportunities for wildlife observation. Public use on the Refuge would be limited to designated trails and roadways, with much of the Refuge closed to public access. This approach will reduce the potential for impacts to habitat and native vegetation; therefore, no significant adverse effects to habitat or vegetation are anticipated.

Potential effects to native vegetation, sensitive plant species, and overall habitat quality from the implementation of the IPM Plan would be minor, temporary, or localized in nature.

**Wildlife Resources**. The wildlife and habitat management actions to be implemented under the selected plan (e.g., habitat restoration and enhancement, additional species surveys) could result in temporary impacts to wildlife in the form of disturbance. To minimize disturbance and other effects, 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 proposed management actions would benefit wildlife.

The proposal to restore Red Hill Bay could result in short-term adverse effects to nearby wildlife due to construction noise and human disturbance. These impacts are not however considered significant, because habitat in and around the project site, including along the Alamo River, is currently of low value. Upon completion, the restoration project would provide long-term benefits for migratory and resident birds.

Another potential impact to wildlife is the possible accumulation of selenium within the shallow waters of the restored Red Hill Bay area. The results of a study initiated in 2006 (Miles et al. 2009) to estimate the ecological risks of blending Salton Sea water with Alamo River water indicated that the blended water approach was effective in reducing selenium concentrations from the Alamo River, which has an average selenium levels of 8 $\mu$g/L (Setmire et al. 1993). Arithmetic mean values of selenium water concentrations in blended water study ponds during the study period ranged from 0.9 to 3.9 $\mu$g/L. 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 Salton Sea Ecosystem Monitoring and Assessment Plan (available at http://pubs.usgs.gov/of/2013/1133/).

The implementation of the IPM Plan would result in the use of pesticides on the Refuge that represent relatively low risk to non-target organisms due to low toxicity or short-term persistence in the environment. Thus, potential adverse impacts to wildlife from pesticide applications would be less than significant.

The implementation of a Predator Management Plan to control individual predators (e.g., raccoons, coyotes, gulls) of ground-nesting seabirds (including adults, chicks, and eggs) during the nesting season through lethal and non-lethal actions would result in a limited, localized reduction in the number of predatory species present within the Refuge. Because of the limited numbers of individual predators to be affected by these actions, no significant adverse effects to the local, regional, or range-wide population of these highly resilient species would occur. Disturbance to other species as a result of implementing this program would be minimal.

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. 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.

Waterfowl hunting on the Refuge can result in direct (e.g., mortality, wounding) and indirect adverse effects (e.g., altered behavior, population structure, distribution) to non-hunted wildlife (DeLong 2002, Bartelt 1987, Cole and Knight 1990). Within the Hazard Tract, shorebirds and other waterbirds (e.g., herons, egrets) are impacted to some extend by this disturbance. However, these impacts are reduced by the availability of adjacent and nearby Refuge lands (Havera et al. 1992) where hunting is not permitted and wildlife can feed and rest relatively undisturbed. 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 direct 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.

Other public uses on the Refuge are restricted to designated trails and roadways, with much of the Refuge closed to public access. This results in minimal disturbance of resident and migratory birds and other wildlife.

**Federal Endangered and Threatened Species**. A number of the management actions included in the selected plan focus on the recovery and protection of listed species, particularly the endangered Yuma Ridgway's rail, while other actions include measures to protect listed species from disturbance or harm.

**Yuma Ridgway's Rail**

Approximately 200 acres of freshwater marsh located in various impoundments are managed on the Refuge to benefit the Yuma Ridgway's rail, which is present 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 required. These maintenance activities, which occur over a period of a few hours, take place periodically throughout the year except during the nesting season, when maintenance would be suspended. Care is taken when implementing these activities to avoid loss or injury to rails or other secretive marsh birds. With these precautions, potential impacts to the rail are not considered significant.

Under the selected plan, a step-down Yuma Ridgway's rail management plan will be prepared to address the long-term management of rail habitat. The plan will address the need for the occasional clean out of dense cattail vegetation to maintain high quality rail habitat and explore how best to accomplish this action with the least amount of disturbance to the existing rail population. Any management activities within cattail habitat would occur outside of the nesting season, a survey would be conducted of rail habitat areas before any clean out actions are implemented, and alternative habitat areas would be established prior to clean out to ensure adequate protection and high quality foraging areas.

Yuma Ridgway's rails do not occupy habitat to be affected by the restoration of Red Hill Bay, nor do they occur in proximity to the restoration area, therefore, no adverse effects to Yuma Ridgway's rails are anticipated from the implementation of this restoration project.

The control of invasive non-native plants in rail habitat would be implemented in accordance with the IPM Plan. All pesticides considered for use in rail habitat 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.

The Refuge's Yuma Ridgway's rail population occurs within managed cattail marshes that provide little opportunity for human access. The majority of these areas occur where no public access is permitted within 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 shotguns 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 from the implementation of the selected plan's public use proposals are therefore anticipated.

The Refuge Manager reviews all research proposed to occur within rail habitat, approving only those proposals that would not have the potential to adversely affect Yuma Ridgway's rails. All research projects require a Special Use Permit (SUP) and researchers must adhere to the conditions and stipulations outlined in the approved SUP.

**Desert Pupfish**

Desert pupfish have been documented in some of the 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. The selected plan proposes to actively

monitor the presence of desert pupfish on the Refuge. Monitoring activities would not result in any adverse effects to the species.

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 found to be occupied by desert pupfish, the Refuge will develop methods for capturing the fish prior to draw down and either translocate them to other suitable habitat on or off the Refuge or temporarily hold them in an appropriate location while the work is conducted. Refuge staff will work with the California Department of Fish and Wildlife (CDFW) and the Palm Springs Fish and Wildlife Office in this effort. Relocation, as needed, and/or minor modifications to water management, as appropriate, would ensure that adverse effects to this species are minimized.

Restoration of the Red Hill Bay area has the potential to affect desert pupfish; therefore, conservation measures have been incorporated into the scope of the project to avoid the potential for significant adverse effects to the species. In preparation for grading and other construction work within the Red Hill Bay area, water from IID drains would 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 to identify the presence or absence of pupfish in the project site will be conducted in advance of any diversion and draining. Measures will be taken to minimize movement of fish from the Salton Sea to the Red Hill Bay impoundments and any pupfish in the area will be removed and relocated prior to draining.

A mesh screen, to be maintained weekly, will be placed across the mouth of the Salton Sea water intake channel in an effort to prevent desert pupfish movement from the Salton Sea into the project site. Despite these efforts, there would still be a chance that these fish may become entrained in the water delivery system or the wetland cells. Therefore, project features have been incorporated into the project design to minimize trauma to the fish while traveling through the water delivery system. This includes the use of a screw centrifugal pump designed to avoid harm to fish, fry, or pelagic eggs that may find their way into the pump. The project design also includes features to support desert pupfish should they become established in the impoundments, including the creation of deep pools and swales (up to six feet deep) within the restoration area and the installation of shade structures (concrete culverts) to provide a thermal buffer and shelter for the pupfish.

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. Salinity levels in the ponds will vary but will not exceed a level that is detrimental to pupfish survival (i.e., 68 ppt).

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. Herbicides proposed for use on the Refuge are evaluated through the Chemical Profile process described in the IPM Plan to determine if its use could pose a threat to desert pupfish. Where necessary, product specific BMPs may be required during application. In general, herbicides would not be applied to surface waters where desert pupfish may be present; BMPs, as described in the IPM Plan, would be implemented to avoid spray drift; and all pesticide products would be applied in accordance with label requirements. The implementation of these measures would avoid any adverse effects to desert pupfish.

Existing and proposed public use facilities and programs do not occur in areas where desert pupfish may exist; therefore, no potential adverse effects to desert pupfish are anticipated from these uses.

The potential for impacts to desert pupfish resulting from future research proposals 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 conservation measures would be incorporated into the SUP to avoid the potential for adverse effects. In the latter case, additional evaluation per the requirements of National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) would likely be required.

**Other Federally Listed Species**. Although rarely, if ever, observed on the Refuge, there is the potential for least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), and California least tern (*Sternula antillarum browni*) to be present and potentially nest on the Refuge. To avoid any adverse effects to these species during the implementation of wildlife and habitat management actions, activities in riparian areas would be avoided during the nesting season. Where actions are proposed during the nesting season in areas that might support least tern nesting, a site survey would be conducted prior to initiating the action. If least tern nests are observed, the action would be postponed until the end of nesting season.

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, the Service has conducted a biological evaluation to determine whether the actions proposed in the selected plan may affect federally listed and proposed species or proposed or designated critical habitat. Based on this evaluation, the Service has determined that the approval and implementation of the Final Comprehensive Conservation Plan for the Sonny Bono Salton Sea NWRC, as well as the approval and implementation of the Complex's Integrated Pest Management Plan and Predator Management Plan for the Sonny Bono Salton Sea NWR that were prepared in conjunction with the CCP may affect the listed species present on the Refuge, but are not likely to adversely affect these species. The biological evaluation also concludes that because the CCP is a programmatic document requiring future site-specific step-down planning, subsequent Section 7 consultation will be conducted for all future actions on the Refuge that may affect listed, proposed, or candidate species.

The Service has also conducted a separate biological evaluation for the implementation of the Red Hill Bay Restoration project. Based on this evaluation, the Service has determined that the approval and implementation of this project may affect desert pupfish present in the project area, but through the implementation of specific conservation measures, this listed species is not likely to be adversely affected.

**State Listed Threatened or Endangered Species and Other Species of Concern**. The implementation of the following conservation measures would avoid any significant adverse effects to State listed species and other species of concern: minimizing disturbance during the nesting season; controlling invasive plant species through an integrated approach to pest management; implementing BMPs that will reduce the potential for adverse effects from the use of herbicides; minimizing disturbance during monitoring; and providing large areas of undisturbed habitat for wildlife use by restricting public use activities to specific locations on the Refuge.

**Cultural Resources**. Few cultural resource investigations, surveys, or research projects have been conducted within the boundaries of the Refuge, although cultural resources have been identified in the project vicinity. Although the potential for archaeological resources to be present within the Refuge varies depending upon the topography, soil types, proximity to water, proximity to food resources, and many other factors, it must be assumed that there is a potential for yet undiscovered buried deposits to be present on the Refuge. Therefore, in accordance with applicable laws and regulations, all proposed actions on the Refuge 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 by the Service's Cultural Resources Program to determine the project's potential to affect cultural resources.

The Service's Cultural Resource staff have the initial responsibility for determining 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 the event of the inadvertent discovering of cultural resources, all earthwork on the site must be halted and the Service's Regional Historic Preservation Officer must be contacted to review the materials and recommend a treatment that is consistent with applicable laws and policies. In addition, the site would be recorded and evaluated for eligibility to the National Register of Historic Places (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 State Historic Preservation Officer (SHPO), federally recognized tribes, and interested parties.

Implementing the requirements of all applicable laws and regulations related to the protection of cultural resources would ensure that no significant adverse effects to cultural resources would occur during the implementation of the selected plan.

In the case of the Red Hill Bay Restoration project, the potential for impacts to cultural resources has already been evaluated by the Service's Cultural Preservation Officer. Based on this evaluation, it has been determined that no significant impacts to cultural resources are anticipated during the implementation of this project. No further cultural resource identification effort is therefore 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 Service's Programmatic Agreements with SHPO and the Advisory Council for Historic Preservation regarding the administration of routine undertakings under the National Historic Preservation Act in the states of California, Idaho, Nevada, Oregon, and Washington, the project was reported to the SHPO in the annual report, prepared and submitted at the end of fiscal year 2011.

The selected plan also includes a proposal to work with the Service's Regional Archaeologist to develop procedures (that would be formalized through a Memorandum of Understanding with the appropriate tribal representatives) to be implemented in the event of the discovery of resources on the Refuge that are addressed under the Native American Graves Protection and Repatriation Act of 1990.

**Land Use**. The wildlife, habitat, and visitor services uses included in the selected plan would not conflict with the land use goals of the Imperial County General Plan, and in some cases would contribute to the achievement of one or more General Plan goals (e.g., preserving commercial agricultural, preserving natural habitat areas). In addition, conservation measures (e.g., implementing BMPs to avoid herbicide spray drift, coordinating with other agencies and adjacent landowners as appropriate during plan implementation) have been incorporated into the selected plan to avoid conflicts with surrounding land uses.

**Recreational Opportunities.** The selected plan would provide opportunities for a range of wildlife-dependent recreational uses including hunting and wildlife observation. No actions are proposed that would adversely affect adjacent recreational opportunities.

**Transportation/Traffic Circulation**. With the exception of short-term increases in vehicular traffic during the restoration of Red Hill Bay, the implementation of the selected plan would not result in any noticeable increases in traffic volumes on surrounding roads, nor would existing levels of service at surrounding intersections be affected.

The restoration of Red Hill Bay, which is likely to be implemented in phases, would result in short-term increasing in vehicular traffic associated with the transport of people, equipment, and materials to and from the restoration site during construction, and minor long-term increases in traffic associated with the operation, monitoring, and maintenance of the restored site. Based on the existing low traffic volumes on the streets that provide access to the restoration site, 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. Therefore, no significant adverse effects to traffic flow in the project vicinity are anticipated.

**Public Utilities/Easements**. 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 conflicts.

**Health and Safety**. 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 in the selected plan, including habitat restoration, would not exacerbate the potential for exposure to these existing safety issues by either the public or Refuge personnel. The Refuge would continue per available funding 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 mosquito surveillance is currently deemed unnecessary 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.

**Population and Employment**. The selected plan includes a restoration proposal that would generate a few short-term job opportunities, providing minor benefits to the local economy. Other contributions to the local economy could include local employment opportunities with the Service, the purchase of goods and equipment from local businesses, occasional hiring of contractors to implement actions to 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. 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 can also have a positive effect on the local economy. All of these benefits are however relatively small in the context of the overall regional economy.

**Environmental Justice**. The Refuge provides equal access to all segments of the population to visit and participate in refuge activities. The implementation of the selected plan would not result in any disproportionate adverse impacts to any residents in the region, particularly minority or low-income residents.

**Cumulative Effects**. An analysis of the interaction of activities proposed for 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) was conducted as part of the EA (refer to section 5.11.1 of the EA) and no significant cumulative impacts were identified.

## Coachella Valley NWR

**Topography/Visual Quality**. The management activities proposed under the selected plan would result in no changes to the landform and no discernible changes to the Refuge's visual quality. Therefore, no significant adverse effects to the existing landform or the visual character of the site are anticipated.

**Geology/Soils**. Proposals to expand invasive species control within the Refuge's sand dune and sand field habitats, as well as on the old vineyard site, would result in limited soil disturbance. 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 controlled areas, where appropriate, with local native species. No structures or other facilities are present or proposed on the Refuge, so there is no potential for significant effects related to geological hazards such as liquefaction, settlement, ground rupture, or lateral spreading.

**Paleontological Resources**. Although there is some potential for paleontological resources to be present within the Coachella Valley NWR, no actions are proposed for managing the Refuge that would require excavation. Therefore, there is no potential for impacts to paleontological resources from the implementation of selected plan.

**Alternative Energy Resources**. The Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) was developed to ensure a balance between environmental protection and economic development, including alternative energy development (CVAG 2007a). The lands included within the Coachella Valley NWR are identified as core habitat area for a number of species covered under the MSHCP, therefore, no alternative energy projects are planned within this portion of the MSHCP planning area, and no adverse effects to alternative energy resources from implementing the selected plan are anticipated.

**Agricultural Resources**. Approximately 400 acres within the Coachella Valley NWR are classified as Farmland of Local Importance. No structures or other actions are proposed that would result in the irreversible alteration of the quality or quantity of these farmlands, therefore, no significant adverse effects to agricultural resources are anticipated as a result of implementing the selected plan.

**Hydrology**. The extent of physical change to the existing conditions on the Refuge from implementing the selected plan would be limited. 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.

**Water Quality**. The management activities proposed in the selected plan are generally associated with habitat and species protection and monitoring. These activities have little, if any, effect on water quality. Impacts to water quality from the application of herbicides on the site would be minimized through the implementation of appropriate BMPs, as described in the IPM Plan for the Refuge Complex, and adherence to the specific label requirements for each herbicide.

**Climate Change**. For the Sonoran Desert ecoregion, various climate models project increases in the median annual temperature in excess of 2 °C (3.64 °F) by the end of the 21$^{st}$ century (PRBO Conservation Science 2011). 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). 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. 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.

Because the actual effects to Refuge resources from climate change are difficult to predict, future management actions include proposals to measure and address the effects of climate change on Refuge resources through monitoring and adaptive management.

**Air Quality**. The wildlife and habitat management activities to be implemented in accordance with the selected plan would 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.

The localized air quality effects of applying herbicides to control invasive plant species would be minimized through the implementation of the BMPs outlined in the IPM Plan for the Refuge Complex and adherence to pesticide label requirements.

**Greenhouse Gas Emissions**. The activities to be implemented on the Refuge under the selected plan would result in minor increases in GHGs, attributed primarily to additional trips associated with monitoring and invasive plant control. These limited increases in GHG emissions would not represent a significant adverse effect.

In an effort to reduce the total GHG emissions generated from the operation and maintenance of the Refuge, as vehicles are replaced, new vehicles will be selected that have better fuel economy. In addition, wherever possible, tasks requiring off-Refuge travel will be combined to reduce the total number of miles driven by Refuge staff.

**Contaminants**. No issues related to contaminants have been identified on the Coachella Valley NWR.

**Habitat and Vegetation Resources**. The implementation of the wildlife and habitat management activities included in the selected plan would result in little, if any, adverse effects to existing native vegetation and habitat. Some minor trampling of vegetation may occur during invasive plant control or species monitoring, but care is taken to walk between plants when on dunes and over all, the activity levels on the Refuge are extremely low. Public use on the Refuge is limited to an existing trail corridor that extends along the western and near the northern perimeter of the Refuge and special guided tours conducted within sand dune and sand field habitat. Monitoring of these areas indicates no adverse effects to habitat or native vegetation from these activities. Therefore, impacts to habitat and vegetation under this alternative would be considered less than significant.

**Wildlife Resources**. The implementation of the wildlife and habitat management activities presented in the selected plan (e.g., protection of sand dune and sand field habitats, control of invasive weeds, monitoring of listed and special status species, enhancement of creosote bush scrub) are intended to benefit wildlife species. Some minor disturbance to wildlife, and in particular short-term disturbance to individuals of the species being monitoring, could occur. Such impacts would be 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.

Prior to conducting habitat enhancement activities, 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 implementation of the IPM Plan would result in the use of pesticides on the Refuge that represent relatively low risk to non-target organisms due to low toxicity or short-term persistence in the environment. Thus, potential adverse impacts to wildlife from pesticide applications would be less than significant.

Authorized public use on the Refuge is limited to occasional guided tours, the use of an existing equestrian/hiking 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. To reduce the potential for impacts to wildlife from 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 when research is conducted on the Refuge, all research must be approved by the Refuge Manager. In addition, a Special Use Permit is issued that 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. Adherence to the stipulations in the Special Use Permit is intended to minimize the potential for adverse effects to wildlife.

**Federal Endangered and Threatened Species**. The majority of the management actions included in the selected plan for the Coachella Valley NWR focus on the recovery and protection of listed species, while other actions include measures to protect listed species from disturbance or harm.

**Coachella Valley Fringe-toed Lizard and Coachella Valley Milk-vetch**

The selected plan includes proposals to increase Refuge staff participation in listed species monitoring efforts, increase invasive plant species control efforts particularly in sand dune and sand field habitats, initiate an effort to reestablish native honey mesquite shrubs on the Refuge to recreate 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 to reduce unauthorized access by vehicles and individuals. Although these proposals represent an overall benefit to the listed species on the Refuge, measures must be taken during their implementation to minimize impacts related to disturbance and injury or death from trampling. To avoid such impacts, monitoring activity will occur at times of the day and times of the year when impacts related to disturbance are least likely to occur, the number of individuals present in sensitive habitat areas will be limited, and monitors and other staff will be trained on how to traverse sensitive habitat areas in a manner that will minimize the potential for trampling of lizards that may be buried just below the surface of the sand.

Control of invasive weeds, particularly Sahara mustard, would involve the use of herbicides. Through the implementation of the IPM Plan, impacts to listed species would be avoided. Potential products would be reviewed through the Chemical Profile process prior to approval for use of on the Refuge to ensure that they do not pose a threat to listed species. The implementation of BMPs during application and adherence to label requirements will also minimize the potential for adverse effects to the Refuge's listed species.

To ensure that no significant adverse effects to listed species result from the limited public use activities permitted on this Refuge, no dogs are permitted on the Refuge including along the existing equestrian/hiking trail; 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.

All research proposals would be reviewed by the Refuge Manager to ensure that there is no potential for adverse effects to listed species. Adherence to the conditions and stipulations included in the SUP, which must be issued by the Refuge Manager before a research project can be initiated on the Refuge, would ensure that no significant adverse effects to listed species would occur.

As described above, the Service has conducted a biological evaluation to determine whether the actions proposed in the selected plan may affect federally listed and proposed species or proposed or designated critical habitat. Based on this evaluation, the Service has determined that the approval and implementation of the Final Comprehensive Conservation Plan for the

Sonny Bono Salton Sea NWRC, as well as the approval and implementation of the Complex's Integrated Pest Management Plan Sea NWR that was prepared in conjunction with the CCP may affect the listed species present on the Refuge, but are not likely to adversely affect these species. The biological evaluation also concludes that because the CCP is a programmatic document requiring future site-specific step-down planning, subsequent Section 7 consultation will be conducted for all future actions on the Refuge that may affect listed, proposed, or candidate species.

**Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) Covered Species and Other Species of Concern**. The actions proposed in the selected plan to benefit federally listed species would also provide benefits for MSHCP covered species and other species of concern. In addition, the selected plan proposes to implement applicable management actions included in the 2012 Reserve Management Unit Plan for the Valley Floor Reserve Management Unit. These actions are intended to address the habitat and management needs of those species covered by the Coachella Valley MSHCP.

The implementation of the following conservation measures would avoid any significant adverse effects to MSHCP covered species and other species of concern: minimizing all disturbance in sensitive habitat areas; controlling invasive plant species through an integrated approach to pest management; implementing BMPs that will reduce the potential for adverse effects from the use of herbicides; minimizing disturbance during monitoring; limiting the intensity of public use occurring in sensitive dune habitat areas, and continuing to prohibit dogs on the Refuge.

**Cultural Resources**. The cultural resources discussion presented for the Sonny Bono Salton Sea NWR is also applicable to the Coachella Valley NWR. As such, implementing the requirements of all applicable laws and regulations related to the protection of cultural resources would ensure that no significant adverse effects to cultural resources would occur as a result of implementing the selected plan for the Coachella Valley NWR.

**Land Use**. The proposals included in the selected plan are consistent with the intent, goals, and objectives of the Coachella Valley MSHCP and as such do not conflict with any General Plan land use designations (CVAG 2007b) applicable to the area in and around the Refuge. In addition, these proposals do not conflict with existing or proposed land uses in the vicinity of the Refuge.

**Recreational Opportunities.** The selected plan continues to accommodate a regional equestrian/hiking trail through the Refuge and provide some limited opportunities for wildlife observation and environmental education. No actions are proposed that would adversely affect adjacent recreational opportunities.

**Transportation/Traffic Circulation**. The Refuge's consistency with the Coachella Valley MSHCP ensures that none of the actions proposed in the selected plan would result in impacts to the regional transportation system. In addition, the low number of vehicular trips to be generated during plan implementation would have no effect on current levels of service on surrounding roadways or at nearby intersections.

**Public Utilities/Easements**. 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.

**Health and Safety**. 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.

**Population and Employment**. Based on the results of the fiscal impact analysis prepared to quantify the potential impacts of the build out of the Coachella Valley MSHCP on the Coachella Valley's regional economy, the overall impacts to the regional economy from implementing actions consistent with the MSHCP are less than significant (CVAG 2007b). The majority of the actions implemented on the Coachella Valley NWR relate to protection and preservation of resources and visitation to the Refuge is limited, therefore, the effects to the regional economy and employment base of implementing the selected plan are nominal.

**Environmental Justice**. The Refuge provides equal access to all segments of the population, and implementation of the selected plan would not result in any disproportionate adverse impacts to any residents in the region, particularly minority or low-income residents.

**Cumulative Effects**. The proposals included in the selected plan for the Coachella Valley NWR 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.

## Public Review

The draft CCP/EA was available for public review and comment between July 23, 2013 and August 22, 2013 and two public meetings were held, one in Palm Desert on July 30, 2013 and one in Brawley on July 31, 2013. The document was distributed to Federal, State, and local agencies, Tribal governments, State Clearinghouse, Brawley Public Library, Thousand Palms Library, Meyer Memorial Library in Calipatria, and interested organizations, businesses, and individuals. It was also available for review on-line at the Sonny Bono Salton Sea NWR web site.

The public review process generated 13 comment letters, which included 87 individual comments. Comment letters originated from various agencies, as well as a tribal government, commercial business, conservation organization, and member of the public. These comments are provided in Appendix F-3 in Volume 2 of the final CCP along with our responses to the comments. As noted in our responses, the Final CCP has been modified in various locations to meet and address, as appropriate, the concerns that were raised in the comment letters. We also corrected all formatting and typographical errors that were brought to our attention.

Throughout the planning process, numerous opportunities for public involvement in the development and review of the CCP were provided. This included two scoping meetings, three planning updates, a CCP webpage announcing various opportunities for public comment, and public review and comment on the draft CCP/EA and accompanying step-down plans. The details of the Service's public involvement program are described in the Final CCP.

The Final CCP, approved step-down plans, and other accompanying documents are available to the public and can be reviewed at the U.S. Fish and Wildlife Service, Sonny Bono Salton Sea National Wildlife Refuge Complex, 906 W. Sinclair Road, Calipatria, CA 92233 (telephone 760-348-5278), as well as at the Brawley Public Library (400 Main Street, Brawley, CA) and Palm Desert Library (73-300 Fred Waring Drive, Palm Desert, CA). These documents can also be downloaded from the Internet at http://www.fws.gov/refuge/sonny_bono_/what_we_do/planning.html.

## Conclusions

Based on my review and evaluation of the information contained in the supporting references, I have determined that implementing: 1) Alterative B (Restore and Enhance Habitat Quality; Expand Opportunities for Wildlife Observation, Environmental Education, and Interpretation) for the management of the Sonny Bono Salton Sea NWR; 2) Alternative B (Expand Management Actions to Support Listed and Sensitive Species; Expand Public Outreach) for the management of the Coachella Valley NWR; 3) the Integrated Pest Management Plan for the Sonny Bono Salton Sea NWRC; 4) the Predator Management Plan for the Sonny Bono Salton Sea NWR; and 5) the Red Hill Bay Restoration project would not represent major Federal actions that would significantly affect the quality of the human environment, within the meaning of Section 102(2)(c) of the National Environmental Policy Act of 1969, as amended. Accordingly, the Service is not required to prepare an Environmental Impact Statement.

This Finding of No Significant Impact and supporting references are on file at the U.S. Fish and Wildlife Service, Sonny Bono Salton Sea National Wildlife Refuge Complex, 906 W. Sinclair Road, Calipatria, CA 92233 (telephone 760-348-5278).

Regional Director, Pacific Southwest Region
Sacramento, California

March 6, 2014
Date

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U.S. Fish & Wildlife Service

# Sonny Bono Salton Sea National Wildlife Refuge Complex

## (Sonny Bono Salton Sea NWR and Coachella Valley NWR)

## *Environmental Assessment*

*March 2014*

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# 1. Purpose and Need for the Action

## 1.1 Introduction

The Sonny Bono Salton Sea National Wildlife Refuge Complex (Complex or NWRC) consists of the Sonny Bono Salton Sea National Wildlife Refuge (NWR) and Coachella Valley NWR. Although both Refuges are located within the 8,000-square-mile Salton Basin of the Colorado Desert (Figure 1-1), the purposes of these two Refuges are as different as the habitats and species they protect.

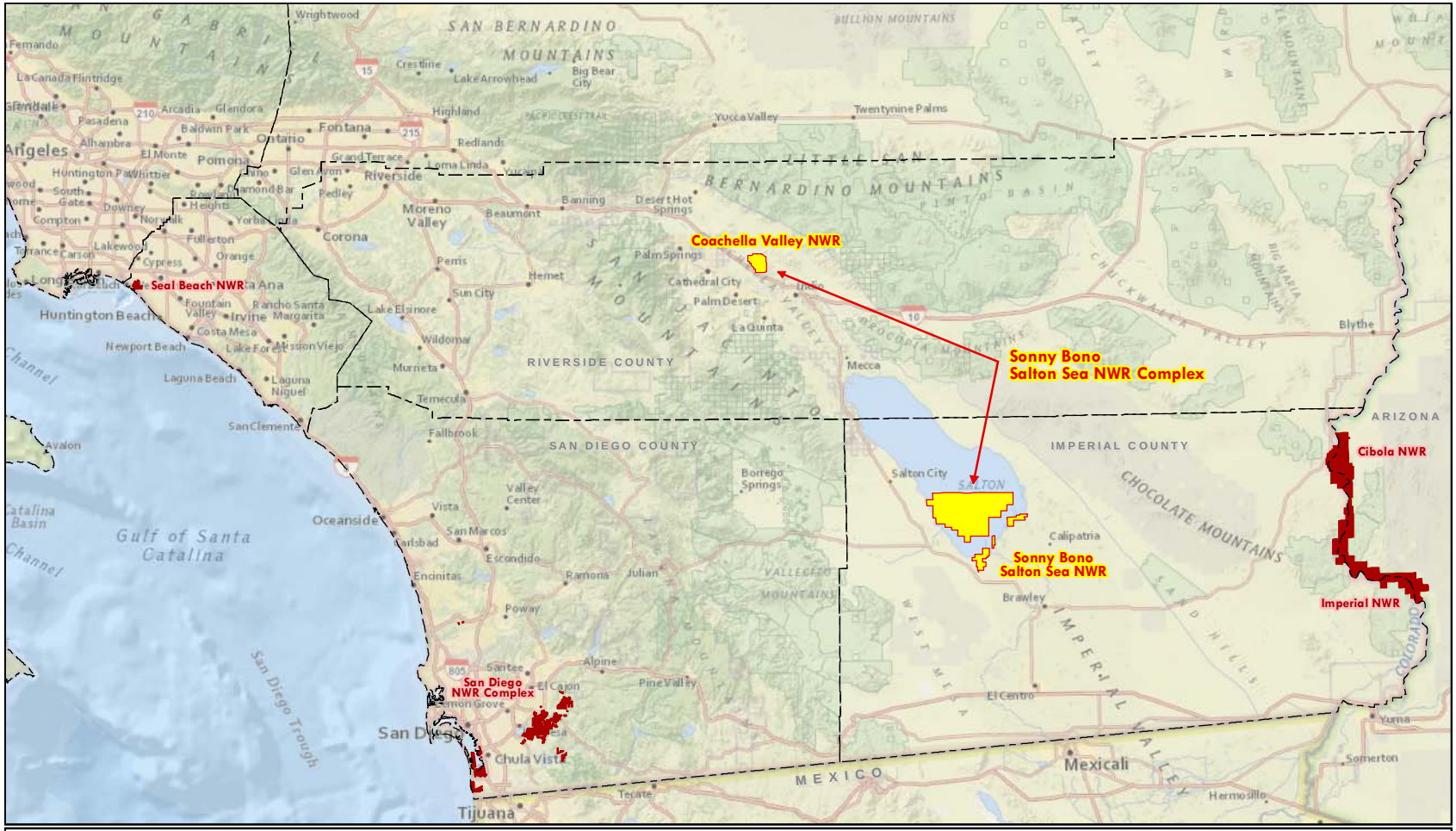
The Sonny Bono Salton Sea NWR, which consists of 37,660 acres, is situated at the south end of the Salton Sea, about 20 miles north of El Centro in Imperial County, California (Figure 1-2). Its purposes include the protection and management of migratory birds, particularly waterfowl, and other wildlife.

About 75 miles to the northwest is the 3,577-acre Coachella Valley NWR, located 10 miles east of Palm Springs in Riverside County, California (Figure 1-3). The purpose of this Refuge is to protect and contribute to the long-term survival of the federally threatened Coachella Valley fringe-toed lizard (*Uma inornata*) and federally endangered Coachella Valley milk-vetch (*Astragalus lentiginosus var. coachellae*), both endemic to the active sand habitats in the Coachella Valley.

The U.S. Fish and Wildlife Service (Service) has prepared a Comprehensive Conservation Plan (CCP) for the Sonny Bono Salton Sea NWR Complex (Sonny Bono Salton Sea NWR and Coachella Valley NWR) to guide the management of these Refuges over the next 15 years. The CCP describes future Refuge conditions and provides long-range management direction for achieving the purposes for which each Refuge was established.

## 1.2 Purpose and Need

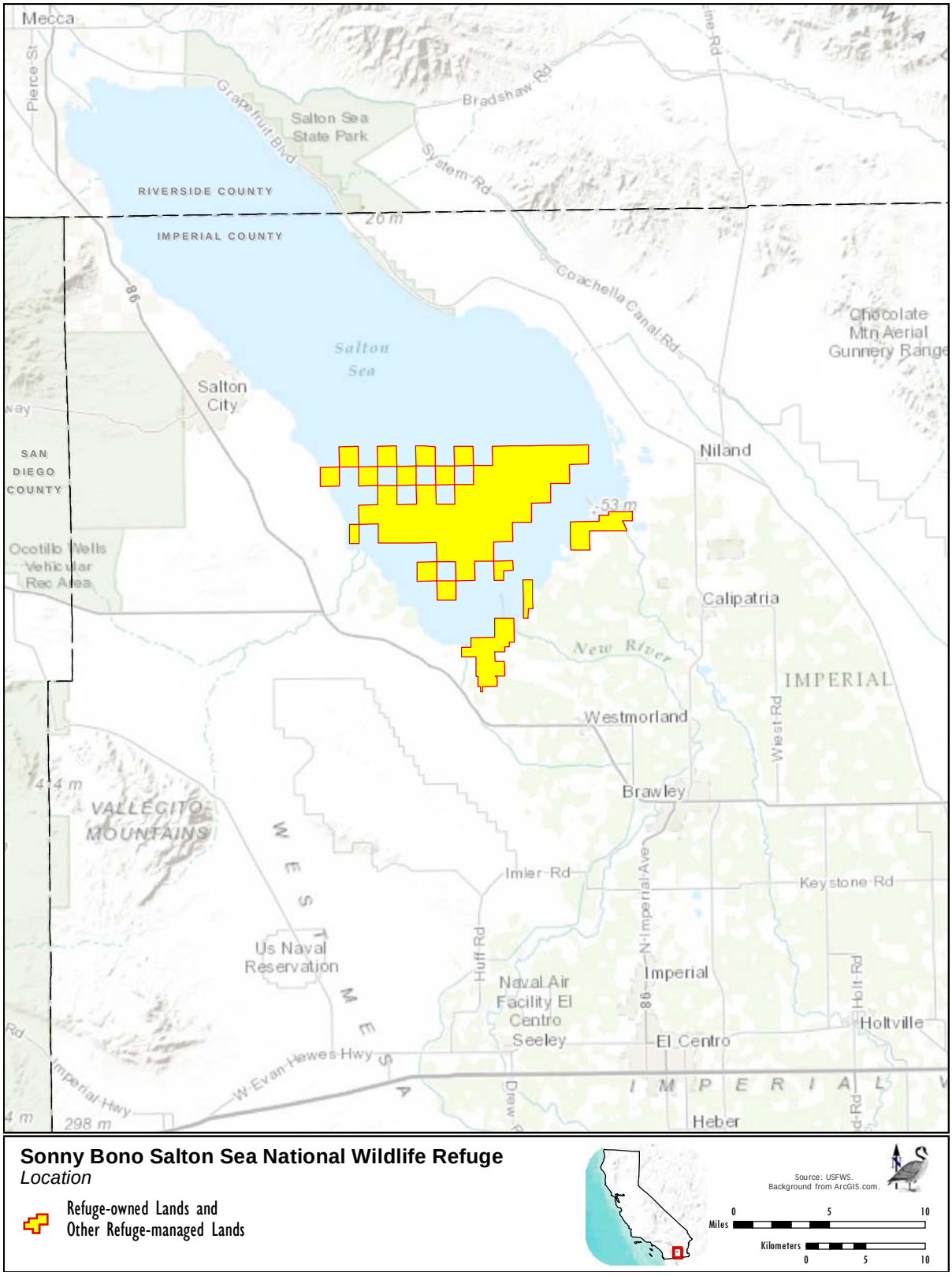
The purpose and need for the Sonny Bono Salton Sea NWRC CCP is to provide guidance to the Refuge Manager and others for how the Refuges within the Complex should be managed to best achieve the purposes for which they were established and to contribute to the mission of the National Wildlife Refuge System (Refuge System or NWRS). This CCP addresses the management of wildlife, fish, and plant resources and their related habitats, while also considering opportunities for compatible wildlife-dependent recreational use. It is through the CCP process that the overarching wildlife, public use, and/or management needs for these Refuges, as well as any issues affecting the management of Refuge resources and public use programs, are identified; and various strategies for meeting Refuge needs and/or resolving issues that may be impeding the achievement of Refuge purposes are evaluated and ultimately presented for implementation.




**Sonny Bono Salton Sea National Wildlife Refuge Complex**
*Vicinity*

Acquisition boundary
*Because the Service's land acquisition program is based on willing sellers, not all lands within the approved acquisition boundary may be acquired.*

**Figure 1-1. Regional Vicinity Map - Sonny Bono Salton Sea National Wildlife Refuge Complex**




**Sonny Bono Salton Sea National Wildlife Refuge**
*Location*

Refuge-owned Lands and Other Refuge-managed Lands

**Figure 1-2. Location Map - Sonny Bono Salton Sea National Wildlife Refuge**

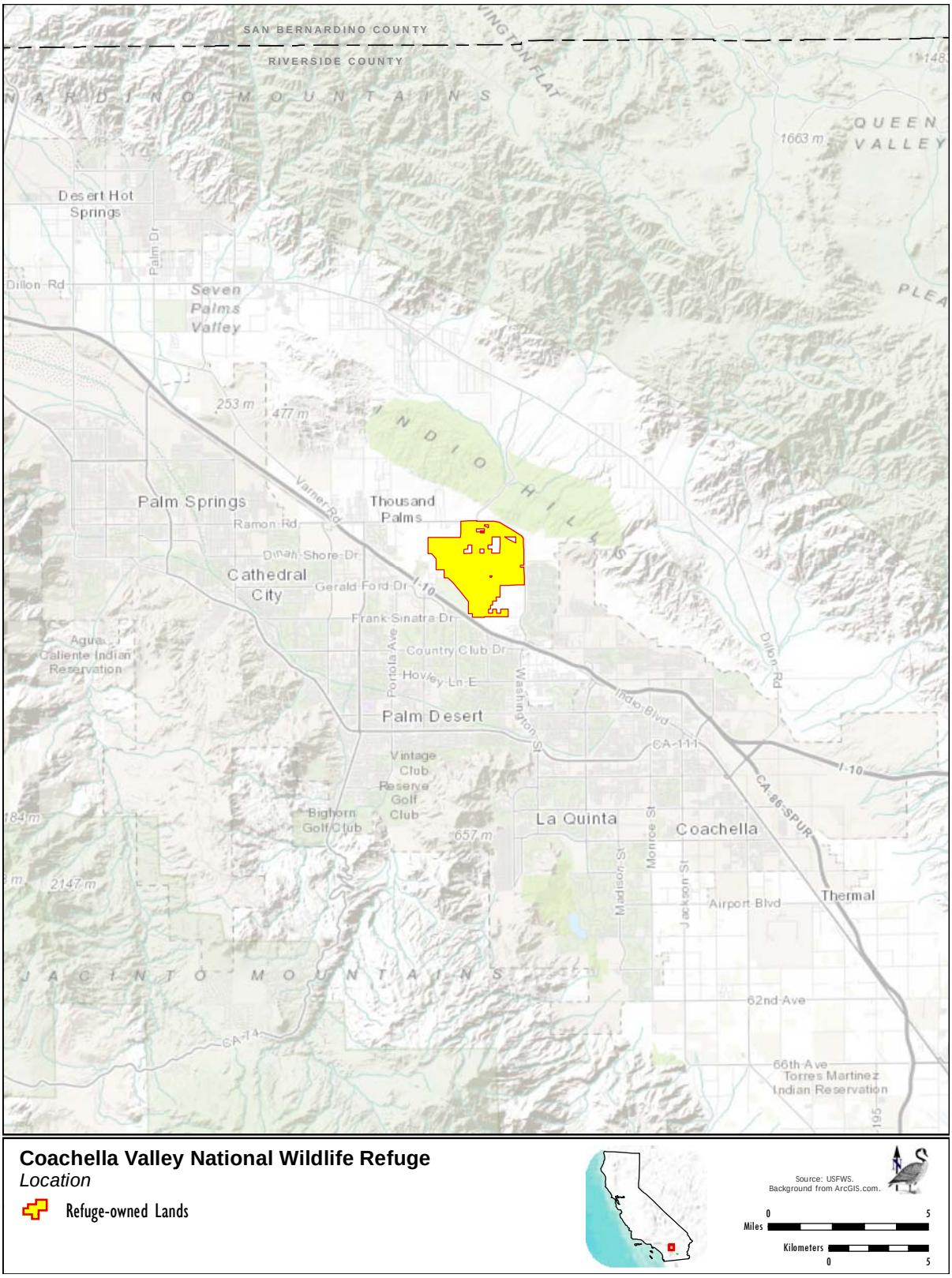



**Figure 1-3. Location Map - Coachella Valley National Wildlife Refuge**

A CCP is intended to:

- Ensure that Refuge management is consistent with the NWRS mission and Refuge purposes and that the needs of wildlife come first, before other uses;
- Provide a scientific foundation for Refuge management;
- Establish a clear vision statement of the desired future conditions for Refuge habitat, wildlife, visitor services, staffing, and facilities;
- Communicate the Service's management priorities for the Refuge to its neighbors, visitors, partners, State, local, and other Federal agencies, and to the general public;
- Ensure that current and future uses of the Refuge are compatible with Refuge purposes;
- Provide long-term continuity in Refuge management; and
- Provide a basis for budget requests to support the Refuge's needs for staffing, operations, maintenance, and capital improvements.

This CCP also fulfills the legislative obligations of the Service. Its preparation is mandated by the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 United States Code [USC] 668dd-668ee) (Improvement Act). The Improvement Act requires that a CCP be prepared for each refuge or related complex of refuges within 15 years of the law's enactment. In accordance with the Act, the Service is developing a CCP for each refuge included within the NWRS.

A plan to guide management of the Sonny Bono Salton Sea NWR has not been updated since 1972; as a result, limited guidance is currently available for how best to achieve Refuge purposes and other mandates. General management direction for the Coachella Valley NWR is currently provided within the Coachella Valley Multiple Species Habitat Conservation Plan (CVAG 2007a). This CCP sets forth specific Refuge goals and objectives and describes the strategies to be implemented to achieve these goals and objectives. The guidance provided is based on specific Refuge purposes, Federal laws, NWRS goals, and Service policies.

Although the CCP addresses all management actions and activities occurring or proposed to occur on the Refuge, some of these actions or activities are broadly stated, while others, such as implementation of an Integrated Pest Management Plan, Predator Management Plan, and restoration of Red Hill Bay, are described in sufficient detail to ensure adequate consideration of potential effects on the environment as required by NEPA.

## 1.3 U.S. Fish and Wildlife Service and National Wildlife Refuge System

### 1.3.1 U.S. Fish and Wildlife Service

The Service is the primary Federal agency responsible for conserving and enhancing the Nation's fish and wildlife populations and their habitats. Although this responsibility is shared with other Federal, State, tribal, local, and private entities, the Service has specific responsibilities for migratory birds, threatened and endangered species, interjurisdictional fish, and certain marine mammals. The Service also has similar trust responsibilities for the lands and waters it administers to support the conservation and enhancement of fish and wildlife. The mission of the Service is "Working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

### 1.3.2 National Wildlife Refuge System

The NWRS is the largest system of lands and waters in the world specifically dedicated to the conservation of fish and wildlife. Unlike other public lands, which are managed under a multiple-uses mandate (e.g., National forests managed by the U.S. Forest Service [USFS] and lands administered by the Bureau of Land Management [BLM]), the lands within the NWRS are managed primarily for the benefit of fish, wildlife, and plant resources and their habitats. The Refuge System consists of over 550 units that provide more than 150 million acres of habitat for native plants, fish, and wildlife, including threatened and endangered species.

In 1903, President Theodore Roosevelt established Pelican Island as the Nation's first bird sanctuary. With this action, pelicans, herons, ibis, and roseate spoonbills nesting on a small island in Florida's Indian River were given protection from feather collectors who were decimating their colonies. President Roosevelt went on to establish many other wildlife sanctuaries during his tenure. This small network of sanctuaries continued to expand, later becoming the NWRS, whose mission is "to administer a national network of lands and waters for the conservation, management and, where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (Improvement Act).

The administration, management, and growth of the NWRS are guided by the following goals (Service Manual, Part 601 FW1, NWRS Mission and Goal, and Refuge Purposes):

- Conserve a diversity of fish, wildlife, and plants and their habitats, including species that are endangered or threatened with becoming endangered;
- Develop and maintain a network of habitats for migratory birds, anadromous and interjurisdictional fish, and marine mammal populations that is strategically distributed and carefully managed to meet important life history needs of these species across their ranges;
- Conserve those ecosystems, plant communities, wetlands of national or international significance, and landscapes and seascapes that are unique, rare, declining, or underrepresented in existing protection efforts;
- Provide and enhance opportunities to participate in compatible wildlife-dependent recreation (hunting, fishing, wildlife observation and photography, and environmental education and interpretation); and
- Foster understanding and instill appreciation of the diversity and interconnectedness of fish, wildlife, and plants and their habitats.

## 1.4 Legal and Policy Guidance

Legal mandates and Service policies govern the Service's planning and management of the NWRS. A list and brief description can be found at the "Division of Congressional and Legislative Affairs, USFWS" Web site (http://www.fws.gov/laws/Lawsdigest.html). In addition, the Service has developed policies to guide NWRS planning and management. These policies can be found at the "NWRS Policies Web site" (http://www.fws.gov/refuges/policiesandbudget/refugepolicies.html). The main sources of legal and policy guidance for the CCP and EA are described in this section, and additional information is provided in Appendix J.

### 1.4.1 National Wildlife Refuge System Improvement Act of 1997

Statutory authority for Service management and associated habitat management planning on units of the NWRS is derived from the National Wildlife Refuge System Administration Act of 1966 (Refuge Administration Act), which was significantly amended by the National Wildlife Refuge System Improvement Act of 1997 (P.L.105-57). The Improvement Act intends that each refuge be managed to fulfill the mission of the Refuge System, as well as the specific purposes for which that refuge was established. As stated in the Refuge Administration Act, as amended by Improvement Act, "purposes of the refuge and purposes for each refuge mean the purposes specified in or derived from law, proclamation, Executive order, agreement, public land order, donation document, or administrative memorandum establishing, authorizing, or expanding a refuge, refuge unit, or refuge subunit."

The Refuge Administration Act, as amended, clearly establishes wildlife conservation as the core NWRS mission. House Report 105-106, accompanying the Improvement Act, states that "the fundamental mission of our Refuge System is wildlife conservation: wildlife and wildlife conservation must come first." In contrast to other systems of public lands, the NWRS is a primary-use network of lands and waters. First and foremost, refuges are managed for fish and wildlife, plants, and their habitats.

The Improvement Act provides clear standards for management, use, planning, and growth of the NWRS. Its passage followed the promulgation of Executive Order 12996 (April 1996), "Management of Public Uses on National Wildlife Refuges," reflecting the importance of conserving natural resource for the benefit of present and future generations of people. The Improvement Act recognizes that wildlife-dependent recreational uses involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation, when determined to be compatible with the mission of the NWRS and purposes of the Refuge, are legitimate and appropriate public uses of the Refuge System.

Section 5 of the Improvement Act directs the Secretary of the Interior to ensure or conduct 14 actions in administering the NWRS. In addressing these actions, a number of policies have been developed to help guide the administration of Refuge lands. Refuge System policies, which can be found in the land use management series (600) of the U.S. Fish and Wildlife Service Manual (available online at http://www.fws.gov/policy/manuals), are summarized in Table 1-1.

**Table 1-1**
**Key Service Policies Related to the Management of National Wildlife Refuges**

| Policy | Purpose |
|---|---|
| **Refuge System Mission and Goals and Refuge Purposes (601 FW 1)** | Reiterates and clarifies the Refuge System mission and how it relates to the Service mission; explains the relationship between the Refuge System mission, goals, and purpose(s). |
| **Comprehensive Conservation Planning (602 FW 3)** | Describes the requirements and processes for developing refuge comprehensive conservation plans. |
| **Biological Integrity, Diversity, and Environmental Health Policy (601 FW 3)** | Provides guidance for maintaining and restoring, where appropriate, the biological integrity, diversity, and environmental health of the NWRS. |

| Table 1-1<br>Key Service Policies Related to the Management of National Wildlife Refuges | |
|---|---|
| **Policy** | **Purpose** |
| **Appropriate Use Policy (603 FW 1)** | Describes the initial decision process the Refuge Manager follows when considering whether to allow a proposed use on a refuge. For uses other than the six wildlife-dependent recreational uses of the Refuge System, the Refuge Manager must first find the use appropriate before undertaking a compatibility review. Appropriateness reviews are included with the compatibility determinations in Appendix E of this CCP. |
| **Compatibility Policy (603 FW 2)** | Details the formal process for determining if a use proposed on a refuge is compatible with the Refuge System mission and the purposes for which the refuge was established. Units of the Refuge System are legally closed to all public access and use, including economic uses, unless and until they are officially opened through a compatibility determination (CD). Appendix E contains the CDs for the uses on Sonny Bono Salton Sea NWR and the Coachella Valley NWR. The draft CDs were made available for public comment along with the draft CCP. |
| **Wildlife-Dependent Recreation (605 FW 1-7)** | Provides specific information and guidance for each of the six priority wildlife-dependent uses (hunting, fishing, wildlife observation, photography, environmental education, and interpretation): the policy for the use; guiding principles for the use; guidelines for program management; and guidelines for opening the specific program. |
| **Wilderness Stewardship Policy (610 FW 1-5)** | Provides guidance on conducting wilderness inventories for Refuge System lands to determine if these lands should be recommended for wilderness designation; establishes policy for managing wilderness study areas and recommended and proposed wilderness; and prescribes how refuge managers will preserve the character and qualities of designated wilderness while managing for refuge purpose(s). The wilderness inventory for the Sonny Bono Salton Sea NWRC is provided in Appendix M. |

### 1.4.2 National Environmental Policy Act (NEPA) of 1969

As the basic national charter for the protection of the environment, NEPA requires Federal agencies to consider the environmental effects of all actions (i.e., policies, plans, programs, or projects that are implemented, funded, permitted, or controlled by a Federal agency or agencies) they undertake. Agencies must also consider the environmental effects of all reasonable and feasible alternatives to a proposed action and must make public the environmental effects of the proposed action and possible alternatives. If adverse environmental effects cannot be entirely avoided, NEPA requires an agency to show evidence of its efforts to reduce these adverse effects and to restore and enhance environmental quality as much as possible. The contents of an EA or Environmental Impact Statement (EIS) document that an agency has addressed these issues.

The CCP process must comply with the provisions of NEPA through the concurrent preparation of an EA or EIS. The NEPA document can accompany the draft CCP or be integrated into the draft CCP. The Sonny Bono Salton Sea NWRC CCP was prepared consistent with the requirements of NEPA, the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR §1500 et seq.), and the Department of Interior's NEPA procedures (43 CFR Part 46). To comply with CEQ NEPA regulations and ensure the NEPA process was integrated into the CCP process at the earliest possible time, an EA was integrated directly into the draft CCP.

## 1.5 The Comprehensive Conservation Planning Process

Key steps in the CCP and parallel NEPA processes include:

- Pre-planning;
- Public scoping and involvement;
- Identifying issues, opportunities, and concerns;
- Defining and revising vision statement and Refuge goals;
- Developing and evaluating alternatives;
- Identifying the proposed action for each Refuge;
- Drafting the CCP and EA;
- Revising draft documents and releasing the Final CCP;
- Implementing the CCP; and
- Monitoring and adapting management practices as necessary.

Figure 1-4 presents the overall steps in the CCP process, many of which include opportunities for public input, in a linear cycle, but the planning process is actually a non-sequential movement among the steps, with many revisions occurring during plan development.

### 1.5.1 Preplanning

Preplanning for this CCP began in 2010 with the establishment of a core planning team. The core planning team consists of the Project Leader, Deputy Project Leader, Refuge Planner, Refuge Wildlife Biologist, and other members of the Sonny Bono Salton Sea NWRC, as well as a representative from CDFW. In addition, an expanded team was formed to integrate stakeholders into the planning process. Section F-1 of Appendix F lists the members of the core planning team, as well as other participants who provided important insight regarding planning issues and ongoing refuge management.

The initial tasks of the core planning team involved the collection of pertinent data for each Refuge and the identification of preliminary issues, concerns, and opportunities. Through this process, the planning team identified primary areas of focus, including wildlife and habitat management, public use, and Refuge operations. These focus areas, which were presented to the public during the scoping process, helped to shape the public input received during the scoping period into potential objectives for each Refuge.

### 1.5.2 Public Involvement in Planning

Public involvement is an essential component of the CCP and NEPA process. The public is encouraged to participate in this planning effort from its initiation during the scoping process through the public comment period on the draft CCP/EA. The Service also encourages the public to stay involved in the planning process during plan implementation.

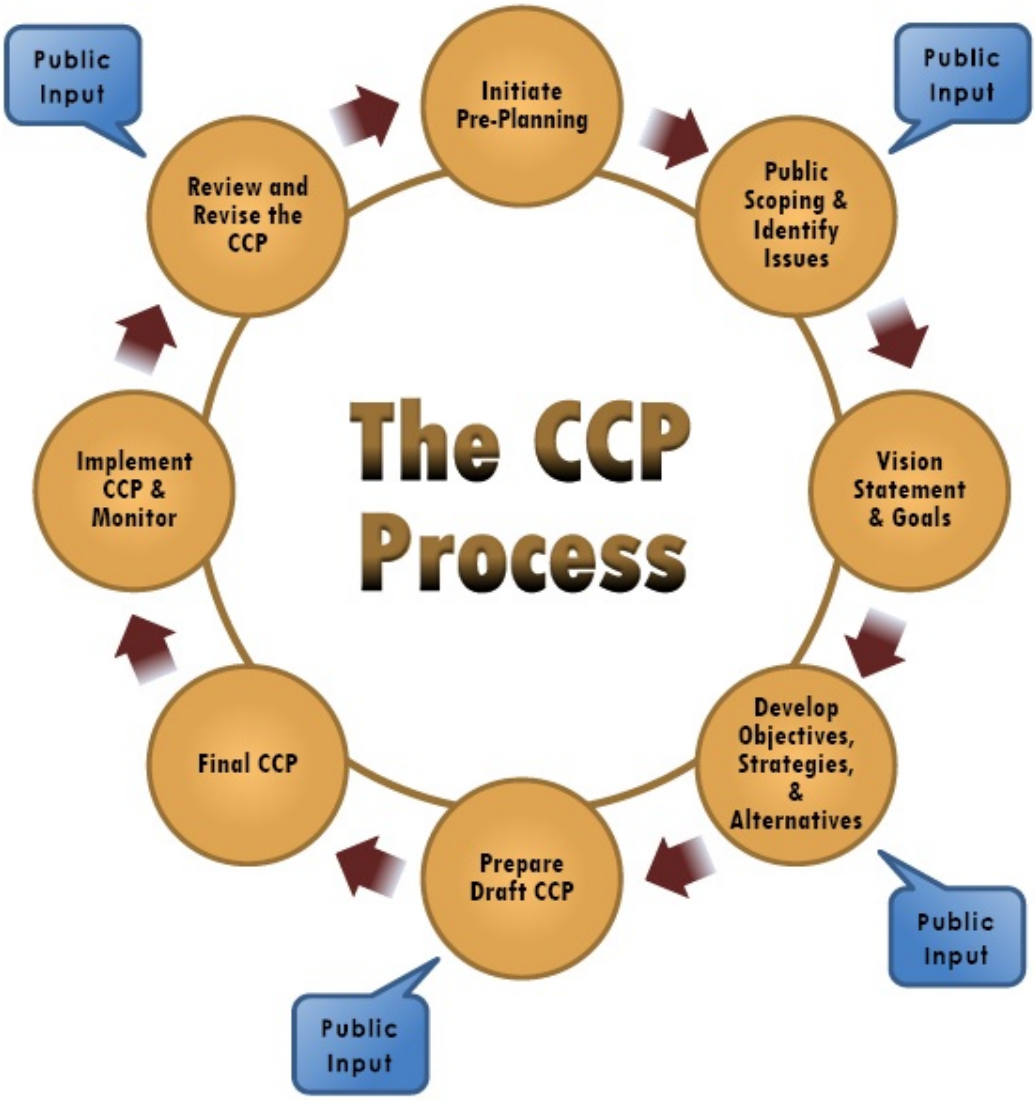



**Figure 1-4. Comprehensive Conservation Planning Process**

The public planning effort for the Sonny Bono Salton Sea NWRC CCP began in August 2010 when a newsletter (referred to as a "Planning Update") was distributed to approximately 380 entities, including local, State, and Federal agencies; special districts; tribes; interested organizations; adjacent property owners; potential user groups; and other interested members of the public. This initial Planning Update described the planning process and requested input regarding the future management of the Refuge Complex. The CCP was officially initiated on October 15, 2010, when the Notice of Intent to prepare a CCP for the Sonny Bono Salton Sea NWRC was published in the *Federal Register* (75 FR 63379 [15 October 2010]).

Two public scoping meetings were held in September 2010, one in Palm Desert and one in Calipatria, to further develop and ascertain Refuge planning issues. Representatives from affected public agencies and non-profit organizations, elected officials, private property owners, and

interested members of the public attended these meetings and provided written and verbal comments that were recorded and compiled for consideration during the development of objectives, strategies, and alternatives. Others contributed written comments either electronically or by mail in response to the *Federal Register* notice, the appeal for input provided in the Planning Update, and the press release that was issued regarding the planning effort and the scoping meetings. The issues raised during the scoping process addressed a range of topics from requests for expanded public uses to concerns regarding the fate of the Salton Sea.

A summary of the comments received during the scoping process was provided in a second Planning Update, distributed in January 2012. This Planning Update also presented preliminary management alternatives for the Sonny Bono Salton Sea NWR and Coachella Valley NWR, with an invitation for the public to provide comments regarding the proposed alternatives. A number of comments were provided that related to the hunting proposals included in two of the alternatives, and several other comments addressed habitat management proposals.

On July 23, 2013, the Notice of Availability of the draft CCP/EA for the Sonny Bono Salton Sea NWR Complex was published in the *Federal Register*. Notice of the document's availability was distributed to Federal, State, and local agencies, Tribal governments, State Clearinghouse, several public libraries, and interested organizations and individuals (refer to the distribution list provided in section F-2 of Appendix F). Public comments were accepted through August 22, 2013. Two public meetings were held to take comments on the document: one in Palm Desert on July 30, 2013 and one in Brawley on July 31, 2013.

Thirteen comment letters were received during the public review process. These comments, which are provided in section F-3 of Appendix F, addressed a range of issues including Salton Sea restoration, water rights, land tenure, surrounding land use, and visitor services. The Final CCP and EA were modified, as appropriate, to address the comments received. Changes to the EA are indicated with underlining.

### 1.5.3 Public Scoping

Issues, concerns, and opportunities associated with the future management of the Refuges within the Sonny Bono Salton Sea NWRC were obtained from a variety of sources. As presented in Section 2.4.1 of the Final CCP, a range of issues was identified during the public scoping process. Additional issues were identified by the planning team and during meetings with Refuge staff. A focused discussion of wildlife and habitat management issues was conducted that involved other Federal and State agencies, The Center for Natural Lands Management, and several other wildlife and habitat professionals. The Service also conducted a visitor services review to examine existing and potential future wildlife-dependent recreational uses on these Refuges.

All of this input was compiled by the Service and taken into consideration during the development of management alternatives. This input was also used to further refine Refuge goals.

### 1.5.4 Management Challenges and Opportunities

In addition to the issues raised during the public scoping process, the planning team, with input from other partners, also identified challenges, threats, and opportunities that are likely to affect management within the Sonny Bono Salton Sea NWRC over the next 15 years and beyond. Additional discussion on this topic is provided in Section 2.5 of the Final CCP.

## 1.6 Sonny Bono Salton Sea National Wildlife Refuge Complex

### 1.6.1 Location

The Sonny Bono Salton Sea NWRC, which includes the Sonny Bono Salton Sea NWR and the Coachella Valley NWR, is located in the southern end of the State of California within the low-lying Colorado Desert subregion of the Sonoran Desert bioregion. Separated by a distance of about 75 miles, these Refuges are situated within the Salton Basin (also known as the Salton Trough), which extends for approximately 200 miles from San Gorgonio Pass in the north through the Coachella, Imperial, and Mexicali valleys to the Gulf of California (refer to Figure 1-1).

#### *1.6.1.1 Sonny Bono Salton Sea NWR*

The Sonny Bono Salton Sea NWR is located within and adjacent to the southern and southeastern portions of the Salton Sea in the northern portion of the Imperial Valley, Imperial County, California. The Refuge consists of approximately 37,900 acres; however, most of this area is currently located below the surface of the Salton Sea. The lands managed within the Refuge occur in three general locations as described below and illustrated in Figure 1-5.

1) Approximately 32,405 acres are located in the southern portion of the Salton Sea, including 23,425 acres of Federal land controlled by the Bureau of Reclamation and administered by the Service and 8,980 acres owned in fee title by the United States and under the jurisdiction of and managed by the Service. When the Refuge was established in 1930, this area consisted of both wetland and upland habitat; however, these lands were subsequently flooded by the Salton Sea.

2) Approximately 3,782 acres are located along the southern edge of the Salton Sea (Unit 1); with approximately 3,226 acres (a combination of open water, managed wetlands, and upland areas, some of which are actively farmed to create foraging areas for snow geese [*Chen caerulescens caerulescens*], Ross' geese [*Chen rossii*], and other waterfowl) located to the south of Bruchard Bay. An additional 556 acres (most of which were until recently submerged beneath the Salton Sea) are located just to the east. Of the approximately 3,780 acres of Refuge lands within Unit 1, about 560 acres are owned in fee title by the United States and under the jurisdiction and management of the Service, about 2,980 acres are leased from the Imperial Irrigation District (IID), and approximately 240 acres, owned by the State of California (Caltrans), have been managed by the Service through an agreement with the State.

3) Approximately 2,026 acres, which include the Refuge headquarters and a variety of managed uplands and wetlands, are located along the southeastern edge of the Salton Sea near the terminus of the Alamo River (Unit 2); of the 2,026 acres of Refuge lands within Unit 2, approximately 164 acres (including the 3.44-acre refuge headquarters site) are federally owned and under the jurisdiction and management of the Service, about 1,247 acres are leased from IID, and 615 acres are leased from the California Department of Fish and Wildlife (CDFW).

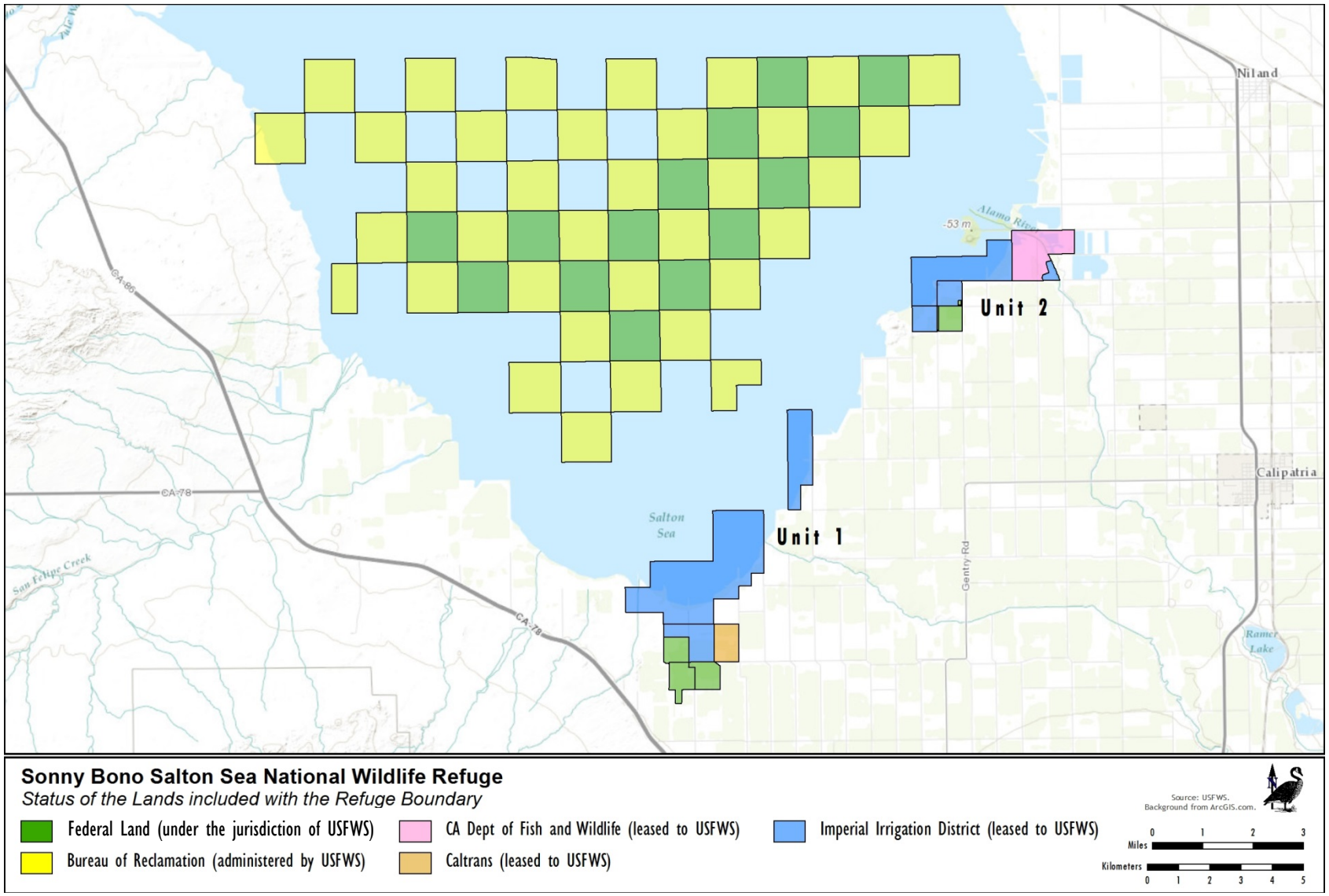



**Figure 1-5. Land Status Map – Sonny Bono Salton Sea NWR**

#### 1.6.1.2 Coachella Valley NWR

The 3,577-acre Coachella Valley NWR is located in the Coachella Valley in eastern Riverside County to the north of Interstate 10 (I-10) near the communities of Bermuda Dunes and Thousand Palms. The Refuge is bounded on the south by Avenue 38, on north by Ramon Road, and on the east by Washington Street (refer to Figure 1-3). All of the lands included within the Refuge are owned in fee title by the Service.

### 1.6.2 Refuge Setting

#### 1.6.2.1 Sonny Bono Salton Sea NWR

The Sonny Bono Salton Sea NWR is located in the rain shadow of the Peninsular Ranges; consequently, the climate is generally very hot and dry. Much of the Salton Trough, where the Refuge is situated, is below sea level. These low-lying lands historically provided an area for Colorado River floodwaters to flow, resulting in the periodic formation of an extensive freshwater lake known as Lake Cahuilla. Today, the Salton Sea, a saline lake that receives most of its water from agricultural drainage occupies a portion of the Salton Trough.

The Imperial Valley is geographically located at the confluence of numerous bird migration pathways as birds fly north and south along the California coast, the Peninsular Mountain Range, California's Central Valley, or the Colorado River corridor through the Imperial Valley and into mainland Mexico. It is in this setting that birds migrate through or winter at the Sonny Bono Salton Sea NWR foraging or loafing in the highly productive wetland and cropland areas of the Refuge. The Refuge also serves as a summer nesting area for several species of seabirds and shorebirds, and provides habitat to support the Federal endangered Yuma Ridgway's rail (*Rallus obsoletus yumanensis*).

#### 1.6.2.2 Coachella Valley NWR

The Coachella Valley NWR is located in the eastern portion of Riverside County (refer to Figure 1-1) within the Coachella Valley, a broad, low elevation, northwest-southeast trending valley comprising the westernmost limits of the Sonoran Desert (CVAG 2007b). At the western edge of the valley, the San Jacinto and San Gorgonio Mountains nearly meet forming the San Gorgonio Pass, which funnels nearly continuous winds from the cooler coastal basins inland. Desert washes draining out of the Little San Bernardino Mountains to the north of the Valley provide alluvial sand that is picked up by wind blowing through the pass and deposited within the Coachella Valley. Over the years, large areas of the Valley's natural desert habitats have been converted to agriculture fields or community developments, leaving limited areas undeveloped to support desert blowsand habitats such as those protected within the Coachella Valley NWR.

### 1.6.3 Ecosystem Context

To the extent possible, the management actions proposed in CCPs should assist in achieving the conservation goals established in existing national and regional plans, California's Wildlife Action Plan, and landscape-scale plans covering the same watershed or ecosystem in which the Refuge resides (602 FW 3.3). CCPs should also consider the larger landscape-level planning that is occurring in various regions of the country through Landscape Conservation Cooperatives (LCCs). The Refuges of the Sonny Bono Salton Sea NWRC are included within the Desert LCC, which encompasses portions of five states: California, Nevada, Arizona, New Mexico, and Texas, as well as a substantial portion of Northern Mexico. The LCCs provide a forum for information sharing that will help scientists and resource managers deal with uncertainties on the landscape and provide tools to compare and contrast the implications of management alternatives. LCC partners jointly decide on the highest priority needs and interests of the LCC and will have a role in helping partners identify common goals and priorities.

Other regional planning efforts that have the potential to influence the management practices within the Refuge Complex, including Sonoran Joint Venture Bi-national Bird Conservation planning, regional habitat conservation plans, and Natural Community Conservation Plans, are described in Section 1.5.3 of the Final CCP.

## 1.7 Refuge Purposes, Vision, and Goals

### 1.7.1 Refuge Purposes

**Sonny Bono Salton Sea NWR**

The Refuge was initially established in 1930 under the Executive Order 5498 as "a refuge and breeding ground for birds and wild animals." Additional lands were acquired for management as part of the Refuge either through fee title, lease, or other agreement for various purposes, including: "for use as an inviolate sanctuary, or for any other management purpose for migratory birds" (Migratory Bird Conservation Act of 1929 [16 U.S.C. 715 to 715s]); "for the management and control of migratory waterfowl and other wildlife" (Lea Act of 1948 [16 U.S.C. 695-695c; 62 Stat. 238]); and "primarily for the production of crops to provide wintering feed for waterfowl and to aid and assist in the control of depredation by waterfowl to commercial crops in the area" (Fish and Wildlife Act of 1956, as amended [16 U.S.C. 742a-742j, not including 742 d-l; 70 Stat. 1119]).

**Coachella Valley NWR**

The Coachella Valley NWR was established in 1985 "to conserve (A) fish and wildlife which are listed as endangered species or threatened species . . . or (B) plants…" (Endangered Species Act of 1973 [16 U.S.C. §1531 et seq.]).

### 1.7.2 Vision Statement and Goals

**Sonny Bono Salton Sea NWR**

Presented here is our vision for the future of the Sonny Bono Salton Sea NWR:

*Often described as one of the most important bird areas in the North America, the Salton Sea has been a vital stopover and wintering spot for migratory birds for about a century. Located within the southern end of the Sea, the Sonny Bono Salton Sea NWR continues to play an important role in the monitoring and management of the abundance of birds that annually visit the Sea and adjacent habitats. The predicted changes to the Salton Sea including decreasing water elevations and increasing salinity levels will necessarily influence how management on the Refuge proceeds into the future. In partnership with other agencies and organizations, the Refuge will manage existing and new habitat areas to compensate for the losses in foraging opportunities within the Sea.*

*Managed fields of lush, green forage will continue to entice wintering snow and Ross's geese to congregate on Refuge lands rather than adjacent commercial agricultural fields, with the Refuge's wintering population of sandhill cranes also taking advantage of these resources. Managed open water and shallow seasonal wetlands within and adjacent to the historical footprint of the Sea will provide a range of foraging and loafing habitats for a diverse array of migratory seabirds, shorebirds, waterfowl, and other waterbirds. The continued management of cattail marshes will aid in the recovery of the endangered Yuma Ridgway's rail, while also providing essential habitat for other secretive marshbirds of concern. Tree rows, restored*

*riparian corridors, and native upland areas will provide breeding and foraging habitat for resident birds and wildlife, as well as migratory songbirds.*

*Public involvement in and appreciation for ongoing efforts to provide essential habitats for migratory birds, as well as the Refuge's resident birds and wildlife, will be fostered through continued opportunities for wildlife-oriented recreation, environmental education, and interpretation.*

The goals for the Sonny Bono Salton Sea NWR include:

Goal 1: Protect, manage, enhance, and restore foraging, loafing, and nesting habitats on the Refuge to support migratory birds.

Goal 2: Protect, manage, and, where appropriate, enhance or restore habitat to support the recovery of federally and State listed threatened and endangered species and other species of concern known to occur on the Refuge.

Goal 3: Manage and protect remnant native desert scrub habitat, tree rows, and riparian areas on the Refuge to support resident bird and other wildlife species, as well as nesting habitat for Neotropical bird species.

Goal 4: Work in partnership with other Federal, State, and local agencies and tribes to restore, enhance, and adaptively manage habitat functions that support fish and bird life, as well as to protect other resources of region-wide significance, in and around the Salton Sea.

Goal 5: Enhance the public's awareness, appreciation, and enjoyment of the Refuge's biological resources by providing opportunities for compatible wildlife-dependent recreational uses.

**Coachella Valley NWR**

Presented here is our vision for the future of the Coachella Valley NWR:

*Through the combined forces of rain and wind, sand is created and carried from the little San Bernardino Mountains, through the Indio Hills, and onto the wide alluvial fan that includes the lands within the Coachella Valley NWR. Deposited sand forms active sand dunes and sand fields that are continually being reshaped as natural sand transport processes moves the sand downwind, replacing the lost sand with new sand blowing down from the Indio Hills. As nearly half of the sand dune and sand field habitat (about 200 acres) remaining within the Thousand Palms Conservation Area is conserved within the Coachella Valley NWR, we will strive to protect this habitat, work in partnership with others to protect the natural sand transport processes, and if necessary, actively manage this habitat to mimic the natural processes essential to the long-term persistence of these aeolian sand communities.*

*Management and enhancement of the Refuge's native habitat areas will aid in the recovery of the federally endangered Coachella Valley milk-vetch and threatened Coachella Valley fringe-toed lizard and benefit core habitat areas for the Coachella Valley giant sand-treader cricket,*

*flat-tailed horned lizard, Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. The Coachella Valley NWR, as a partner in a larger effort to conserve the native habitats and listed and sensitive species within the Coachella Valley, will continue to actively participate in the management and monitoring efforts outlined in the Coachella Valley Multiple Species Habitat Conservation Plan and will encourage research on the Refuge that supports Refuge purposes and the goals of the larger conservation planning effort. Support for the protection of the Refuge's unique resources will be achieved through environmental education and a public outreach program that includes permanent off-site and traveling interpretive displays.*

The goals for the Coachella Valley NWR include:

Goal 1: Protect, restore, and enhance Refuge lands to contribute to the recovery of the federally threatened Coachella Valley fringe-toed lizard and endangered Coachella Valley milk-vetch, as well as to conserve other species of concern supported on the Refuge.

Goal 2: Through participation in a coordinated management effort involving all of the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) partners, sustain the ecological and evolutionary processes necessary to maintain the viability of the natural communities and habitats that support the species identified in the CVMSHCP and manage these communities and habitats adaptively to be responsive to short- and long-term environmental change.

Goal 3: Enhance the public's awareness, appreciation, and support for the Refuge's listed and sensitive species, as well as the ecological functions and geological processes that sustain these species, through compatible opportunities for environmental interpretation.

# 2. Alternatives, Including the Proposed Action

## 2.1 Introduction

An important step in the planning process is the development and analysis of alternatives. Alternatives are developed to identify and analyze different ways to achieve Refuge purposes, contribute to the mission of the NWRS, meet Refuge goals, and resolve issues identified during scoping and throughout the CCP process. As described in Chapter 1, compliance with NEPA for this CCP was accomplished through an integrated document, a draft CCP/EA, which enables the requirements of both NEPA and the CCP process to be addressed in one document. Upon completion of the public review process, the two documents were separated, to include a Final CCP and this EA.

In this chapter, we describe the process followed to develop a range of management alternatives for both the Sonny Bono Salton Sea NWR and the Coachella Valley NWR. Also provided are detailed descriptions of the alternative developed for each Refuge; identification of the proposed action for each Refuge; a comparison of the way in which each alternative addresses identified issues; a summary of the similarities among the alternatives; and a discussion of the alternatives that were considered, but eliminated from detailed study.

## 2.2 Alternatives Development Process

The alternatives development process for the Sonny Bono Salton Sea NWRC was an iterative process that required consideration of a number of factors, some of which were known at the beginning of the process and others that became evident during the process as a result of public comments, analysis by the planning team, and information provided by other agencies and interested parties. The issues, constraints, and opportunities affecting management of the Refuges within the Complex were all taken into consideration during alternatives development. Also influencing this process were Refuge purposes, as well as the vision, goals, and objectives for each Refuge.

One of the first steps in the alternatives development process was identifying and describing the various programs and management actions currently being implemented on these Refuges, as these practices represent the "No Action" Alternative. Under the No Action Alternative, the current management of the Refuges would continue to be implemented for the next 15 years or until changes in management direction are approved through a revision to the CCP. It is important to describe the No Action Alternative accurately because it serves as the baseline to which all other alternatives are compared.

Next, the planning team reviewed and evaluated the comments received during the initial phases of the CCP planning process, including scoping and alternatives review, as well as the issues, management concerns, threats, and opportunities described in Sections 2.4 and 2.5 of the Final CCP. Through further analysis of the issues and general public comment, the team developed various objectives for achieving Refuge goals, the mission of the NWRS, and other mandates. Based on the objectives and an analysis of the types of strategies that might be implemented to achieve the objectives, a range of alternatives was developed for how the Refuge should be managed over the next 15 years. These alternatives were further refined during the analysis of environmental consequences.

Three management alternatives, including a no action alternative and two action alternatives, were developed for each Refuge for evaluation in the draft CCP/EA. The three alternatives for each Refuge differ in the extent and focus of wildlife and habitat management actions to be implemented and in the types and levels of public use opportunities to be provided. For each Refuge, Alternative "B" was identified in the draft CCP/EA as the proposed action. The selected management alternative for each Refuge is described in the Final CCP.

## 2.3 Sonny Bono Salton Sea NWR

### 2.3.1 Refuge Management History

Following Refuge establishment in 1930, management actions have focused on protecting birds and wildlife and reducing depredation of adjacent private croplands by ducks and geese. As private agricultural development in the Imperial Valley increased and the amount of farmable land available to the Refuge between the Sea and the private lands decreased, Refuge staff increasingly focused on improving the productivity of the lands that were available to provide forage for wintering waterfowl. Considerable effort also went into identifying suitable farmland that could be acquired in fee title by the Refuge, although for the most part, these efforts were unsuccessful.

With the enactment of the ESA, management activities on the Refuge were expanded to include the protection of listed species known to occur on the Refuge, as well as on restoration and enhancement of habitats to support listed species. The mid 1990s brought added responsibilities related to avian disease monitoring throughout the Salton Sea. A complete description of past and current management activities on the Refuge is provided in Chapter 3, Refuge Management, of the Final CCP.

### 2.3.2 Management Alternatives

The three management alternatives evaluated for the Sonny Bono Salton Sea NWR are summarized in Table 2-1 and described in greater detail in the sections that follow.

**Table 2-1**
**Summary of Major Management Actions for the Sonny Bono Salton Sea NWR under each Alternative**

| Refuge Management Activity | Alternative A (No Action) | Alternative B (Proposed Action) | Alternative C |
|---|---|---|---|
| | | | |
| **Managed Agricultural Fields** | Continue current activities | Implement actions to increase crop yield | Same as Alt. B |
| **Managed Open Water Wetlands** | Continue current activities | Same as Alt. A and partner with IID to restore Red Hill Bay | Same as Alt. B |
| **Managed Seasonal Wetlands** | Continue current activities | Implement actions to improve efficiency of water use | Same as Alt. B |
| **Managed cattail marsh habitat** | Continue current activities | Implement actions to improve habitat quality (e.g., rehabilitation, creation of new habitat) | Same as Alt. B |

| Table 2-1<br>Summary of Major Management Actions for the Sonny Bono Salton Sea NWR under each Alternative | | | |
|---|---|---|---|
| **Refuge Management Activity** | **Alternative A (No Action)** | **Alternative B (Proposed Action)** | **Alternative C** |
| **Salton Sea restoration partnership** | Continue to partner with the State to restore Bruchard Bay | Same as Alt. A | Same as Alt. A |
| **Surveys/Monitoring** | Continue current bird activities | Same as Alt. A and initiate monitoring of desert pupfish in managed habitat areas | Same as Alt. B |
| **Invasive Plant Control** | Continue current invasive plant control | Implement an integrated appropriate to pest management | Same as Alt. B |
| **Predator Management** | Maintain electric fencing around nesting sites | Same as Alt. A and control mammalian predators | Same as Alt. B |
| **Monitoring avian disease on the Salton Sea** | Continue current activities | Continue current activities per available funding | Same as Alt. B |
| **Waterfowl Hunting** | Continue current program | Same as Alt. A | Eliminate Wednesday hunting on Union Tract |
| **Fishing** | Continue current program | Same as Alt. A | Same as Alt. A |
| **Wildlife Observation, Photography, Interpretation** | Continue current program | Improve current facilities, expand opportunities for wildlife observation in Unit 1 & 2 | Improve current facilities, expand wildlife observation opportunities in Unit 1 |
| **Environmental Education (EE)** | Continue current program | Expand current EE program to connect children with nature | Same as Alt. B |
| **Public Outreach** | Continue current efforts | Same as Alt. A | Partner with others to develop an interpretive auto tour route through the Imperial Valley |
| **Research** | Continue current program | Expand opportunities consistent with Refuge purposes | Same as Alt. B |
| **Land Tenure** | Retain current fee title and leased/agreement lands | Evaluate the status of currently managed Refuge lands in light of changing conditions in the Salton Sea | Same as Alt. B |
| **Staffing** | Maintain current staffing levels | Expand staffing to achieve proposed management | Same as Alt. B |
| **Facilities Maintenance** | Continue current activities | Reconstruct or improve various facilities | Same as Alt. B |

#### 2.3.2.1 Similarities among the Alternatives for the Sonny Bono Salton Sea NWR

Although there are differences among the range of alternatives presented for managing the Sonny Bono Salton Sea NWR, the alternatives also include various features and management components that would be part of the CCP regardless of the alternative selected for implementation.

**Features Common to All Alternatives**

Features common to all alternatives are summarized below. To reduce repetition in the alternatives descriptions, those features that are common among all of the alternatives are described in detail in the section that follows only under Alternative A – No Action.

- *Managed Agricultural Fields* - Manage agricultural fields on the Refuge to attract wintering geese that would otherwise forage in nearby fields supporting a variety of commercial crops.

- *Managed Habitats to Support Migratory Birds* - Manage existing permanent open water areas and seasonal shallow wetlands to provide resting and foraging habitat for a wide range of migratory, wintering, and summer nesting waterbirds.

- *Managed Cattail Marsh Habitat* - Manage cattail marsh habitat to support the Refuge's year-round population of endangered Yuma Ridgway's rails, as well as other secretive marshbirds.

- *Salton Sea Restoration Partnerships* – Continue to work cooperatively with Federal and State agencies (e.g., USACOE, Bureau of Reclamation, California Natural Resources Agency, CDFW) to develop and implement restoration projects in the Salton Sea that will support a range of migratory birds, including deep-water habitat restoration within Bruchard Bay to support fish-eating birds.

- *Bird Surveys* - Conduct waterfowl surveys and waterbird surveys on and adjacent to the Salton Sea, and sandhill crane and Yuma Ridgway's rail surveys on the Refuge.

- *Invasive Plant Species Control* - Annually control invasive plant species in managed agricultural areas to control broadleaf weeds; and periodically control other invasive weeds (e.g., sesbania, common reed) and shrubs (i.e., salt cedar) in wetland areas.

- *Monitoring Avian Disease on the Salton Sea* - Monitor for the presence of avian disease on the Salton Sea by conducting regular year-round coordinated patrols with CDFW to search for and remove sick and dead birds. Sick birds are provided with rehabilitation, and dead birds are promptly disposed of to reduce the potential for spreading disease.

- *Environmental Contaminants Coordination* - Work with the Service's Environmental Contaminants Program to ensure that trust resources are not being adversely affected by contaminants originating on site, as well as from offsite sources.

- *Protection of Cultural Resources* - Manage recorded and any yet to be discovered cultural resources located within the Refuge in accordance with existing Federal laws and Service policies. Continue to consider the effects of all proposed actions on cultural resources and consult with the Regional Cultural Resources team, and, when appropriate, the SHPO, federally recognized Tribes, and interested parties.

- *Waterfowl Hunting* - Continue to provide opportunities for waterfowl hunting on the Refuge in partnership with CDFW.

- *Wildlife Observation/Photography/Interpretation* - Continue to maintain facilities on the Refuge that support non-consumptive wildlife-dependent recreational uses.

- *Environmental Education* - Continue to assist in the implementation of on- and off-Refuge environmental education programs.

- *Facilitation of Scientific Research* - Encourage scientific research activities on the Refuge that are consistent with Refuge purposes and provide information relevant to Refuge management responsibilities and actions.

**Features Common to All Action Alternatives**

- *Managed Agricultural Fields* - Implement management actions intended to increase crop yield and optimize water use in managed agricultural fields, and consider the potential for achieving Refuge purposes through a cooperative farming agreement.

- *Restore Shallow Open Water Habitats to Replace Wetlands Lost to a Receding Salton Sea* - Restore the Red Hill Bay area of the Salton Sea in partnership with others to provide shallow water habitat for a range of migratory birds, including nesting seabirds, while also reducing dust emissions from this exposed area of the Salton Sea.

- *Yuma Ridgway's Rail Management Plan* - Prepare a step-down habitat management plan that includes specific actions related to the management of the Refuge's population of Yuma Ridgway's rails, as well as the habitat that supports the rails.

- *Desert Pupfish Monitoring* - Actively monitor the presence of the endangered desert pupfish on the Refuge and work with CDFW to relocate populations discovered in managed ponds to appropriate habitat in the Salton Sea or adjacent drainage ditches.

- *Bird Surveys* - Continue to conduct waterfowl surveys and waterbird surveys on and adjacent to the Salton Sea, and sandhill crane and Yuma Ridgway's rail surveys on the Refuge. Funding and partnerships would be sought for the purpose of establishing baseline productivity data for the various managed habitats within the Refuge, as well as for implementing subsequent periodic monitoring to identify trends and variations in species abundance and diversity over time.

- *Integrated Pest Management (IPM)* – Implement an integrated approach to pest management (as described in the IPM Plan provided as Appendix G) that involves a comprehensive, environmentally sensitive approach to managing pests through a combination of strategies, including the aerial application of herbicides, that pose the least hazard to people, property, and the environment.

- *Predator Management Plan* – Implement, per available funding, a predator management program that includes a range of management actions from vegetation control and other nesting habitat enhancements to non-lethal (deterrence) control of avian and mammalian predators and lethal control of individual mammalian predators (e.g., coyotes, raccoons, feral dogs and cats) that pose a threat to ground nesting gull-billed terns and black skimmers.

- *Optimize Water Delivery to Managed Habitat Areas* – Evaluate, and where feasible make improvements to, the Refuge's current water delivery system to better distribute and conserve water within the various management areas on the Refuge.

- *Improve Opportunities for Wildlife-dependent Recreational Use* – Upgrade existing public use facilities (e.g., sidewalks, trails, interpretive elements) to accommodate all visitors and provide new facilities(e.g., trails, photo blinds) to support wildlife observation and photography.

- *Expand Opportunities of Research* – Research projects that are consistent with Refuge purposes would be identified for implementation on the Refuge to benefit Refuge resources and improve management effectiveness.

- *Address the Refuge's Long-term Water Needs* – Ensure an adequate supply of water to achieve Refuge purposes and goals by exploring and developing a range of water conservation measures and by coordinating with IID to secure an adequate annual allocation of water for the Refuge.

- *Evaluate Current and Future Upland and Wetlands Needs* - In light of the changing conditions at the Salton Sea, initiate a step-down plan to review the land and water needs of the Refuge into the future; this plan will evaluate the current status and configuration of fee-title and leased properties included within the Refuge, determine which lands are necessary to achieve Refuge purposes and goals either now or into the future, and review the potential for land exchanges, transfers of ownership, and/or removal of some lands from the Refuge to better address Refuge purposes and goals.

- *Monitor Changes Related to Climate Change and Receding Water Levels in the Salton Sea* – Funding and partnerships would be sought to monitor changes in avian and fish species composition and abundance in and around the Salton Sea to better understand and address the effects of receding water levels and climate change on the diversity and abundance of migratory and resident bird species in the region.

#### *2.3.2.2 Detailed Description of the Alternatives for the Sonny Bono Salton Sea NWR*

### Alternative A - No Action

The No Action Alternative (Figures 2-1, 2-2, 2-3, and 2-4) proposes no changes in current management practices or public use activities. This alternative also proposes to continue current coordination with other Federal and State agencies related to restoration within the Salton Sea.

#### Wildlife and Habitat Management

The majority of the habitat management actions implemented on the Refuge involve highly managed systems with specific wildlife species and habitat purposes. Managed habitats include agricultural fields maintained for the primary purpose of providing forage for wintering waterfowl; seasonal shallow water wetlands that support alkali bulrush and other vegetation to provide additional forage for waterfowl; freshwater impoundments that support cattails and other freshwater emergent vegetation to provide habitat for the endangered Yuma Ridgway's rail and a number of other secretive marsh birds; and permanent open water areas that provide habitat for shorebirds, seabirds, and other waterbirds, including nesting areas for terns and gulls.

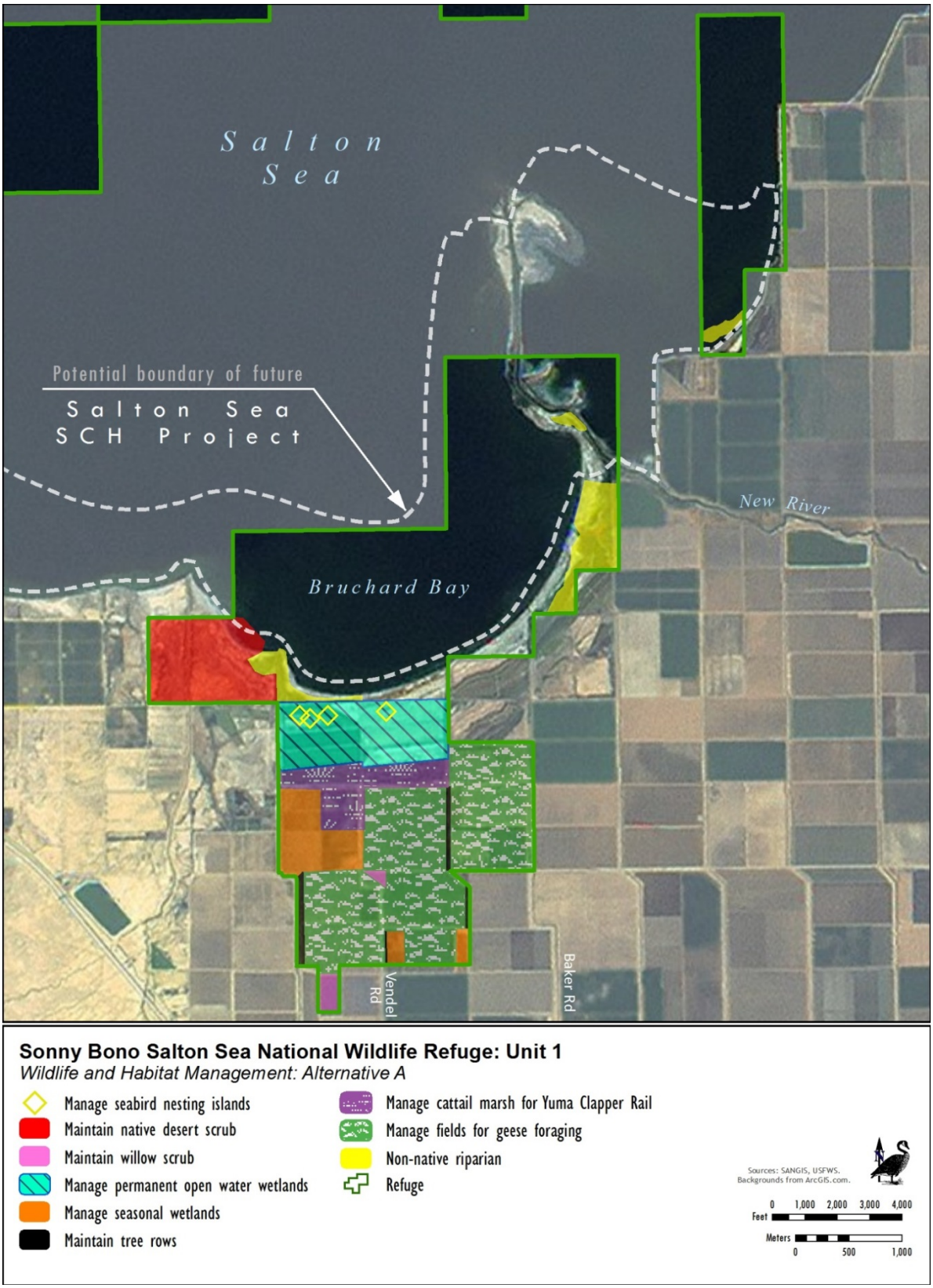



**Figure 2-1. Sonny Bono Salton Sea NWR, Alternative A – No Action (Wildlife and Habitat Management, Unit 1)**

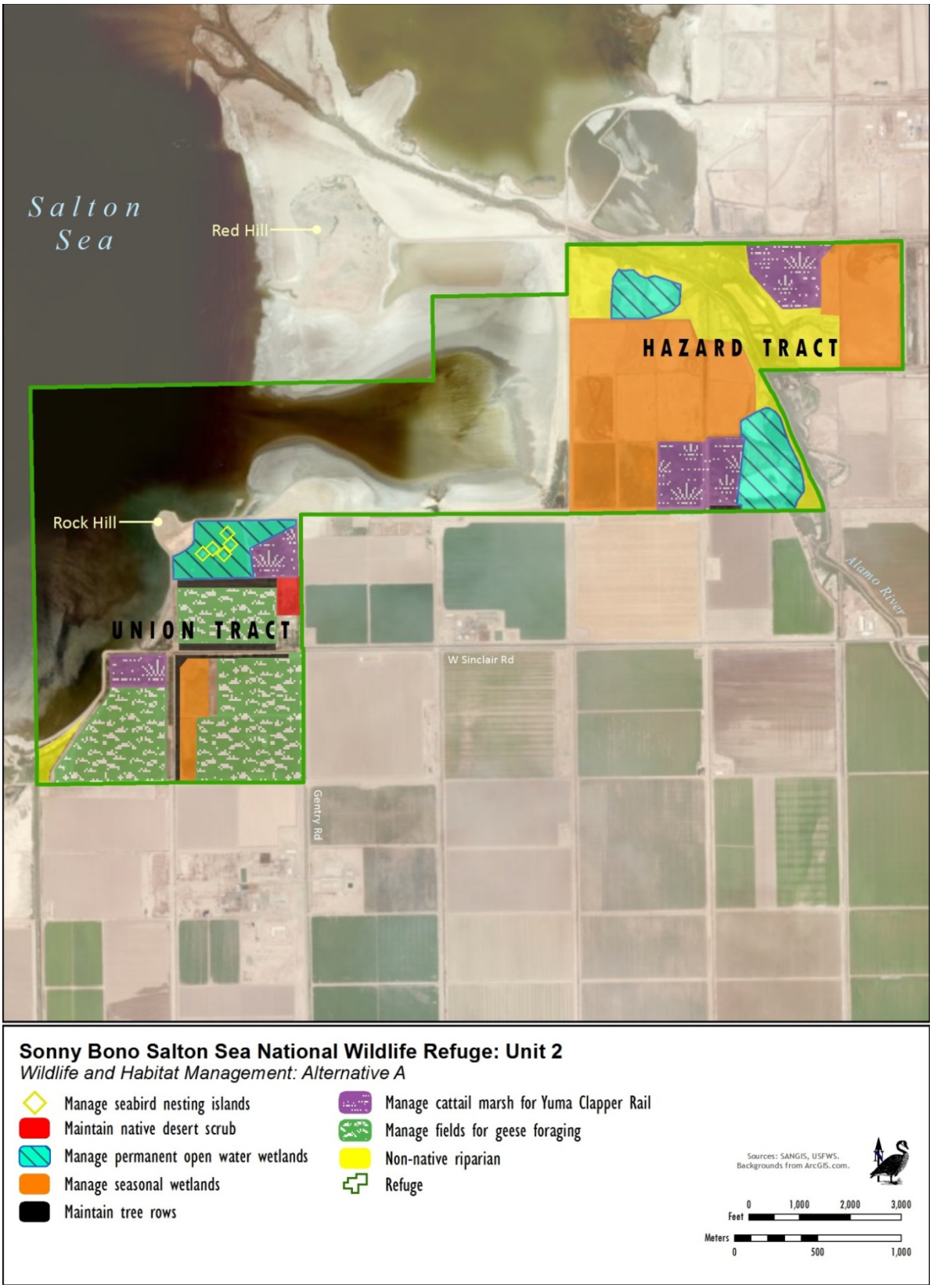



**Figure 2-2. Sonny Bono Salton Sea NWR, Alternative A – No Action (Wildlife and Habitat Management, Unit 2)**

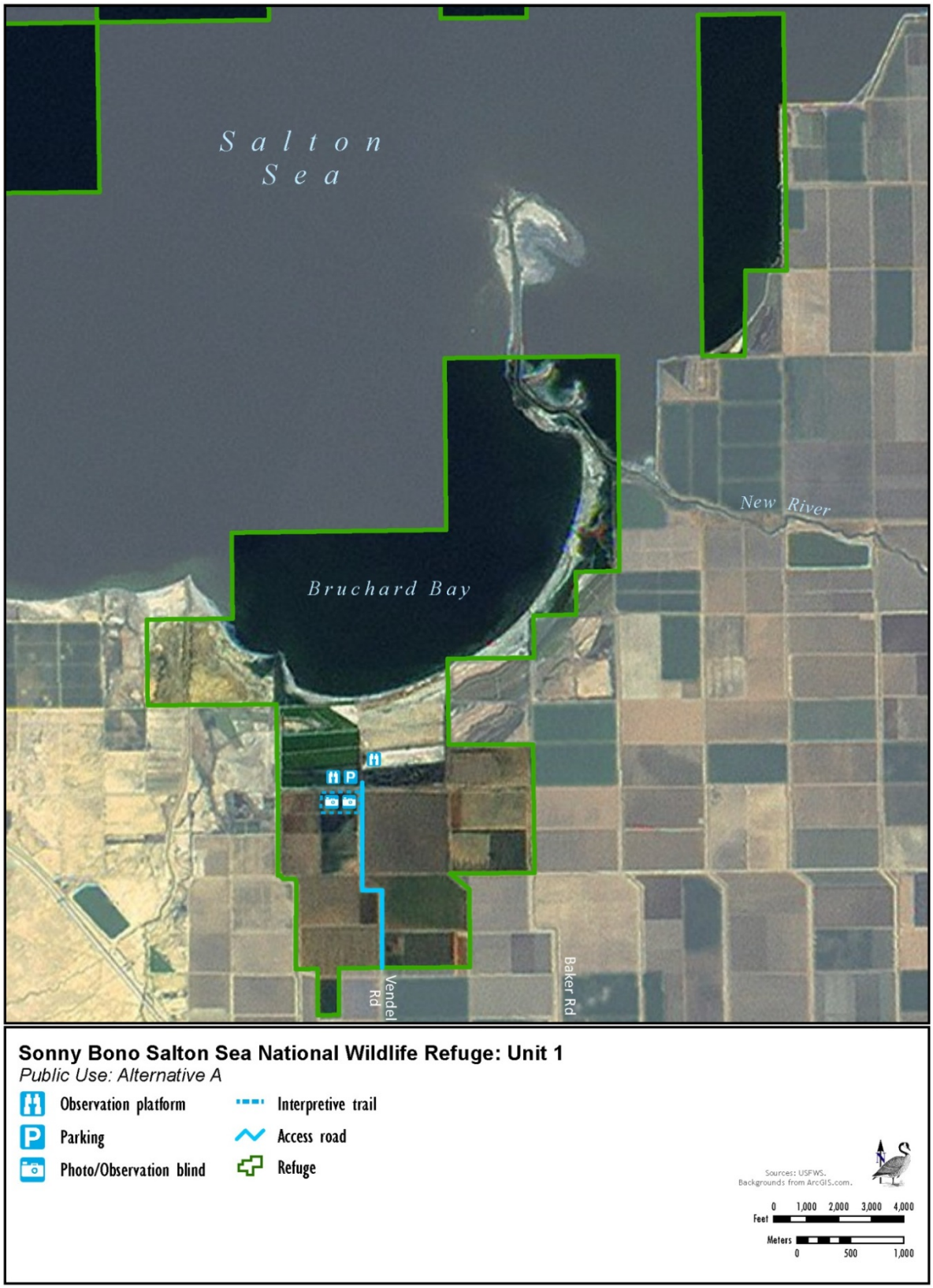



**Figure 2-3. Sonny Bono Salton Sea NWR, Alternative A – No Action (Public Use, Unit 1)**

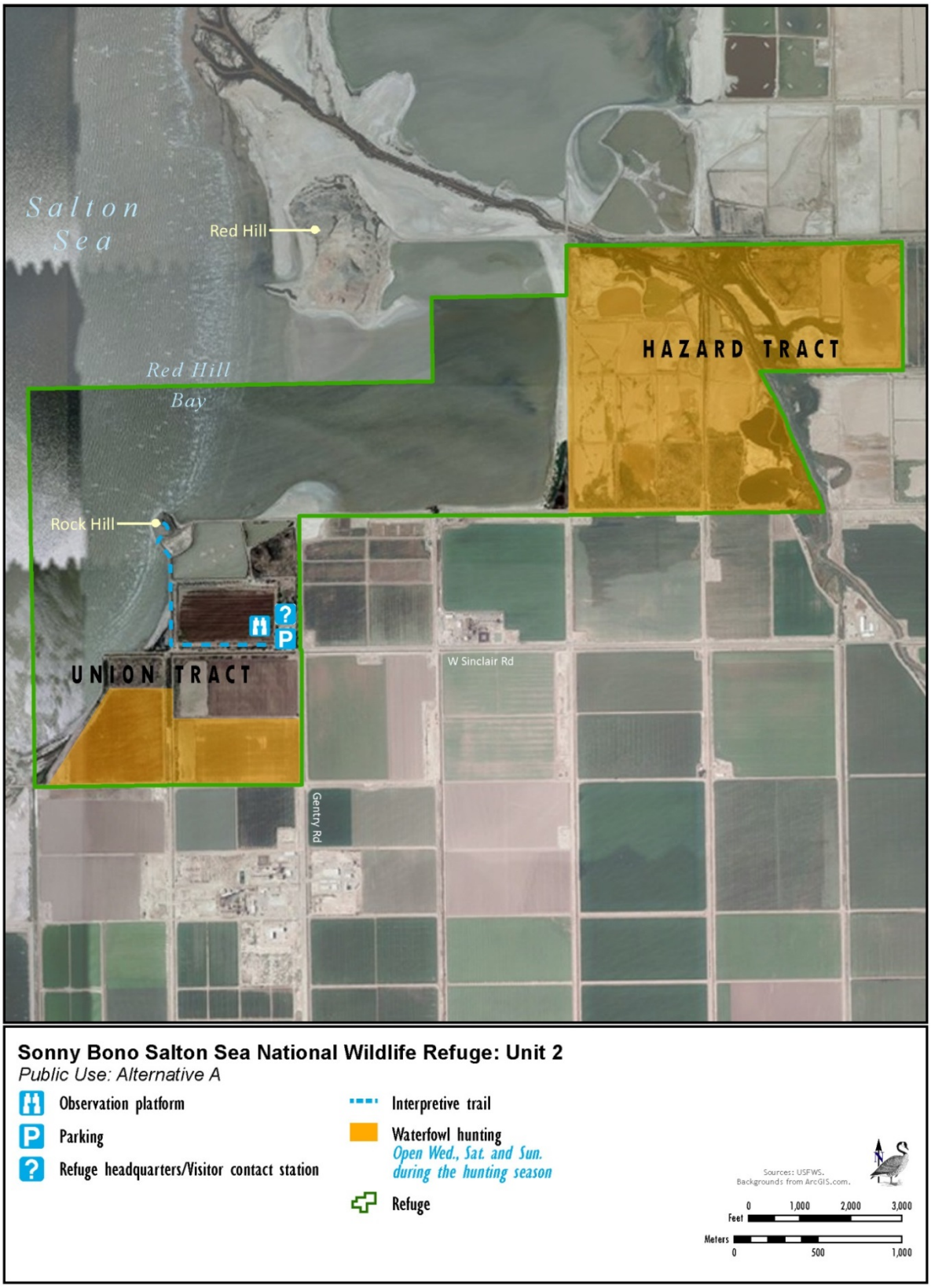



**Figure 2-4. Sonny Bono Salton Sea NWR, Alternative A – No Action (Public Use, Unit 2)**

Other areas on the Refuge consist of the open waters within the Salton Sea; riparian areas located along the New and Alamo rivers and the various drains and irrigation channels present on the Refuge; tree rows that consist of native and non-native desert trees; and Salton Sea desert scrub habitat.

Managed Agricultural Fields. Approximately 850 acres (refer to Figures 2-1 and 2-2), the majority of which are leased from the IID, are farmed annually to provide foraging habitat for wintering geese (e.g., snow geese, Ross's geese). This activity is conducted to achieve the Refuge purpose of reducing depredation of commercial cropland in the Imperial Valley by wintering waterfowl. Over the years, Refuge management practices have been and continue to be effective at enticing most geese and ducks that winter in the northern part of the Imperial Valley away from private farmlands.

Maintaining these agricultural fields is an energy intensive process involving significant labor hours and fuel. Productivity in these fields is also dependent upon an adequate supply of irrigation water. Field management includes disking and seed drilling, the delivery and distribution of irrigation water, and the as needed use of herbicides and fertilizer.

Factors affecting productivity include the presence of heavy clay soils that can become highly compacted, as well as the tendency for salts to accumulate in the soil. Subsurface tile drainage systems, which have been installed under the Refuge's agricultural fields, allow salts that accumulate below the surface to drain away from production areas. These systems, which result in an increase in overall crop productivity, require regular inspection and maintenance to ensure that they continue to function properly.

A wide range of crops has been cultivated on the Refuge over the years. Some crops have required greater management than others. In addition, the cultivation of some crops has resulted in concerns by adjacent farmers. For instance, alfalfa is no longer grown on the Refuge because surrounding farmers had concerns that weeds and insect pests in the Refuge fields were impacting their crops. To address these concerns and receive input on how best to optimize forage production on the Refuge, the Refuge conducted a farm review in 2002. This review involved interested farmers, the Imperial County Farm Bureau, and other interested agencies and organizations such as Service staff, CDFW, Ducks Unlimited, and California Waterfowl Association.

Based on the discussions and information obtained during the farm review, the Refuge staff determined that the production of annual rye grass would provide an appropriate level of forage for the geese in combination with wetland foods, while also requiring lower amounts of pesticides, fertilizers, and herbicides than other crops, such as alfalfa. Weed control would also be simplified because herbicides formulated to kill invasive broadleaf species can be applied once a year with no impact to rye grass production.

Agricultural fields are prepared for planting starting in late spring and continuing throughout the summer months. Annual preparations generally include disking fields (usually twice), leveling the fields by tri-planing, and placing borders in the fields to control flood irrigation water. In an effort to optimize annual crop yields, Refuge managers are continually making adjustments in how and when seed, fertilizer, and herbicides are applied to the site. For several years, rye grass seed was distributed within the prepared fields at the beginning of September at a rate of 40 to 50 pounds per acre. This was followed by fertilizing the fields with liquid urea ammonium nitrate. The fertilizer was applied by adding it to irrigation water at about 312 pounds per acre to achieve a desired target of 100 pounds of nitrogen per acre (liquid

fertilizer contains about 32 percent available nitrogen per pound). In 2012, slight adjustments were made to this practice that resulted in significant improvements in crop yield. These adjustments included reducing the rate of seeding to about 35 pounds per acre and increasing the fertilizer to about 150 pounds of nitrogen per acre. Due to the success of these adjustments, it is likely that these procedures will continue.

Fields are irrigated after seeding at least once a month during the fall and then as needed into the winter, depending on weather. Approximately four acre-feet of water are used to irrigate each acre of farm ground for the duration of the crop. Irrigation usually ends by late February as the geese begin to migrate north.

The use of liquid nitrogen fertilizer enables the Refuge to continue growing green forage during the cool winter months after the geese have consumed the initial growth that began in the warmer months of October and November. Without fertilizer, goose forage would be completely consumed well before the geese were ready to migrate north, thereby putting the nearby commercial crops in jeopardy of depredation.

Broadleaf weeds growing in these fields are currently controlled with herbicides. The primary products used in these fields are WEEDAR 64 (active ingredient: 2,4-D DMA), Milestone VM (active ingredient: aminopyralid), and Clarity (active ingredient: dicamba). These products control noxious and invasive broadleaf species and other problem weeds. WEEDAR 64, which is tank mixed with Clarity, is applied in late fall or early winter. Milestone VM, when used, is usually applied in fields when weeds begin to compete with rye grass after the grass has developed secondary roots and can tolerate the effects of the herbicide. This normally occurs in November. Problem grasses (mainly Bermuda grass) are controlled with glyphosate herbicide before rye grass is planted. After the geese migrate from the Imperial Valley, these fields will get disked while soil moisture is sufficient to allow easy disking, usually by June.

To reduce fuel consumption, $CO_2$ emissions, and other pollutants, Refuge staff has been experimenting with the practice of no till or limited till soil preparation. Under the no till or limited till method, the previous crop is left standing and a special high ground pressure no-till seed drill is used to penetrate the soil when seeding is required. This practice, which omits the process of disking the soil, has been performed successfully at other farms in the Imperial Valley. It has proved successful on the Refuge as well, resulting in a significant reduction in diesel fuel consumption (fuel use was reduced from 10,000 gallons per year to 5,000 to 7,000 gallons per year) because far less tractor use is required under no till practices. To date, the practice of no till farming has been expanded to include about half of the Refuge's farm field acreage. Continuous monitoring of the crop is required to ensure that a high level of crop productivity is maintained. Disking or tilling of the soil helps ensure healthy robust root development in otherwise heavy silty clay soils. On the Refuge, alternating disking with a one, two, or three-year cycle of no-till farming for rye grass has maintained a satisfactory productive crop. An additional benefit observed by Refuge staff is the use of residual grass cover in the no-till fields by passerine birds and waterfowl, presumably in association with insect foraging or spring nesting.

The main goal of this management action is to maintain good forage productivity for geese that spend the fall and winter months in the Imperial Valley. This can be a challenge during the late winter months when rye grass growth slows down. With timely management actions, the Refuge has been capable of supporting almost all of the wintering geese population in the area. The total numbers of geese present in the valley have varied considerably over the years and

Refuge staff is continually evaluating the capability of the agricultural fields to support the winter goose population.

Seasonal Shallow Wetlands. The provision of seasonal shallow wetlands began in the 1940s when farmable land on the Refuge was limited due to rising water levels in the Salton Sea. These brackish wetlands were established in impoundments created in fields with salinity levels too high to produce green forage for geese. The intent was to provide wetland plant forage such as alkali bulrush for waterfowl to supplement the green forage provided in the agricultural fields. Management of seasonal wetland areas continues today with various wetland plants providing forage for geese and other waterfowl. Approximately 560 acres of the Refuge (refer to Figures 2-1 and 2-2) are managed as seasonal shallow wetlands, however, the types of wetland plants provided throughout this acreage varies depending upon the soil conditions.

These managed wetland areas, which also represent important foraging and resting areas for migratory shorebirds, are flooded in the late summer to provide shallow open water or mixed marsh areas in various locations throughout the Refuge. To keep these wetlands productive from September through March, as well as to ensure the growth of emergent vegetation for food and cover in late spring and early summer, approximately five to six acre-feet of water is required per year per acre of wetland.

Some of the Refuge's seasonal wetland areas require little effort to grow waterfowl food plants. These are generally ponds that have been constructed on previous agricultural land or other land that has been previously tiled to flush salts from the soil profile. In these wetlands, wetland food plants typically germinate after the spring drawdown in March or April. Two or three irrigations are provided afterwards in May and June to promote growth. Usually the crop in these ponds, which include watergrass (*Echinochloa crusgalli*), Mexican sprangle-top (*Leptochloa uninervia*), and swamp timothy, are mature by the end of June or early July.

Many other seasonal wetlands have not been capable of producing typical wetland plants that grow in other western U.S. wetlands. These wetland impoundments are not located on previous farm land and have not had the benefit of the salt flushing; instead, they consist of heavy clay, saline-sodic soils with significant salt accumulation. As a result, it is difficult to keep the pond soils in a moist condition suitable for wetland plant germination and development. In an effort to overcome these inherent soil conditions, Refuge staff have tested the soils and sought advice of specialists. The current management strategy, which was used and described by former Refuge Manager John Nowak in 1963, has proven productive at growing normal seasonal wetland food and cover vegetation on wetland basins where no plant growth occurred previously. To help provide a "wet edge" for plant germination, dry pond bottoms are disked to break up the extremely hard soil. The ground is then "corrugated" into rows approximately ten inches deep. The furrows that are created are able to hold a pool of water when flooded so that even when hot windy conditions evaporate a half inch of water or more per day, a wet edge is more easily maintained.

Trying to maintain a flat bottomed pond with a quarter to a half inch of water is much harder in the Imperial Valley's hot environment, so corrugating helps to minimize the effect of evaporation, allowing the soil to remain moist enough to facilitate wetland plant germination. Desirable food plant seeds such as watergrass and/or alkali bulrush (*Scirpus robustus*) are broadcasted on the pond bottom and fall into the crevices of the soil. Based on soil testing results, gypsum has been prescribed to help loosen the hard soil, release salts, and improve soil friability, enabling successful seed germination. A convenient and beneficial substitute for

gypsum has been a mix of urea sulfuric acid fertilizer (15-0-0 16S). When introduced into the first application of irrigation water, the diluted sulfuric acid combines with excessive calcium ($CaCO_3$ = limestone) to form a diluted solution of calcium sulfate, or gypsum. The result is a deep, thorough, penetrating application of gypsum to positively affect soil development and productivity. The added urea provides a boost of nitrogen to promote growth of newly sprouted plants. The liquid fertilizer is introduced into the irrigation water, which flows down the furrows melting the clods of dirt over the seeds. In about ten days, plants become visible and water is kept in the furrows to promote growth. It is expected that over time sufficient soil improvements will be accomplished so that periodic irrigations can be provided in between drying periods until a mature crop with full seed heads have developed, similar to practices described for the areas with high quality soil conditions.

A third seasonal wetland strategy currently implemented on the Refuge involves growth of alkali bulrush, a preferred food plant of snow geese. Pond soils of adequate quality that are kept very wet can produce nearly pure stands of alkali bulrush. This strategy involves keeping the ponds flooded with a skim of water in early summer until residual tubers in the soil sprout and develop mature plants. The longer the crop is kept wet, the more each plant can multiply by root. These ponds can be allowed to dry for the remainder of summer, and then be flooded again in the fall. As the ponds slowly flood, new plants sprout from each existing stalk, adding to the available foraging crop. Geese prefer the green plants and if at all possible, the Refuge attempts to grow the crop so that a mature green crop is available for geese when they arrive in late October. This crop uses more water than a typical seasonal wetland, although not as much as a permanent wetland.

Permanent Cattail Marsh. Approximately 200 acres of permanent cattail marsh are managed on the Refuge. These freshwater marsh areas, which support a variety of secretive marsh birds (e.g., endangered Yuma Ridgway's rail, black rail, Virginia rail, sora, least bittern), are located in portions of Unit 1 and Unit 2 (refer to Figures 2-1 and 2-2). Management of these areas involves periodic irrigation to maintain optimum water levels for the Ridgway's rail and control of invasive plants around the perimeter of the marsh areas.

The primary management action in these areas is providing adequate water to support the vegetation. Approximately 12 acre-feet of water per acre are needed to maintain these wetlands throughout the year. Periodic water control structure maintenance is required, as well as levee maintenance. Invasive plant control focuses on salt cedar and common reed, but also involves attempts to reduce the coverage of a variety of other weedy species. Water flows into and out of the ponds by way of concrete water control structures. Maintenance involving the clearing of vegetation within a radius of approximately five feet around the structure is necessary to ensure free water flow and safe working conditions for employees who might otherwise encounter snakes, spiders, and ants. Vegetation in these areas is mechanically cleared using a backhoe or eliminated as a result of glyphosate application. Each structure is cleared approximately two times each year.

As these wetlands age and the cattails no longer regenerate, the structure and productivity of the marsh begins to decline. For rails, this means a decrease in food and shelter. This excessive accumulation of vegetation typically occurs about five to seven years after the marsh is initially developed. To re-establish good habitat quality in the marsh it is necessary to let the marsh dry out following the end of the breeding season. As the marsh dries out, rails and other marsh birds and wildlife will move to an adjacent marsh area. Once dried out and abandoned, the overgrown vegetation can be burned off in accordance with the requirements of a prescribed burn or mechanically removed.

Planning for a prescribed burn requires consideration of various issues including potential effects to Ridgway's rails and other wildlife, and impacts to air quality. Past actions demonstrate that as the marsh dries out, Ridgway's rails and other species in response to these dry pond conditions relocate into adjacent wet pond areas. Burning off the old-dead cattail structure renews the marsh, giving the still viable root stalks an opportunity to regenerate without competing with decayed old growth. A marsh that is burned in December or January will regenerate a new crop of cattails by the summer, at which time the marsh is repopulated with birds and other wildlife.

Permanent Open Water Wetlands. The permanent open water wetlands maintained on the Refuge are located just to the south of Bruchard Bay in Unit 1 (refer to Figure 2-1) and to the north of the Refuge headquarters and in two locations on the Hazard Tract in Unit 2 (refer to Figure 2-2). Approximately 143 acres are maintained on the Refuge as permanent open water for wildlife. About 105 acres of these permanent open water areas include earthen islands of various shapes and sizes that are maintained specifically to support nesting seabirds. The locations of nesting areas within Ponds A4 and B4 in Unit 1 are illustrated in Figures 2-5.

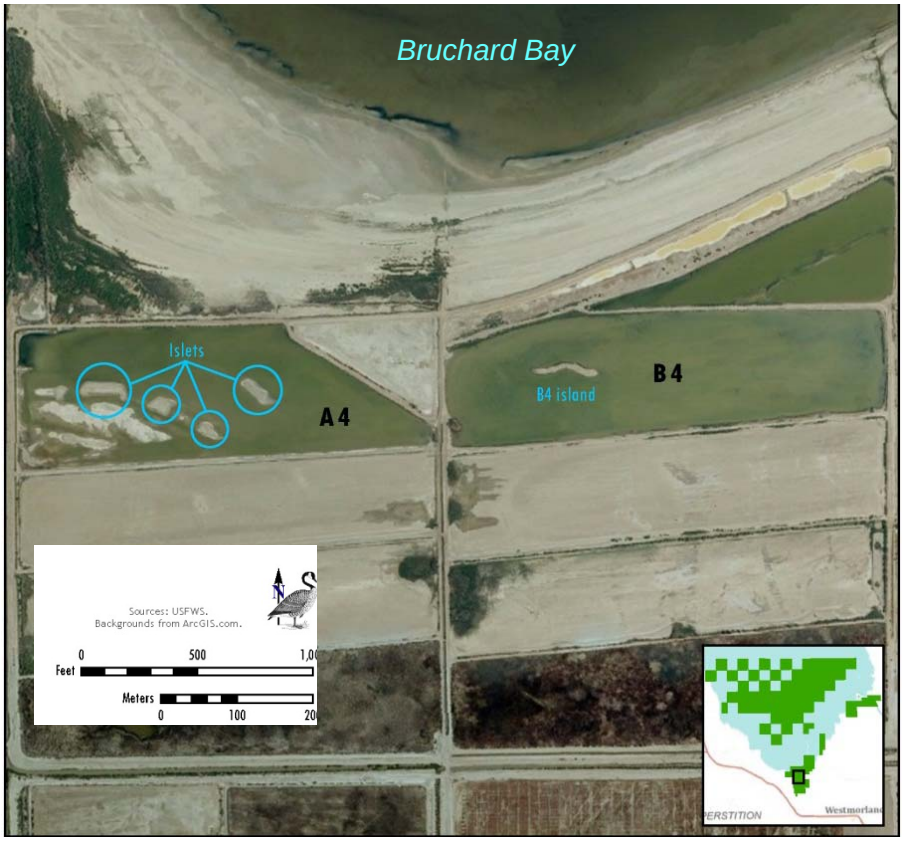



**Figure 2-5. Nesting Islands in Unit 1**

Gull-billed terns and black skimmers have been nesting on small islands in the open water wetlands located to the north of the Refuge headquarters since the early 1990s. Originally, this 30-acre "D" pond (Figure 2-6) was managed as a seasonal waterfowl pond. In 1995, the decision was made to maintain this pond as a year-round open water area for the primary purpose of replacing nesting areas for seabirds such as gull-billed terns, black skimmers, and Caspian terns that were being lost to rising water levels in the Salton Sea. Water levels in

these ponds are maintained with water collected from the outflow of an adjacent permanent cattail marsh. Water from the cattail ponds has been subject to evaporation; therefore the outflow water has a relatively high mineral and salt content. Once distributed into the ponds, the water has salinity levels high enough to discourage the growth of emergent vegetation such as cattails and rushes. Some site management is however required to control salt cedar around the perimeters of the nesting islands.

Five of the earthen islands located in "D" pond were colonized by seabirds during the first nesting season following permanent inundation of the pond. The same seabird species continued to successfully fledge young for several subsequent years. Black-necked stilts and American avocets also nested on the islands during that first year and in subsequent years. In 2005, electric fencing was installed around the perimeter of "D" pond to deter mammalian predators, primarily raccoons and coyotes, from entering the ponds and accessing the nesting islands. This fencing continues to be maintained today, although its effectiveness appears to be limited.

**Figure 2-6. Nesting Islands in D-Pond, Unit 2**

Because of the conservation status of the gull-billed tern and black skimmer (identified by the Service as Birds of Conservation Concern), the Refuge developed new nesting islands in Unit 1, including a single large island in pond B4 in 2001 (refer to Figure 2-5) and several small islets in pond A4 in 2006, with the intent of increasing available nesting habitat during the

summer months. The primary management action, which continues today, simply involves maintaining adequate water levels in these areas during the hot summer months. The water in these ponds is provided from the outflow of upstream permanent cattail marshes. Other management needs include annual removal of salt cedar from island perimeters and maintaining the electric fence installed around pond A4 to discourage mammalian predators from entering the pond. Islands need to be cleared of large vegetative growth to facilitate seabird nesting and without electric fences to limit access; mammalian predators would have easy access to islands, where they could prey on bird eggs and chicks.

The remaining 22 acres of permanent open water wetlands are located on the Hazard Unit, adjacent to the Alamo River. These two wetlands (Oxbow Lake and Hazard Lake) receive water from the Alamo River. Hazard Lake also receives freshwater outflow from Hazard pond 7. As the Salton Sea recedes and the subsequent lowering of the Alamo River follows, input from the Alamo River may be completely eliminated, requiring water flow from Hazard pond 7 to serve both Oxbow Lake and Hazard Lake if they are to be maintained as permanent open water wetlands.

Native Salton Sea Scrub. The 92 acres of native Salton Sea Scrub present on the Refuge occurs in three general locations, at the western edge of the Salton Sea on one of the original Refuge parcels, in the northwestern corner of Unit 1 (refer to Figure 2-1), and to the north of the Refuge headquarters in Unit 2 (refer to Figure 2-2). Management of these areas involves limited monitoring of habitat quality and surveillance for invasive species of concern.

Riparian Areas. The 15 acres of riparian habitat on the Refuge occur along existing waterways and along portions of the Salton Sea shoreline (refer to Figures 2-1 and 2-2). Some areas support native vegetation (e.g., Goodding's black willow, mesquite), while other areas are dominated by invasive shrubs and other invasive perennials (e.g., tamarisk, common reed). As staffing and funding permits, efforts are continuing to remove invasive riparian plants both mechanically and with the use of herbicides. Once removed, the treated areas are planted with appropriate native shrubs.

Tree Rows. The 62 acres of tree rows on the Refuge are distributed in various locations throughout Units 1 and 2 (refer to Figures 2-1 and 2-2). Maintenance of these tree rows requires minimal effort and generally only involves periodic watering. Under Alternative A, no changes in current management of these areas would occur.

### Salton Sea Restoration Partnerships

The Refuge is working cooperatively with various agencies, including the USACOE, Bureau of Reclamation, California Natural Resources Agency, CDFW, and IID, in the development and evaluation of restoration proposals intended to address the effects of the receding Salton Sea on fish, migratory birds, and other wildlife. One of these projects is the Salton Sea Species Conservation Habitat (SCH) Project. As described here, a portion of one of the restoration alternatives under consideration for this project would occur within an area currently managed by the Refuge. Should this alternative be selected for implementation, the Service, which is a cooperating agency for the EIS/EIR, would use the EIS/EIR to authorize construction activities on Refuge-managed land.

#### Salton Sea SCH Project

Overview. The USACOE, California Natural Resources Agency, and CDFW are proposing to restore up to 3,770 acres of wetland habitat at the south end of the Salton Sea. This restoration project is being proposed to address the loss of important fish and wildlife

habitat in the Salton Sea as a result of ever-increasing hypersalinity and receding water levels. The goals, objectives, and basic components of the proposal are summarized here. For a complete description of the project alternatives, as well as an analysis of the potential environmental effects of implementing this restoration project, refer to the draft Salton Sea SCH Project Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) (USACOE and California Natural Resources Agency 2011), available at http://www.water.ca.gov/saltonsea/. The draft EIS/EIR was released for public review and comment on August 17, 2011. The comment period ended October 17, 2011. Because the project boundary for several of the alternatives includes lands included within the Sonny Bono Salton Sea NWR, the Service is participating in the NEPA process as a cooperating agency in accordance with CEQ regulations. As a result, the Final EIS/EIR will serve as the Refuge's NEPA document for those portions of the project that occur within the Refuge boundary.

Salton Sea SCH Project Purpose and Goals. The purpose of the project under NEPA is to develop a range of aquatic habitats that will support fish and wildlife species dependent on the Salton Sea. The project was initiated in response to the anticipated loss of fishery resources in the Salton Sea that support piscivorous (fish-eating) birds. In recognition of the importance of the Salton Sea ecosystem, the California Legislature enacted legislation in 2003 that directed the California Resources Agency (now the Natural Resources Agency) to prepare a restoration study and a programmatic environmental document to explore ways to restore important ecological functions of the Salton Sea and to develop a preferred alternative. Funding for restoration planning and implementation is to be provided through the Salton Sea Restoration Fund, which was established with enactment of the Salton Sea Restoration Act (Chapter 13 of Division 3 of the Fish and Game Code commencing with Section 2930) and funded in part by Proposition 84 (The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006).

The current Salton Sea SCH Project, which is the next step in the restoration planning process, is designed as a "proof-of-concept" project in which several project features, characteristics, and operations could be tested under an adaptive management framework. The project goals are two-fold: 1) develop a range of aquatic habitats that will support fish and wildlife species dependent on the Salton Sea; and 2) develop and refine information needed to successfully manage the restored habitat (adaptive management).

To achieve the first goal, the project proposes to provide in-kind replacement for near-term habitat losses. The project's target species are piscivorous bird species that forage within the Sea's shallow saline habitat. Project objectives related to this goal include:

- Provide sufficient prey necessary to support piscivorous bird species;
- Develop appropriate physical structure and microhabitat elements to support life-history needs of target piscivorous bird species;
- Support a sustainable, productive aquatic community;
- Provide suitable water quality for fish;
- Minimize adverse effects on desert pupfish;
- Minimize the risk to birds of selenium bioaccumulation; and
- Minimize the potential for disease/toxicity impacts to birds.

Under the second goal, the project would incorporate an adaptive management framework to guide evaluation and improved management of the newly created habitat as well as to inform future restoration. The objectives associated with this goal include:

- Develop and implement a monitoring plan to measure key indicators of SCH Project performance;
- Develop a decision-making framework for evaluating data, adjusting management, and refining operations and monitoring as appropriate; and
- Provide proof of concept for future restoration to verify that the core ideas for the larger Salton Sea restoration proposal are functional and feasible.

Project Alternatives. Six alternatives, involving several different locations along the south end of the Sea, are evaluated in the draft EIS/EIR. Alternative 3 was identified in the draft EIS/EIR as the Natural Resources Agency's preferred alternative. Alternatives 1, 2, and 3, which include portions of Bruchard Bay, would occur within a portion of Unit 1 of the Sonny Bono Salton Sea NWR. Alternatives 4, 5, and 6 occur to the north of the Refuge along the southeastern edge of the Salton Sea. The six alternatives are listed below, and described in the draft EIS/EIR (USACOE and California Natural Resources Agency 2011).

- Alternative 1 – New River, Gravity Diversion + Cascading Ponds (3,130 acres of ponds constructed on either side of the New River).
- Alternative 2 – New River, Pumped Diversion (2,670 acres of ponds constructed on either side of the New River).
- Alternative 3 – New River, Pumped Diversion + Cascading Ponds (3,770 acres of ponds constructed on either side of the New River).
- Alternative 4 – Alamo River, Gravity Diversion + Cascading Pond (2,290 acres of ponds constructed on the north side of the Alamo River in Morton Bay).
- Alternative 5 – Alamo River, Pumped Diversion (2,080 acres of ponds constructed on the north side of the Alamo River, including Morton Bay and Wister Beach).
- Alternative 6 – Alamo River, Pumped Diversion + Cascading Ponds (2,940 acres of ponds constructed on the north side of the Alamo River, including Morton Bay and Wister Beach).

All alternatives considered for the SCH Project would restore shallow water habitat on land at elevations below -228 feet mean sea level (the former level of the Salton Sea in June 2005). The SCH Project would consist of one or more large ponded units that each contains three to five smaller ponds. The newly created habitat would be contained within low berms. The water supply for the ponds would be a combination of brackish river water and saline water from the Sea, blended to maintain an appropriate salinity range. This "proof-of-concept" project would be monitored for approximately ten years after completion of construction. It is expected that within this ten-year period, managers would have had adequate time to identify those management practices that best meet the larger restoration goals. After the proof-of-concept period, the Project would be operated until the end of the 75-year period covered by the Quantification Settlement Agreement (2078) or until funding were no longer available. The ponds would be constructed and operated by CDFW, on behalf of the California Natural Resources Agency, and where the project overlaps with the Refuge boundary, construction and long-term management and monitoring would be coordinated with Refuge staff.

Permits/Approvals. The following permits and consultations are expected to be required for project implementation:

1) Final NEPA/CEQA document;
2) Section 404 of the Clean Water Act (Standard Individual Permit);
3) Section 401 Water Quality Certification from the Colorado River Basin Regional Water Quality Control Board;
4) Consultation in compliance with Section 106 of NHPA;
5) Compliance with Section 7 of the Federal ESA;
6) Compliance with California Fish and Game Code section 1602 or 1605;
7) California ESA Section 2081 Incidental Take Permit from CDFW;
8) Approval of lease agreements from the State Lands Commission and/or IID;
9) Preparation of a Fugitive Dust Control Plan under Regulation VIII, Fugitive Dust Rules (800–806) of the Imperial County APCD; and
10) Other necessary haul and/or encroachment permits and easements needed to facilitate construction and operation of the project.

If the restoration alternative ultimately selected for implementation occurs within the Refuge boundary, a Special Use Permit and Memorandum of Understanding involving the Service, California Natural Resources Agency (including CDFW and Department of Water Resources), and USACOE would be prepared that addresses how and by whom project construction, habitat management, and monitoring would be implemented and funded.

**Endangered and Sensitive Species Management**

The Refuge supports two federally listed species, the endangered Yuma Ridgway's rail and the endangered desert pupfish. The Refuge addresses management of these listed species as needed and the type of management depends on which species is being addressed.

Yuma Ridgway's Rail. In the case of the Yuma Ridgway's rail, the Refuge is situated in a core area for the species, so it was considered appropriate for the Refuge to manage some portion of the Refuge for this species. Such management is consistent with the overarching goal for the NWRS. Early on, management of this species was implemented opportunistically as areas capable of supporting freshwater marsh habitat were identified. Management began in 1988 when about 60 acres of habitat were set aside for the species.

Today, about 200 acres of permanent cattail marsh are managed on the Refuge in large part to provide habitat for the Yuma Ridgway's rail. The densities of Ridgway's rails supported in these managed marshes are some of the highest throughout its range. These cattail marshes also provide habitat for the State threatened California black rail, as well as the least bittern, a Bird of Conservation Concern.

Annual secretive marsh bird surveys are conducted on the Refuge three times a year between March and May. These surveys are conducted as part of the National Marshbird Monitoring Program. Because of the presence of the endangered Yuma Ridgway's rail within the Refuge marshes, these surveys emphasize monitoring of the existing Ridgway's rail population, and include an annual spring call playback survey, consistent with the recommendations in the Yuma Clapper Rail (now referred to as the Yuma Ridgway's rail) Recovery Plan (USFWS 2009). Monitoring data are shared with partners and maintained at the Refuge office for use in comparing population levels from year to year and over extended periods of time.

Desert Pupfish. No specific actions related to the management of the endangered desert pupfish are currently implemented on the Refuge, and management of the species on the Refuge would be very difficult to implement if it were to be proposed. This species currently occurs in the Salton Sea, drainage ditches connected to the Salton Sea, and has been recently found in one of the Refuge managed water areas. Although no management actions are currently implemented to support the desert pupfish, precautions are taken to ensure that those actions implemented by the Refuge do not adversely affect the species.

Nesting Seabirds of Conservation Concern. In recent years, nesting areas, including artificial nesting platforms, within the Refuge's permanent open water areas have been managed to support nesting habitat for seabirds, particularly gull-billed terns and black skimmers, both designated as Birds of Conservation Concern by the Service. In an effort to reduce mammalian predation of gull-billed tern and black skimmer chicks and eggs, the Refuge maintains electric fencing around potential nesting areas. The Refuge currently supports annual monitoring of these nest sites. Data gathering includes species presence and abundance, number of gull-billed tern and black skimmer nests, chicks, and successful fledges, and any information available regarding adult, chick, and/or egg mortality and/or predation. Gull-billed tern breeding surveys are conducted annually from April through August. These surveys also include incidental counts of associated breeding seabirds.

Chick banding to assist in monitoring tern movements and survival is conducted only when colony disturbance would be minimal. Monitoring and banding data are shared with various partners and maintained at the Refuge office for use in comparing population levels and productivity from year to year and over extended periods of time.

Other Species of Concern. Although a number of management actions implemented on the Refuge are intended to protect and support specific listed or sensitive avian species, many of these and other management actions also provide direct and indirect benefits to a variety of other avian species listed as threatened or endangered by the State and/or identified by the State or Service as species of concern. For instance, the State endangered Gila woodpecker (a rare sighting on the Refuge during migration) and particularly the little willow flycatcher (often observed on the Refuge during spring migration) benefit from the management activities occurring within the Refuge's riparian habitat. Wintering greater sandhill cranes, a State threatened species, derive benefits from the Refuge's efforts to provide winter forage for waterfowl, and a variety of shorebirds identified as Birds of Conservation Concern benefit from the foraging and resting opportunities provided within the seasonal shallow wetlands and permanent open water wetlands that are managed and maintained on the Refuge.

### Resident Native Species Management

The Refuge implements various actions to support native birds, reptiles, and other wildlife. These include maintaining tree rows, providing nest boxes for burrowing owls, and replacing salt cedar with stands of mesquite and Goodding's black willow. Through a contract with the California Conservation Corps, the phased removal of salt cedar is underway. The project with the goal of restoring 100 acres of native riparian shrub vegetation, including Goodding's black willows and mesquite, near Bruchard Bay in Unit 1 will support resident birds, as well as visiting Neotropical species.

### General Habitat Management

General management actions implemented on the Refuge to support habitat and species include maintaining the wetland and farm water distribution system, managing water movement through the Refuge to irrigate fields and flood impoundment areas, conducting

various bird surveys, controlling invasive plant species, and year-round surveillance for avian disease on the Salton Sea. Occasionally, prescribed burns are conducted to address species habitat management issues.

Bird Surveys. In addition to species monitoring, aerial waterfowl surveys are also conducted by Refuge staff for the Salton Sea and surrounding areas monthly between November and February of each year. Refuge staff also conducts annual sandhill crane surveys monthly between October and March and partners with CDFW to conduct monthly waterbird surveys on the Salton Sea.

Invasive Plant Control. Invasive plant control in the form of mechanical and chemical control is implemented on the Refuge. Glyphosate or imazapyr is used to control woody invasive species that occur adjacent to wetlands and within the water delivery ditches that provide water to the farm fields and managed wetlands. Although the practice of no till in the farm fields is intended to and possibly has reduced the numbers of weeds; some control of broad-leafed invasive weeds is still required. The herbicide Milestone has been used most often to control broad-leafed weeds in these areas.

All herbicides used on the Refuge must be reviewed and approved as part of the Service's Pesticide Use Proposal System (PUPS). The PUPS identify specific pesticides approved for use on each Refuge, and includes details on target pests, products applied, application dates, rates, methods of use, number of applications, site description, sensitive habitats, and best management practices (BMPs) to avoid impacts to sensitive resources. The herbicides approved for use on the Refuge in 2013 through the PUPS process are listed in Table 2-2. This table also provides information regarding the target weeds and modes of application for each of the approved products.

Pesticide use is regulated at both the Federal and State level (California Department of Pesticide Regulations 2011). The Imperial County Agricultural Commissioner also regulates the use of Restricted Use Materials, including the herbicides used on the Refuge. A user permit is required for lands on which restricted pesticides are to be applied. This permit defines the manner, method and approximate time of the proposed application. All agricultural and commercial pesticide applications are randomly monitored to ensure that pesticides are handled in an environmentally safe manner.

Mechanical methods used to remove invasive plants can include, but are not limited to, digging by hand, a nylon filament trimmer (weed "whacker"), chainsaw, uprooting the plant with a jack or hand pulling, and tilling. Other methods of control may include increasing salinity levels in seasonal ponds to control cattail growth and prescribed burning to remove salt cedar, common reed, and other unwanted vegetation.

Monitoring Avian Disease on the Salton Sea. Until the early 1990s, the Refuge did not provide any management within the Salton Sea. However, in 1992, a disease outbreak effecting eared grebes resulted in 200,000 deaths. There is no confirmed cause for these deaths, although there is some thought that it may have been related to excessive blue-green algal toxins in the Sea. In the mid-1990s, thousands of California brown pelicans and American white pelicans died of avian botulism. As a result of these and other events, the Refuge, CDFW, USEPA, USGS, Bureau of Reclamation, and Salton Sea Authority in the late 1990s developed a plan for avian disease monitoring and response.

**Table 2-2**
**Pesticides Approved for Use in 2013 on the Sonny Bono Salton Sea NWR**

| Active Ingredient | Glyphosate (terrestrial) | Glyphosate (aquatic) | Dicamba | Imazapyr | Triclopyr | 2,4-D DMA | Tribenuron-methyl | Halosulfuron-methyl | Aminopyralid |
|---|---|---|---|---|---|---|---|---|---|
| **Product Name(s)** | Razor Pro | AquaNeat | Clarity | Stalker | Garlon 3A | WEEDAR 64 | Express | Sandea | Milestone VM |
| **Target Pests** | cheeseweed, Bermuda grass, goosefoot; applied on dry ditch banks and in managed agricultural fields | cattail, salt cedar, Bermuda grass; applied in water ditches and wetland units | broadleaf plants; applied in managed agricultural fields | salt cedar; applied wherever control of salt cedar is required, not used in managed agricultural fields | sesbania; applied in dried seasonal wetlands, except those supporting Yuma Ridgway's rail | broadleaf plants (cheese-weed, lambs-quarter, Sahara mustard); applied in managed agricultural fields | Sahara and black mustard, London rocket; applied in managed agricultural fields | yellow nutsedge; applied in managed agricultural fields | cheeseweed, goosefoot, London rocket, puncturevine; applied in managed agricultural fields |
| **Treatment Site** | terrestrial | aquatic | terrestrial | terrestrial, aquatic | terrestrial | terrestrial | terrestrial | terrestrial | terrestrial |
| **Treatment Area** | 200 ac. | 800 ac. | 900 ac. | 200 ac. | 50 ac. | 850 ac. | 900 ac. | 900 ac. | 900 ac. |
| **Application Method(s)** | foliar | foliar | foliar | foliar | foliar | Boom sprayer | aerial | aerial | aerial |
| **Application Rate(s)** | 5 qt./ac. | 2 qt./ac. | 32 oz./ac. | 64 oz./ac. boom sprayer<br>cut stump 64 oz./acre | 0.67 gal./ac. | 2 pints/ac. | 1 oz./ac. boom sprayer<br>ground 1 oz./ac. | 1 oz./ac. boom sprayer<br>ground 1 oz./ac. | 7 oz./ac. |
| **Application Equipment(s)** | tractor sprayer | backpack sprayer | boom sprayer | hand-held sprayer | boom sprayer | | tractor, ATV, backpack sprayer | tractor sprayer | boom sprayer |
| **Applications per year** | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |

The Refuge also established a Site Health and Safety Plan, defined Airboat Operating Procedures specific to avian disease monitoring, entered into a Memorandum of Understanding with the Salton Sea Authority for sustained disease monitoring on the Salton Sea, and set up regular year-round coordinated patrols with CDFW to search for and remove sick and dead birds. Sick birds are provided with rehabilitation, and dead birds are promptly disposed of to reduce the potential for spreading disease. The Refuge maintains various facilities to assist in response and care, including a hospital, recovery cages, and incinerators to properly dispose of carcasses. This active program requires staff time commitments primarily in the summer, but winter work is also necessary. This coordinated effort appears to be working because there have been no major disease outbreaks since it started. The Refuge will to continue to partner with the State in this effort, per available funding.

**Public Use**

The public use program on the Refuge includes opportunities for hunting, fishing, wildlife observation and photography, environmental education, and interpretation. Facilities that support these uses are present in both Unit 1 and Unit 2 (refer to Figures 2-3 and 2-4).

Public Access. Areas of the Refuge open to the public include the main portion of the Refuge that was inundated by the Salton Sea in the 1940s (this area is only accessible by boat); the visitor area, observation platform, and interpretive trail to Red Hill located adjacent to the Refuge Complex headquarters in Unit 2; approximately 480 acres within the Union Tract and the Hazard Tract, which are accessible during the hunting season for purposes of waterfowl hunting (refer to the discussion of waterfowl hunting); and the main entry road, parking area, observation decks, and interpretive trail in Unit 1.

An estimated 12,000 visitors stop at the visitor contact station each year, but the total number of visitors to the Refuge is likely on the order of 25,000 visits per year, since many birdwatchers visit Unit 1 (which has no counter) and do not stop by the visitor contact station during their stay. Visitors come from the local community, the larger metropolitan areas to the west (San Diego), northwest (Los Angeles), and east (Phoenix/Tucson), and the rest of the country. Identified as one of the top 50 birding hot spots in the nation by WildBirds and one of the top 200 North American Birding Hot Spots by birding.com, this Refuge also attracts a large number of international visitors. Based on the information provided by visitors who sign the Refuge guestbook, individuals from more than 20 countries annually visit the Refuge. Although the majority of the visitors to the Refuge are present during the winter months, because the Refuge is recognized as important birding area year-round, visitors may be present even on the hottest of summer days.

Waterfowl Hunting. Two areas are open seasonally for waterfowl hunting on the Refuge including approximately 350 acres on the Hazard Tract and 130 acres on the Union Tract (refer to Figure 2-4). Within the Union Tract, the primary target is white geese (snow geese and Ross' geese), while a wider range of waterfowl are present within Hazard Tract. Hunting has been occurring in this area since at least 1953 according to Refuge records. The hunting program generally accommodates about 1,000 hunter visits per year. With this level of use, about half of the blinds are not filled during most of the season on the Hazard Tract. The Union Tract hunting blinds are filled more frequently, reaching 100 percent capacity on all open hunt days late in the season.

CDFW administers the Refuge's hunt program and operates the check stations under a cooperative agreement with the Service. Hunting is permitted on Saturdays, Sundays, and Wednesdays during the open season, and only ducks, geese, American coots, and common

gallinules (moorhens) may be hunted. Hunters must comply with the State of California's "Waterfowl and Upland Game Hunting & Department Lands Public Use Regulations," which are updated annually, including the specific regulations addressed in the section entitled, *National Wildlife Refuges with DFG Hunting Programs*.

A total of 80 hunters can be accommodated on the Refuge during a hunt day. Hunting blinds are assigned to those holding advance reservations, which are issued by CDFW. Hunters with reservations must present them at the Wister Check Station no later than 1.5 hours before shooting time. Vacancies occurring from no show reservation holders and from hunters leaving the area are filled according to the order established in the previous night's drawing at the Wister Check Station. Hunters must obtain a permit at the Wister Check Station, which is to be in the hunter's possession while hunting on the Refuge. Hunters are permitted to enter only the assigned blind site for which the permit is issued. A fee is required for all persons 16 years and older. All hunters are required to check out at the Wister Check Station, report hunting results, and return their permits before leaving the area.

Only the use of shotguns and steel or other nontoxic shot, as approved by the Service, may be used on the Refuge, and a hunter may not possess more than 25 shot shells while in the field. Firearms must be unloaded when being transported between parking areas and blind sites. No camping or use of trailers is allowed on the Refuge. As of 2012, Refuge staff did not include a Federal wildlife officer; therefore, monitoring of compliance with Refuge hunting regulations involves limited visiting law enforcement from either the Service or CDFW.

On the Hazard Tract, hunting opportunities are provided at about one hunter party (i.e., up to four hunters per blind) per 20 acres. There are a total of 18 duck hunting blind sites in this area, each consisting of a double set of buried concrete pit blinds capable of hosting up to four hunters per site. Hunters may hunt from within 100 feet of their assigned blind sites or stakes, and can only leave this area to retrieve downed birds. Northern pintail, green-winged teal, and northern shoveler are common species taken at these blind sites. About six inches and no more than one foot of water is retained in the ponds within the Hazard Tract to float decoys.

The Union Tract, which consists of the farm fields located to the south of the Refuge headquarters, provides an opportunity for goose hunting three days a week. In this area, goose hunting usually does not begin until mid-November when rye grass is better established and greater numbers of geese have arrived in the Imperial Valley.

The arrangements for hunting blind sites on this tract are generally the same as those described for the Hazard Tract, although these sites provided more space for hunters to decoy in geese. Four hunt sites are available in these fields and free roam hunting is not permitted. Hunters are required to hunt only from within their blinds, except to retrieve downed birds. Two hunting blind sites on the Hazard Tract and another on the Union Tract are available for use by disabled hunters by priority on Wednesday and Saturday. Accessible parking is provided at this site. If there are no disabled hunters requesting this site, it is open to all requesters. On Sunday, there is no priority on any of these blinds.

<u>Fishing</u>. The only part of the Refuge that is open to fishing is the area of the Refuge located within the Salton Sea, which is considered a navigable water of the U.S. No bank fishing or fishing in water drainage channels is permitted. The sea is closed to fishing during the winter months (October 1 to March 31) to protect waterfowl from disturbance. There are no buoys in the sea to delineate the Refuge boundary. Use of the areas within the Refuge for fishing is

limited, and as a result, disturbance to Refuge trust species is low. Refuge waters are patrolled by Refuge staff using an air boat.

Wildlife Observation. The Sonny Bono Salton Sea NWR provides a variety of opportunities for wildlife observation on Unit 1 and Unit 2. In Unit 1, two observation platforms, an interpretive loop trail, and two blinds are provided. The newest observation deck is accessible and provides views of the Refuge's managed seasonal wetland areas and cattail marshes. The other observation tower provides views of adjacent freshwater cattail marsh habitat where the occasional call of a Yuma Ridgway's rail can be heard. Distance views of open water habitat and the Salton Sea are also provided. A range of migratory and resident birds can be observed from these facilities. Secretive marsh birds are more likely to be heard than seen. In addition to waterfowl, shorebirds, and seabirds, there are also seasonal opportunities to see and hear a variety of Neotropical songbirds.

A one-mile interpretive loop trail (Michael Hardenberger Trail) is available for public use in Unit 1. The trail extends around existing freshwater marsh habitat and shallow seasonal wetland areas. Two photo blinds have been constructed along the trail that also serve as birding blinds. This trail begins near a small unpaved parking area at the end of Vendel Road. Additional opportunities for wildlife observation are available from Vendel Road.

Opportunities for wildlife observation are also available in Unit 2, primarily in the vicinity of the Refuge headquarters, located at the intersection of West Sinclair Road and Gentry Road. The two-mile round-trip Rock Hill Trail leads from the Refuge headquarters' visitor parking area to the top of Rock Hill. Along the route, there are opportunities to view wildlife in a variety of managed habitats including farm fields that provide forage for geese; open water habitat that supports shorebirds, seabirds, and other waterbirds; and nesting areas that support tern colonies in the summer. Near the start of this trail is an elevated observation deck that provides views of the farm fields and distant views of the Salton Sea.

Prior to the receding of the Salton Sea, wildlife observation also occurred along the west side of Garst Road in the vicinity of Red Hill Bay. Although some opportunities for wildlife observation continue, they are much more limited than in the past.

Photography. Two photo blinds are present along the interpretive trail in Unit 1. Use is on a first come, first served basis. One blind is situated alongside a pond managed to support shallow seasonal wetland habitat. The opening in the blind faces a small island and tree snag where birds often perch, making for a good photo opportunity. Shorebirds and waterfowl can be observed and photographed from this spot. The other blind is located among the cattails in the middle of freshwater marsh habitat. When the blind was constructed, the surrounding habitat consisted of open water habitat, however, over time this area converted to freshwater marsh habitat. Today, this blind would more likely be used as a listening blind where visitors can hear the calls of Yuma Ridgway's rails and other secretive marsh birds.

Opportunities for wildlife photography are also available along the roadway leading to Unit 1 where during the appropriate season there is a high potential to spot shorebirds, geese, and sandhill cranes.

Environmental Education. Environmental education tours for third through eighth grade students from local schools are conducted annually on the Refuge. Staff from the Refuge also visit local schools to provide information to the students about the resources present in and around the Refuge. In addition, using challenge cost share money to pay for buses and drivers,

the Refuge hosts 60 to 70 sixth graders two days a week (about 560 students a year) during the school year. This is a joint project with the Imperial Valley Regional Occupation Program and the Refuge. Special tours for Imperial Valley Community College and other educational institutions are also accommodated. Refuge staff also participate in Earth Day events and school nature curriculum programs.

Interpretation. Interpretive panels are provided along the Rock Hill trail that interpret a variety of issues including the cultural and geologic history of the area, the Refuge's diverse bird life, Refuge management actions, organisms in the Salton Sea, and geothermal and earthquake activity in the area. Interpretive signs that address the bird use in the area are provided along the interpretive trail in Unit 1.

Guided interpretive group tours are provided throughout the year, although more commonly in winter and spring. Arrangements can be made in advance for a group tour by contacting Refuge staff.

Research. Over the years, the Refuge has supported various research projects and resource surveys conducted in association with graduate work at various universities and/or implemented by other public (e.g., USGS, CDFW), private, and non-profit researchers. All research conducted on the Refuge is evaluated to ensure that the work being conducted is compatible with Refuge purposes and is likely to result in benefits to Refuge management and/or Refuge resources. Work conducted on the Refuge by outside individuals, organizations, or agencies that is not directly related to Refuge management may only be conducted after a Special Use Permit (SUP) has been issued by the Refuge Manager that documents the purposes of the work to be conducted and includes specific conditions intended to protect trust resources and ensure adherence to applicable Refuge regulations and policies.

**Refuge Operations**

Staffing. In 2012, the Refuge was managed with assistance from 11 permanent full time employees, two full time term employees, and one student participating in the Service's Student Temporary Employment Program. Four additional positions were included on the approved organizational chart, but had not been filled, including Park Ranger (term position), Biological Technician (term position), Irrigation System Operator (term position), and Tractor Operator (term position). Refuge Complex offices are all located in Unit 2 of the Refuge.

Law Enforcement. Law enforcement on the Refuge is the primary responsibility of the Service's uniformed Federal wildlife officers, although CDFW wardens also provide assistance, particularly during the hunting season. Federal wildlife officers enforce Federal wildlife laws on Service-owned lands within the National Wildlife Refuge System. They are charged with protecting wildlife and wildlife habitat, protecting Service facilities, and ensuring employee and visitor safety. Duties may include patrols, surveillance, investigations, apprehensions, seizures and arrests, and interaction with the judicial system. Refuge officers often work with other Federal, Tribal, State and local law enforcement agencies that have overlapping jurisdiction within and adjacent to NWRs. Currently, the Refuge Complex organizational chart does not include a Federal wildlife officer, therefore, law enforcement is provided by the Southern California zone officer, who is stationed at the San Diego NWR Complex.

Refuge Headquarters. Refuge complex administrative offices (headquarters) include a 2,300-square-foot building with five staff offices, a file/copy area, two staff restrooms, a visitor contact station, and two visitor restrooms with access from outside the building. Refuge

visitors enter the headquarters and visitor contact station from the junction of West Sinclair Road and Gentry Road. A paved parking lot with 25 parking stalls is provided for visitors. Adjacent to the parking lot is a 450-square-foot shaded picnic area and a wheelchair accessible observation deck. This area connects to the Rock Hill Trail. From the parking lot, visitors also have access via a concrete walkway to the restrooms and visitor contact station that is part of the administrative offices.

The visitor contact station provides the public with the opportunity to interact with Refuge staff. The Refuge relies on a combination of staff members and volunteers to staff the visitor contact station, with volunteers available from October through April. During that time, the volunteers work Friday, Saturday, Sunday, and Monday. These seasonal volunteers are permitted to stay at the Refuge in their recreational vehicle (RV), which is accommodated within the Refuge compound at a designated RV pad with full hook-ups. Refuge staff assists at the visitor contact station on Tuesday, Wednesday, and Thursday during the season and on weekdays between May and September.

Also included within the Refuge headquarters compound is a four-bedroom residence built in 1952. Housing a Refuge staff member at this location helps to facilitate visitor and facility security. The Refuge compound also includes two bunkhouses to accommodate researchers and temporary employees. The bunkhouse built in 1999 has five bedrooms and the one built in 2005 has three bedrooms.

A bird recovery and avian disease management area is located at the north end of the compound yard. This facility is intended to provide staff with a place to provide initial treatment of sick birds picked up on the Salton Sea and minimize the spread of contagion in the environment. Included in this part of the facility is a 360-square-foot triage/hospital building. Next to the hospital is a shaded outdoor holding pen where birds can recover and be released back into the wild or be taken to a licensed rehabilitation facility. This area can hold up to 100 pelican-sized birds at any one time. Also part of the facility is a small research building with instrumentation to help visiting researchers study diseases and other organisms of the Salton Sea. As part of the Refuge's role in attempting to contain avian disease agents, two propane fired incinerators capable of burning up to 120 pounds per hour are available to incinerate dead birds and disease organisms they may be carrying. Two storage barns (one five-bay barn and another three-bay barn) provide shelter for air boats and space for a refuge woodshop.

Also located with the compound is a maintenance building that provides work space and tools to help maintain refuge vehicles and equipment. The maintenance building consists of four work bays with roll-up doors and office space for maintenance staff. Fuel storage is provided to accommodate the fuel needs of refuge vehicles and farm equipment.

Attached to the roofs of four buildings and a parking shade structure are approximately 250 photovoltaic solar panels that annually generate up to 80,000 useable kilowatt hours of electricity during daylight hours or the equivalent of about 87 percent of the Refuge compound's electrical needs.

Other Refuge Facilities. Other facilities maintained on the Refuge include roads, primarily unpaved, water pumps, irrigation gates, and other irrigation equipment, drainage channels, and unpaved parking areas to serve hunting and other visitor service purposes. The Refuge also maintains a permanent portable restroom in Unit 1 near the observation tower and temporary restrooms during the hunting season on the Hazard and Union Tracts.

Land Tenure. The vast majority of the area within the Refuge that is owned in fee title by the Service was inundated by the Salton Sea in the 1940s. Only a small portion of this fee title land, approximately 140 acres located along the western edge of the Salton Sea, was never inundated. The only other fee title upland areas within the Refuge, a total of approximately 690 acres, was acquired in the 1970s and 1980s, as described in Chapter 1, for the purpose of providing foraging habitat for wintering geese.

Approximately 2,500 acres of the Refuge to the south of the Salton Sea were leased to the Service by the IID in the 1940s and 1950s. The original leases have expired and the IID is not interested in entering into another long term lease at this time; as a result, the Refuge operates on a year to year lease. The Refuge continues to coordinate with the IID in an effort to once again enter into a long term lease agreement.

Geothermal interests own subsurface geothermal resources in and around the lands leased to the Refuge by IID. The Refuge recognizes IID's need to provide access through these lands for geothermal wells and piping, and as the Salton Sea recedes, there will likely be requests from geothermal interests to place or relocate pipelines and access facilities. Some of the areas affected could include lands currently leased by the Service, requiring potential changes in the current Refuge boundary.

With respect to the Hazard Tract, located in Unit 2, the Service has managed this area under a permit with CDFW for many years. The land covered by the permit, which was originally approved in the 1960s, includes waterfowl hunting areas and several Yuma Ridgway's rail management areas. Although the permit has expired, the Service and State are in the process of renewing the agreement. In the meantime, the Service continues to manage the habitat and the State continues to manage the site's hunting program.

In addition to the fee title lands and IID leased lands, approximately 240 acres (the Caltrans Fields) in Unit 1 is managed under an agreement with the California Department of Transportation (Caltrans), which owns the land. This land has been managed as part of the Refuge for goose forage since 1992. As part of an agreement between Caltrans and the Service's Ecological Services program, these lands were to be deeded to the Refuge as part of a mitigation plan for nearby Caltrans projects. Although the land ownership transfer has not yet occurred, the Refuge continues to manage these lands for goose forage. These fields represent some of the most heavily foraged fields within the Refuge. The Refuge will continue to work with interested parties to either acquire the land or obtain the necessary agreements to manage it on a long-term basis.

**Fire Management Plan**

The Fire Management Plan prepared for the Sonny Bono Salton Sea NWR in 2001 was prepared as an operational guide for managing the Refuge's wildland fire and prescribed fire programs. It defines levels of protection needed to help ensure safety, protect facilities and resources, and restore and perpetuate natural processes, given current understanding of the Refuge relationships in natural ecosystems.

The Fire Management Plan adheres to the Service's policy and regulations pertaining to fire management activities and supports the enabling legislation of the Sonny Bono Salton Sea NWR. All fire management plans must comply with a Service-wide requirement that Refuges with burnable vegetation develop a fire management plan (620 DM 1). The DOI Manual states the following regarding wildland fires: "Wildfires may result in loss of life, have detrimental impacts upon natural resources, and damage to or destruction of man-made developments.

However, the use of fire under carefully defined conditions is to be a valuable tool in wildland management. Therefore, all wildfires within the Department will be classified either as wildfire or as prescribed fires."

The objectives of the Refuge's Fire Management Plan (USFWS 2001) are:

- To protect life, property, and natural resources from unwanted fire;
- Use prescribed fire to accomplish resource management objectives within the context of a natural ecological process;
- Develop and implement a process of collection, analysis, and application of fire management information needed for sound management decisions, and
- Use prescribed fire to manage and enhance the habitat as research and experience demonstrates the need.

The Refuge Fire Management Plan describes the responsibilities of various Refuge personnel for the implementation of the Plan. The Sonny Bono Salton Sea NWR does not have a dedicated fire management staff; therefore, the Project Leader is responsible for planning and implementing the fire management program on the Refuge. The Zone Fire Management Officer (FMO) located in San Diego is responsible for fire management program over- site and coordination. The Project Leader has assigned fire management responsibilities to staff, who possess appropriate training, experience, and incident qualifications. Pre-suppression planning and work is accomplished by Refuge staff in accordance with national and regional fire management direction under guidance from the Zone FMO. Emergency fire management actions are handled by Refuge staff according to training and incident qualifications. The Zone FMO is to be immediately notified of all actions.

Cooperative agreements with various Federal, State, and local agencies generally provide that resources of each agency are available to assist in initial attack efforts. The primary emergency wildland fire management contact for Sonny Bono Salton Sea NWR is the Cleveland National Forest Emergency Command Center (ECC) located in El Cajon, California. The ECC handles wildland fire emergency dispatching for the Refuge under a cooperative agreement. Westmoreland Volunteer Fire Department is the fire department responsible for structural fire protection on the Refuge. The BLM's California Desert District is also considered a cooperator due to their proximity to the Refuge and their ability to provide resources. Additional information about these cooperating agencies, and additional information and direction related to fire response, are provided in the Refuge Emergency Fire Plan, which is included in the Complex's Fire Management Plan.

Historically, wildfires on the Refuge have been very rare. When they have occurred, they usually involve stands of salt cedar. Due to the limited value of salt cedar as wildlife habitat, most of these fires are extinguished only when initial attack will be most effective, such as along breaks or clearings in stands of vegetation. However, the fire may be more aggressively attacked if it threatens higher value habitat or resources such as private property, croplands, or cattail ponds during nesting season, where important species could be adversely affected.

The Sonny Bono Salton Sea NWR has been conducting prescribed burns for at least 12 years. As of 2001, on average, two prescribed fires covering 100 acres were conducting on the Refuge annually. In recent years, the use of prescribed fire on the Refuge has been limited to once every few years, as needed to improve habitat in cattail marshes. When a prescribed fire is conducted on the Refuge, it is managed by the Service fire crew based out of the San Diego NWR Complex.

All prescribed burns are conducted in accordance with the approved Fire Management Plan and applicable County and air basin regulations. In past years, fire has been used to improve habitat quality by creating open areas within dense cattail stands. This action has been conducted most often to improve conditions for the Yuma Ridgway's rail. Prescribed fire has also been implemented in the past to remove stubble vegetation in managed agricultural fields in an effort to return nutrients to the soil and remove decadent grassland cover. This activity improves the vigor and quality of foraging crops cultivated to attract geese to the site.

Prescribed burns may also be used to treat and remove exotic vegetation (e.g., salt cedar, common reed). Such burns are typically carried out as a "pile" burn and are generally located in dry, open ponds or disced agricultural fields where there is very little risk of unwanted fire spread.

Prescribed burns involve the use of fire as a tool to achieve management objectives. Research burning may be conducted when determined necessary for accomplishing research project objectives. Actions included in the prescribed burn program include: the selection and prioritization of prescribed burns to be carried out during the year, prescribed burn plans, burn prescriptions, burn operations, documentation and reporting, and burn critiques. Measures to ensure the successful implementation of the prescribed fire program include:

- Conducting a vigorous prescribed fire program with the highest professional and technological standards;
- Identifying the prescribed burn type most appropriate to specific situations and areas;
- Efficiently accomplishing resource management objectives through the application of prescribed fire;
- Continually evaluating the prescribed fire program to better meet program goals by refining prescriptions treatments and monitoring methods, and by integrating applicable technical and scientific advancements;
- Preparing prescribed burn plans with a review by a qualified Prescribed Fire Manager/ Prescribed Burn Boss, and approval by the Project Leader; and
- Conducting prescribed burns with an adequate number of qualified personnel to conduct the burn as well as to mop-up.

All prescribed fire activity is implemented in compliance with applicable Federal, State, and local air quality laws and regulations. The Imperial Valley Agricultural Commission, which regulates the prescribe burn program for the Imperial Valley APCD, approves annual burn permits for the Refuge and specific requests for a prescribed burn on the day of the burn.

The management actions that would be implemented under the No Action Alternative would be consistent with the implementation direction in the currently approved Fire Management Plan for the San Diego National Wildlife Refuge Complex (USFWS 2004) or any updated Fire Management Plans prepared for the Refuge Complex in accordance with Service policies and regulations.

**Mosquito Management**

As of 2013, mosquito monitoring and control was not conducted on the Sonny Bono Salton Sea NWR.

**Cultural Resource Management**

It is the policy of the NWRS to identify, protect, and manage cultural resources located on Service lands and affected by Service undertakings for the benefit of present and future generations and in accordance with applicable laws and regulations. Cultural resources, including both archaeological and historic sites, are known to occur in the vicinity of the Refuge. Some of the known archaeological sites have been previously evaluated to determine if they are eligible for inclusion on the National Register of Historic Places (NRHP), while others have not yet been evaluated. It is also likely that sites occur on the Refuge that have not yet been detected and/or recorded. Because cultural resources are known to be present in the area, any Refuge project that would result in subsurface disturbance of previously undisturbed soil or disturbance that would extend below the depth of previous disturbance (e.g., below soils historically disturbed by agricultural activities), or would impact a structure that is considered more than 50 years old must be reviewed by the Service's Cultural Resources Program for compliance with Section 106 of the Historic Preservation Act. The review process involves the preparation of a Request for Cultural Resources Compliance which is submitted to the Regional Cultural Resources Office for review. With information about the project location and extent of the proposed ground-disturbing activity, the Cultural Resources Office will determine the potential effect of the proposal on cultural resources. Those projects that are not likely to affect subsurface materials could fall under the Service's programmatic agreement with the State Historic Preservation Office (SHPO), while other projects requiring greater ground disturbance could require SHPO review and concurrence. When there is a potential for disturbance to cultural resources, consultation with federally recognized Tribes, interested parties, and SHPO is required. Review and consultation requirements are applicable to all of the alternatives evaluated in the CCP.

**Environmental Contaminants Coordination**

The Service's Environmental Contaminants Program assists the Refuge Manager in issues related to contaminants, including seeking funds to conduct contaminant assessments, monitoring, and other studies related to the effects of contamination on Refuge trust resources. The Carlsbad Fish and Wildlife Office's Contaminants Program has assisted in addressing potential contaminants issues on the Sonny Bono Salton Sea NWR on several occasions, including on issues related to selenium. The accumulation of selenium in Salton Sea sediments and water where prey items occur represent a potential threat to nesting and foraging waterbirds. Monitoring efforts have been implemented in the past and will likely continue. Under all of the alternatives, the Contaminants Program would continue to work with the Refuge on this and other contaminant issues.

**Volunteers/Partners/Public Outreach**

The Refuge has a small, but active volunteer program. Volunteers staff the visitor center contact station on Fridays, Saturdays, Sundays, and Mondays from October through April. They are paid a small stipend and are allowed to live on the Refuge at a designated RV pad during the period in which they provide volunteer services. These and other volunteers go through a volunteer training program conducted by Refuge staff that enables the volunteers to orient visitors and answer questions related to birding. The Refuge also received assistance from members of the Anza-Borrego Foundation.

The Refuge also has a variety of Federal, State, and local partners that assist in conducting environmental education programs, managing the hunting program, and managing Refuge resources. These partners include CDFW, State Resources Agency, IID, Imperial County Regional Occupational Program, Desert Protective Council, Friends of Wister, Anza Borrego Natural History Association, Imperial County Farm Bureau, Coachella Valley Association of

Governments, Center for Natural Lands Management, Imperial County Airport, and the Brawley Chamber of Commerce.

Over the years, Refuge staff have been active in both on-Refuge and off-Refuge events and activities that help increase the visibility of the Refuge within the surrounding communities. Such activities include participation in the Imperial County Fair, the Brawley Cattle Call Parade, Calipatria Christmas Parade, Westmorland Honey Festival, Riverside County Fair, and the Salton Sea Bird Festival.

## Alternative B (Proposed Action) - Restore and Enhance Habitat Quality; Expand Opportunities for Wildlife Observation, Environmental Education, and Interpretation

All of the management activities described in Alternative A would also be implemented under Alternative B; in addition, Alternative B includes a variety of additional actions such as habitat restoration and expansion of existing public use facilities. The proposals included in Alternative B are illustrated in Figure 2-7 through 2-10.

### Wildlife and Habitat Management

The range of management actions described under Alternative A would continue under Alternative B, but in some cases, current management practices would be expanded to enhance habitat quality for specific target species.

The majority of the management practices conducted on the Refuge, as described here, require the use of irrigation water to maintain appropriate levels of habitat quality. To ensure the efficient use of irrigation water within the Refuge, Alternative B includes measures intended to conserve water use without compromising habitat quality. Although the Refuge has been receiving water from IID since it was created in 1930, reliable water delivery to meet 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, including the Refuge, to approximately 5.25 acre-feet per acre, which is less that the Refuge needs to optimize habitat quality for listed and sensitive species. As the Salton Sea continues to recede, the wetland habitats on the Refuge will become increasingly more important to resident and migratory birds. To provide better assurance that the Refuge will be able to achieve its wildlife purposes, an objective of this alternative is to reach an agreement with IID that would ensure adequate water to support the Refuge's managed wildlife habitats.

Managed Agricultural Fields. No changes in the current acreage of managed agricultural fields is proposed under this alternative, however, Alternative B does include new and expanded practices intended to increase the total crop yield within these fields to support wintering geese. One such proposal is to laser level these fields, which would allow for more uniform water coverage during irrigation, as well as increased water use efficiency. Better water coverage is expected to improve plant forage production throughout the fields. Another benefit of level farm fields is the need for less surface manipulation with tractor-pulled implements thereby reducing both dust generation and carbon emissions.

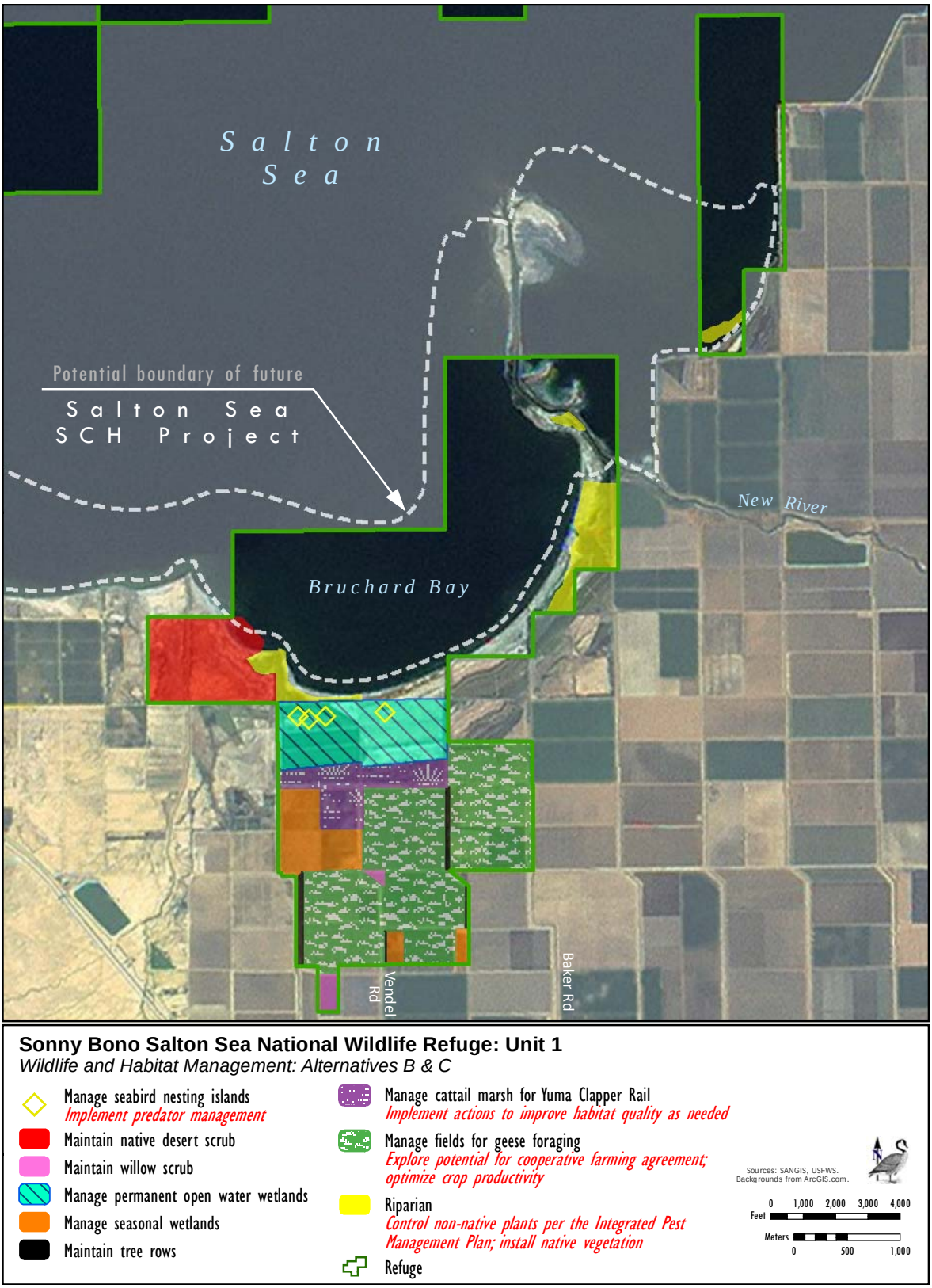



**Figure 2-7. Sonny Bono Salton Sea NWR, Alternative B (Proposed Action) and Alternative C – Habitat and Wildlife Management, Unit 1**

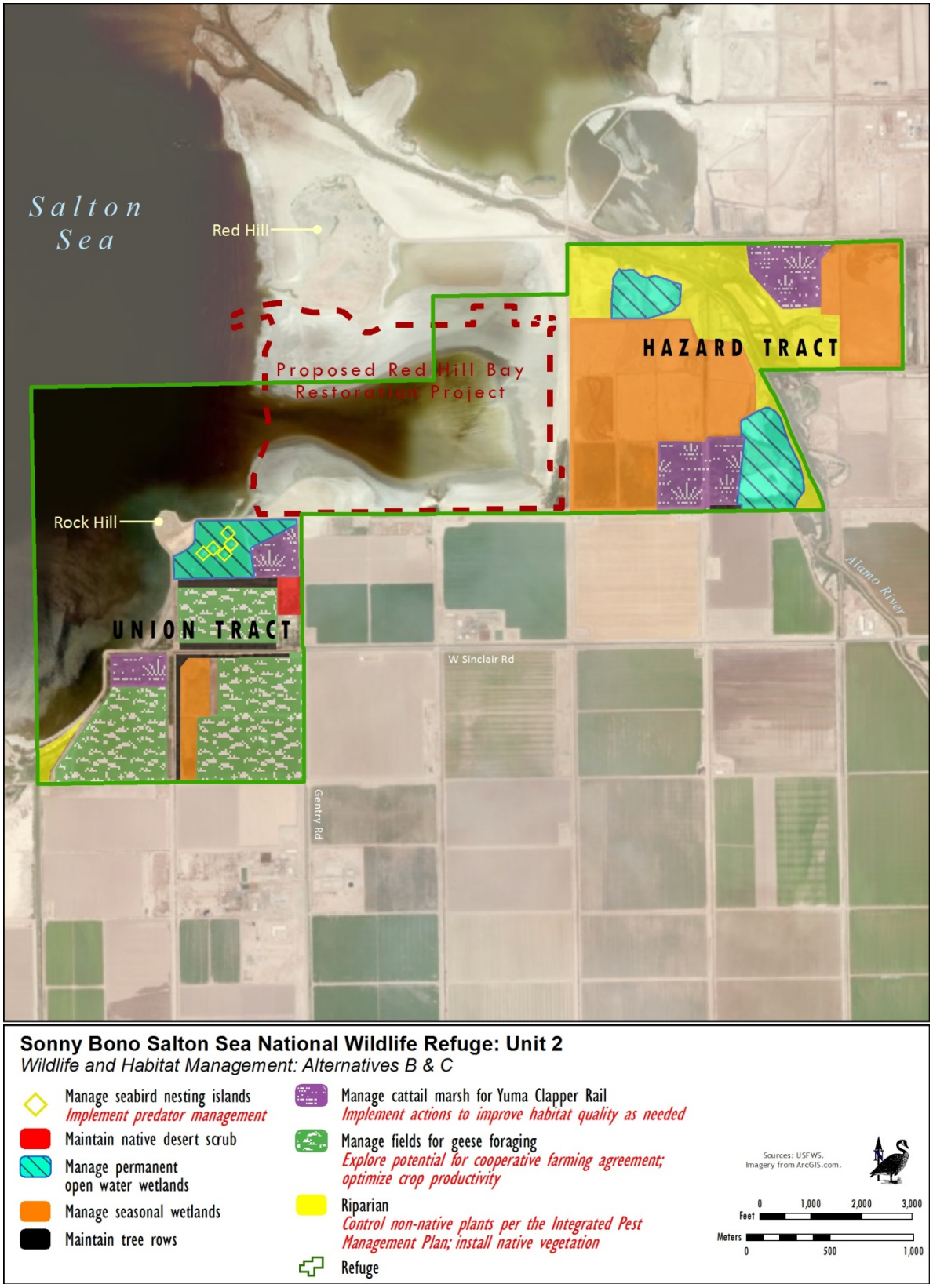



**Figure 2-8. Sonny Bono Salton Sea NWR, Alternative B (Proposed Action) and Alternative C – Habitat and Wildlife Management, Unit 2**

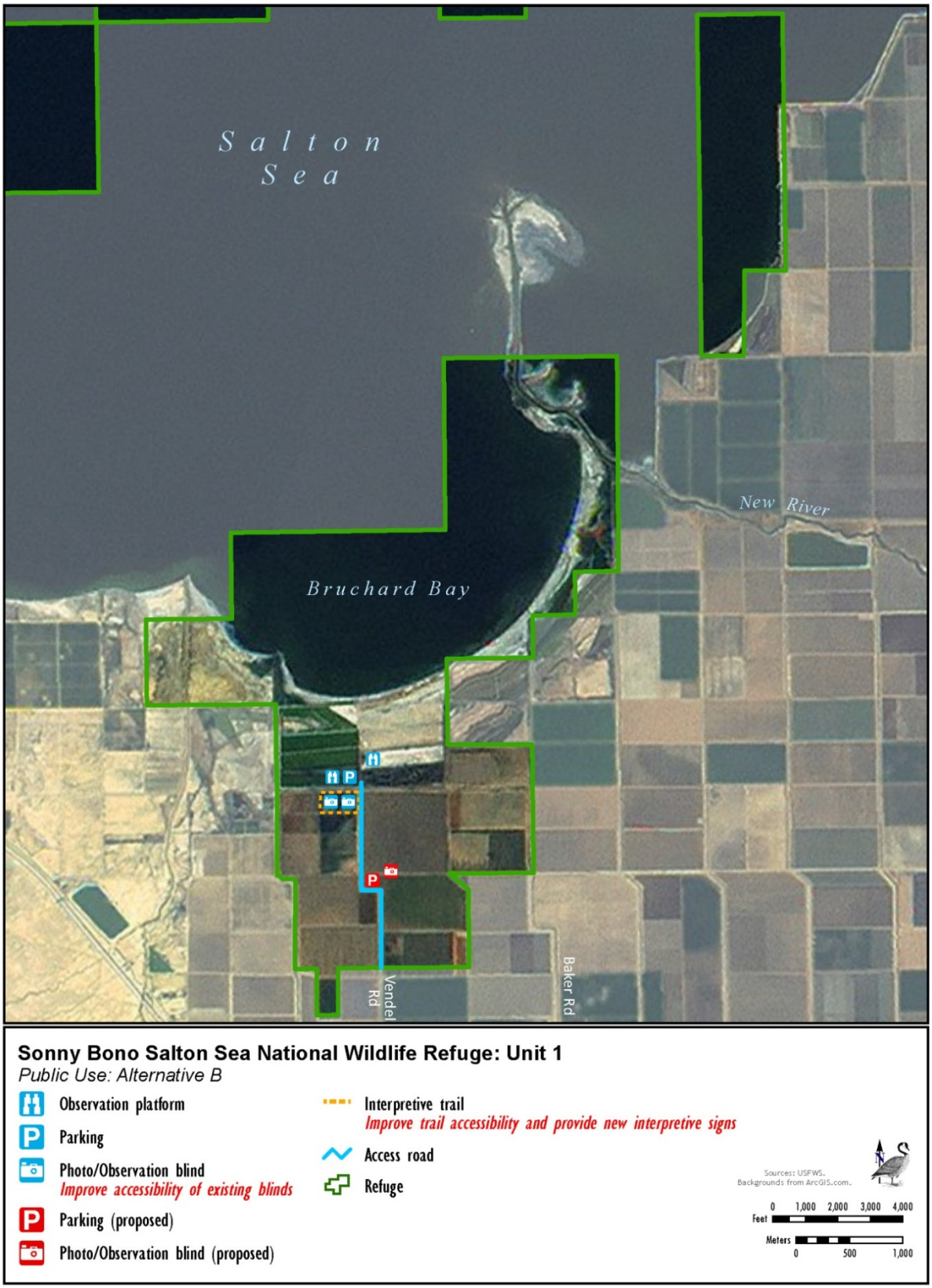



**Figure 2-9. Sonny Bono Salton Sea NWR, Alternative B (Proposed Action) – Public Use, Unit 1**

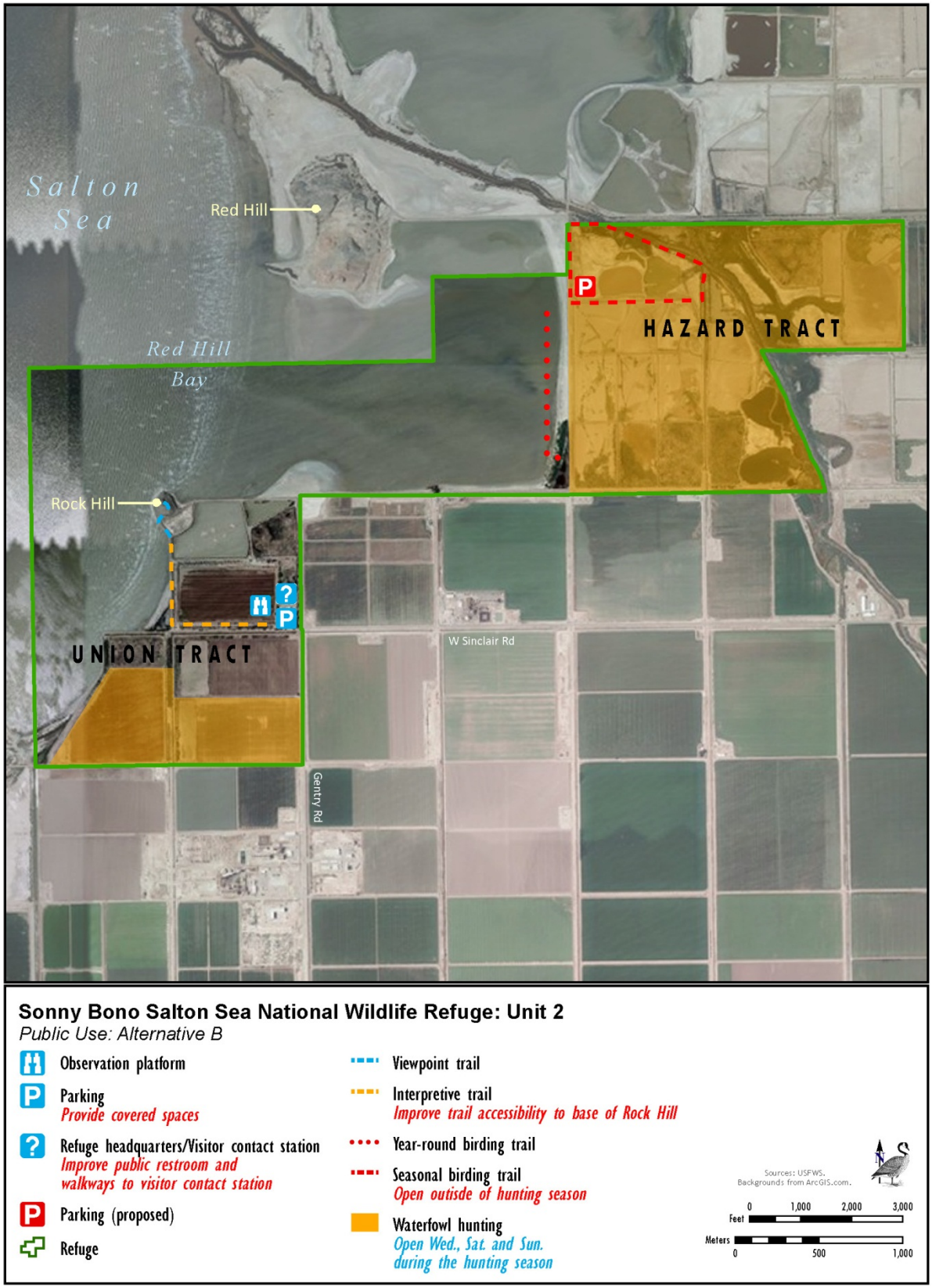



**Figure 2-10. Sonny Bono Salton Sea NWR, Alternative B (Proposed Action) – Public Use, Unit 2**

The Refuge would also continue to evaluate the effectiveness of the current no till practices and if deemed appropriate, this practice would be expanded over time to include more of the Refuge's managed farm fields.

Under this alternative, the Refuge also proposes to evaluate the potential for future cooperative farming opportunities on the Refuge. Various forms of cooperative farming have been implemented in the past, including double cropping in the Refuge's farm fields. Under this scenario, in exchange for the use of some or all of the farm fields for cultivating a crop that could be planted in the spring for harvest in mid-summer, a farmer would plant annual rye grass in the fields immediately upon harvesting the summer crop. The timing of the summer planting of rye grass would have to ensure that adequate forage was available for the geese upon their arrival in the Imperial Valley.

Another potential arrangement that could be permitted under a cooperative farming agreement might allow sheep or cattle grazing in the fields once the geese have migrated north for the summer. Grazing in the fields would assist in reducing the remaining grass stubble and any broadleaf weeds that germinate following the winter rains.

Prior to implementing a cooperative farming program on the Refuge, an analysis of the water needs and the environmental and financial costs and benefits to the Refuge of implementing such a program would be conducted.

Seasonal Shallow Wetlands. No changes in the current management of the shallow seasonal wetland areas on the Refuge are proposed. However, Alternative B does include a proposal to monitor waterfowl numbers in both the Hazard Tract and Unit 1 in an effort to identify trends and variables in overall abundance and species diversity over time.

Permanent Cattail Marsh. As vegetation in the Refuge's cattail marshes becomes denser, the habitat quality for Yuma Ridgway's rails and other secretive birds decreases. As a result, this alternative proposes to periodically rotate managed cattail marsh habitat areas on the Refuge. Such as process could involve allowing a seasonal shallow wetland located adjacent to an existing cattail marsh area to convert to cattail marsh. Once the desired habitat quality has been achieved, the existing cattail marsh would be allowed to dry out at the end of the nesting season. Rails and other marsh birds would slowly migrate to the adjacent cattail habitat. Once the old marsh has adequately dried out, the overgrown marsh area would be cleared through the mechanical harvesting of vegetation or through the use of a prescribed fire.

A future step-down Yuma Ridgway's rail management plan would evaluate when and how prescribed burns or mechanical harvesting would be implemented. This step-down plan would also identify potential new locations on the Refuge for establishing permanent cattail marsh habitat and replacing existing areas of marsh habitat that have been affected by an accumulation of silt and/or an overgrowth of cattail vegetation with other mixed marsh wetland habitat that supports waterfowl and other waterbirds.

Permanent Open Water Wetlands. Under Alternative B, the existing areas of current open water wetland would continue to be managed to support migratory waterbirds and nesting seabirds. In addition, this alternative proposes the phased restoration of 420 acres of a previously submerged portion of the Salton Sea, Red Hill Bay, to shallow water marine habitat to support resident and migratory waterbirds. These ponds also have the potential to support desert pupfish. The restoration site would extend from west of Garst Road to the south edge of the Salton Sea near the Refuge headquarters seawall.

Also proposed under this alternative are actions intended to improve nesting conditions for seabirds that nest on the islands located within the Refuge's permanent open water wetlands. Such actions include seeking funding to study the physical and biological factors that contribute to nest site selection by gull-billed terns and black skimmers at the Salton Sea. Based on the findings of this study, changes to the configuration of the islands located in Unit 1 could be implemented, changes the depth or salinity levels of the open water area may be initiated, nesting substrate on the islands may be enhanced, or other improvements may be made in an effort to encourage these species to reestablish nesting colonies on the islands located within Unit 1. In addition, the Refuge will encourage the creation of nesting islands within proposed Salton Sea restoration projects, including the Red Hill Bay restoration and the Salton Sea SCH project.

A related action involves the implementation a predator management plan on the Refuge to control mammalian predators known or suspected to take the chicks and eggs of nesting gull-billed terns and black skimmers. The details of this predator management proposal are included in Appendix H, Predator Management Program for the Sonny Bono Salton Sea NWR.

Native Salton Sea Scrub. Management of native scrub habitat on the Refuge would be the same under this alternative as it is under Alternative A.

Riparian Areas. Management of the Refuge's riparian areas would continue to involve the control of non-native species followed by the restoration of native scrub vegetation. Under Alternative B, approximately 80 acres of invasive salt cedar would be removed from the area around Bruchard Bay by 2018. This area would then be planted with a mixture of native Goodding's black willow, screwbean mesquite, and blue Palo Verde.

Tree Rows. Management of the tree rows on the Refuge would be the same under this alternative as described under Alternative A.

### Habitat Restoration

Included under Alternative B are two wetland restoration proposals that the Refuge would implement in partnership with one or more other agencies. Both projects are intended to restore permanent open water areas along the southern edge of the Salton Sea to provide foraging and loafing habitat for shorebirds, seabirds, waterfowl, and other waterbirds. These projects are described in greater detail below.

#### Red Hill Bay Restoration Project

Location. The Red Hill Bay Restoration Project site encompasses approximately 420 acres along the southeastern section of the Salton Sea (portions of Sections 22 and 27, Township 11 South, Range 13 East), immediately west of Garst Road and south of Red Hill Bay Marina Road (Figure 2-11). The site is bordered on the south by a portion of the Salton Sea levee system and adjacent agricultural land and on the west by the Salton Sea. The Refuge headquarters and Rock Hill occur to the southwest.

Project Partners. The project site includes a portion of the Refuge that is leased to the Service from IID, as well as areas located outside the Refuge boundary that are owned and maintained solely by IID. IID is participating in the planning, design, and implementation of this project.

**Figure 2-11. Location Map - Red Hill Bay Restoration Project**

Purpose. The purpose of the Red Hill Bay Restoration Project is twofold: 1) to reestablish the Red Hill Bay area as an important saline shallow water shorebird habitat, and 2) to cover the playa area with saline water and decrease particulate matter that become airborne during wind events. Up until a few years ago, this area was inundated by the Salton Sea and supported a variety of aquatic organisms and migratory birds. As a result of new conservation measures implemented in the Imperial Valley to conserve water for transport to the San Diego region, this portion of the Sea has receded exposing the sea floor and eliminating shallow water habitat.

Project Overview. Implementation of this project would include the construction of a set of low (approximately three feet high) berms across portions of Red Hill Bay to form a pair of cells that would hold impounded shallow saline water at a target salinity of 20,000 mg/l in the first cell and 30,000 mg/l in the second cell. The shallow impoundments would provide habitat for wading birds and shorebirds in the currently exposed playa areas. The berms would be constructed using excavators, a dredge, and/or bulldozers. Additionally, loafing and nesting islands, snags for bird perches, deeper water channels and culverts to support invertebrates (and potentially fish) would be constructed within the project site.

Water would be pumped from the Alamo River and discharged to the eastern-most cell along a gravity fed feeder ditch running north-south along the west side of Garst Road. Saline water would be pumped to this cell via a saline water delivery system that would have an inlet constructed at the Salton Sea edge. It is likely that the project would be completed in phases, with the first phase including the development of the Alamo River water delivery and saline water delivery systems and construction of the berms in the eastern portion of the site. Ultimately the project would include a western berm extending from a site near the existing picnic area at the south edge of Red Hill Marina south toward the Refuge's "D" Pond (Figure 2-12). The western berm would be constructed along the shallow shelf formed at the entrance of Red Hill Bay.

The Refuge would have primary responsibility for identifying funding sources for project implementation, with other agencies such as IID participating as available. Portions of Red Hill Bay are currently considered Waters of the U.S. by the USACOE and waters of the State by CDFW. Preliminary planning for the project is ongoing and construction of Phase 1 is planned for 2013. Completion of Phase 2 (construction of the berm across the bay inlet) would be implemented as the Salton Sea water elevation recedes, making construction access possible.

Water Delivery Infrastructure. The project includes a water delivery system from the Alamo River and a salt water delivery system from the Salton Sea. The water delivery system from the Alamo River includes an approach channel west of the Garst Road bridge that will be excavated perpendicular to the Alamo River, approximately 20 feet wide and 40 feet long. Two pre-cast concrete vault structures and a trash rack will be installed in the approach channel to stabilize flows from the Alamo River. An unlined open channel will convey the water to a siphon under Red Hill Marina Road into a 1,900-foot-long, open channel to Red Hill Bay. The open channel will be approximately 10 feet wide with a water depth of two to three feet. Approximately two functioning 10 cubic feet per second (cfs) vertical centrifugal screw pumps will be installed in a concrete vault structure that will support all pumping facilities at the northeast corner of the Red Hill Bay restoration site (refer to Figure 2-12). One pump will lift Alamo River water and the other will lift Salton Sea water. The Alamo River water discharge will be routed into a mixing basin where it will blend with Salton Sea water.

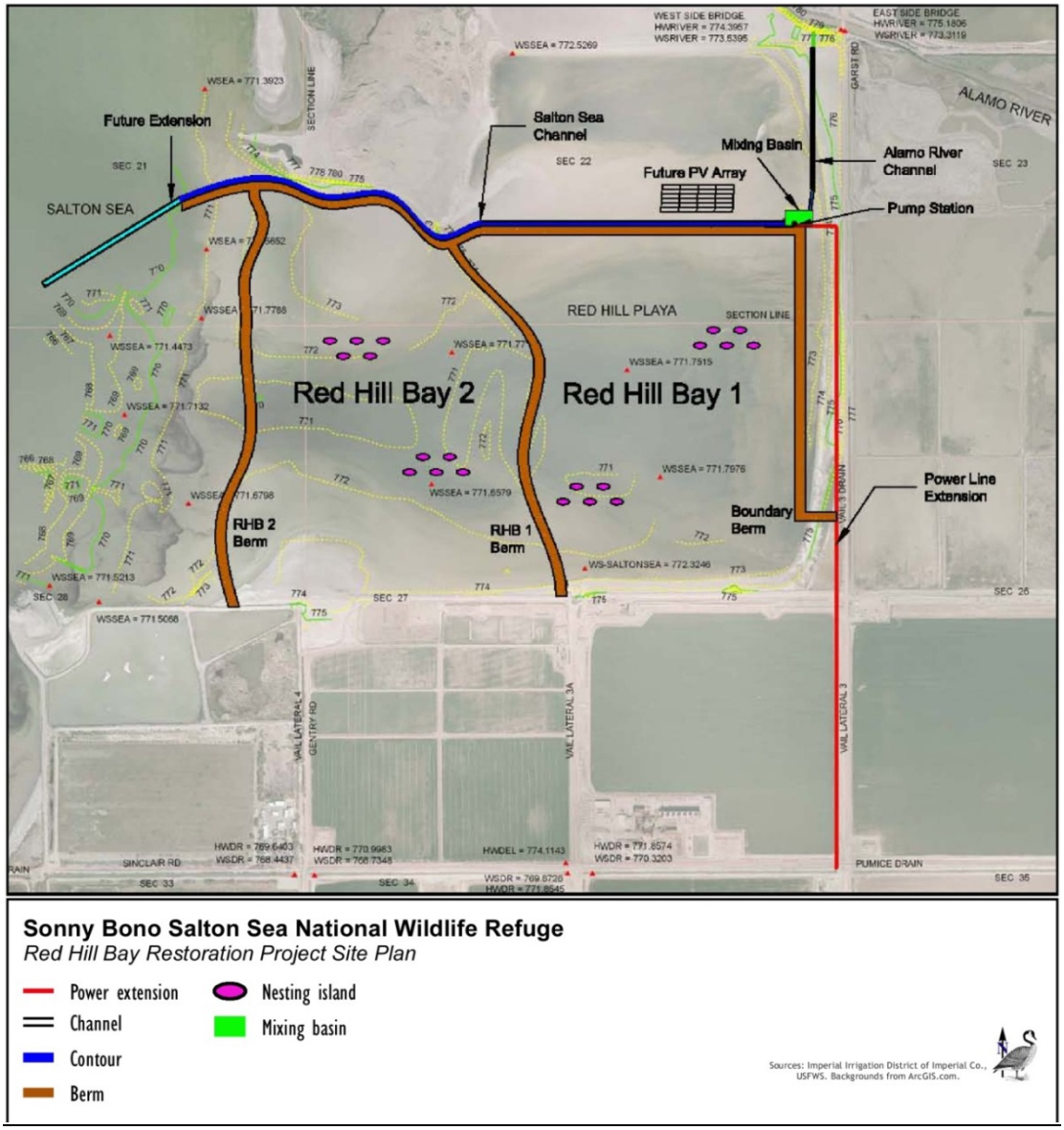



**Figure 2-12. Site Plan - Red Hill Bay Restoration Project**

A small sediment basin may be constructed south of the Alamo River after the pump plant to help remove sediment before water flows to the first cell. There are two existing pumps that intermittently discharge water to the Alamo River from the freshwater Refuge ponds east of Red Hill Bay. The discharge from these two pumps will be diverted (via a culvert under Garst Road) and discharged into the Alamo River/Red Hill Bay delivery ditch to help reduce pumping needs at the new main pump location.

The saline water intake alignment will access the Salton Sea on the north side of the project, near the southern edge of Red Hill and will extend to the edge of the Salton Sea until water flows into the channel. Initially, this channel will be about 15 feet wide at the top and approximately ten feet below existing grade. The saline water inlet will require periodic cleaning and extension as the Sea's elevation drops. Eventually, the elevation of the saltwater intake pump will be too high to receive saltwater from the Sea. At that point, either the intake channel will need to be excavated deeper and the pump lowered to lift

saltwater into the Bay, or a separate lift pump station will have to be constructed near the junction of the current saltwater intake channel at the Salton Sea shoreline to lift water into the original intake channel. This added intake lift pump could be powered by an extension of the grid electricity currently at Garst Road or by a photovoltaic system occupying an adjacent area of approximately 150 feet by 350 feet. Ultimately a longer channel will be needed to access the saltwater source and its function and appeareance will be similar to the original intake channel.

Dredge material from the excavation of the intake channel will form drivable berms on either side of the channel. It will extend approximately 5,800 feet east to the northeast corner of the project where the Salton Sea water will be lifted up about three feet with a screw-type pump and blended with the flows from the Alamo River.

The water delivery and drainage infrastructure will be constructed with tracked excavators and bulldozers. Additionally, rubber tire backhoes and/or excavators and haulage trucks may be utilized in the placement of the pumps, inlet and outlet structures, and water control devices. Where necessary, the inlets and outlets of the delivery system will be armored or otherwise protected from erosion.

Cell Development. Four berms would be constructed to create two water cells (water impoundments). The berms are designed to be three feet high and about 20 feet wide on the top. The sides of the berms would be sloped to achieve an 8:1 slope gradient on the water side of the impoundment berm and a 4:1 slope gradient on the outside slope. In Phase 1, a north-south trending berm about 4,800 feet long, would be constructed as shown in Figure 2-12 and another north-south trending berm about 5,000 feet long would be constructed just to the west of Garst Road. The berm that would extend parallel to Garst Road would be made available to the public for bird watching, while the northern berm would be part of the saltwater conveyance system. Finally, a 5,800-foot-long east-west tending berm would be constructed along the northern perimeter of the restoration site, adjacent to the channel that would convey water from the Salton Sea to the project.

Cell berms would be constructed from material obtained onsite. Construction equipment would include D-4 to D-8 bulldozers, tracked excavators, rubber tire excavators, and ancillary support equipment. Where moisture conditions allow, the berms would be pushed into placed with in situ soils. Compaction of the berm material would be accomplished by repeated tracking of equipment across the berm material and, if necessary, the addition of water during compaction. Where the substrate is too wet for repeated equipment movement, tracked excavators would excavate shallow borrow pits adjacent to the berm alignment and place the excavated material along the berm. Once the material is dry enough to access, bulldozers would be used to level and compact it.

In Phase 2, an additional berm would be constructed across the mouth of Red Hill Bay. It is anticipated that this berm would be constructed within 100 feet of the sand bar shelf that has formed at the edge of the bay. This sand bar is currently inundated with about one foot of water and with the steadily declining Salton Sea water elevations will soon be exposed. As this area becomes accessible for construction, the western berm would be constructed using tracked excavators or a dredge. The material to construct the berm would be excavated from either side of the area proposed to support the berm.

Within each cell, deeper pools (about six feet in depth) would be excavated to create invertebrate and potential fish habitat. The spoil would be used elsewhere in the cell to

create loafing and nesting islands. Individual pools may be linear or oval, depending on the ease of construction, but would likely not be more than 2,000 square feet in area. About ten islands would be constructed in each cell for bird loafing and nesting. The shape of the islands is expected to be elliptical, similar to islands used by nesting seabirds such as gull-billed terns and black skimmers in other permanent open water habitat within the Refuge.

Electrical Power. There is limited electrical power available for the operation of the required water pumps; therefore, the pump operation at the Alamo River inlet would be timed to avoid use when the existing pumps to the east of Red Hill Bay in the Hazard Tract are operational. Use of the new waters pumps would require processing an application with IID for the approval of two new electrical hookups. To operate the 20 horsepower screw pump at the Alamo River inlet would require the use of the available single-phase electrical power line located near the site.

The water pump that would move water originating from the Salton Sea would also require electrical power. Based on current estimates of saltwater use, a 15 horsepower pump would likely be required. A three-phase extension from the IID grid at Garst Road would be run from near the Refuge's northern boundary in Red Hill Bay west into the dry eastern edge of Red Hill Bay for a distance of about 400 feet where the saltwater pump would be located. This power supply would be utilized primarily at night and during the day on an as-needed basis. Ultimately, a photovoltaic array (125 feet by 325 feet in size) would be installed immediately to the northwest of the pump station to power the saltwater pump during daylight hours.

Operations and Maintenance. The cells within the project site would be operated as saline impoundments primarily to provide foraging and loafing habitat for migrating waterbirds, but also to eliminate the potential for emissive dust from the exposed playa that would result if the project were not to be implemented. The proposal to create a saline environment, rather than a freshwater environment, would reduce the potential for vegetation growth in the cells, minimizing long-term maintenance costs and reducing the potential for providing habitat suitable for mosquito breeding. The project design calls for salt concentrations within the cells to be approximately 20 ppt to 30 ppt. Water depths would vary depending on the existing topography of the bay substrate. The deepest areas would likely range from one to two feet and would occur along the centerline of the cells and adjacent to the constructed berms. Water depths would decrease along the eastern edge of the cells. In addition, deeper areas will be scattered within the cell in locations where borrow material was excavated for the construction of the berms.

The cells would be constructed as a flow through design in which outlets would discharge water from the cells into the Salton Sea. In Phase 1, outlets constructed in the western berm of the Phase 1 cell would allow water to sheet flow onto the exposed playa areas to the west, ultimately discharging into the Salton Sea. Once Phase 2 is implemented, the western cell would receive water from the Phase 1 outlets.

The ponds will be operated and maintained by the Sonny Bono Salton Sea NWR staff unless it is determined later that a contract operator is preferred.

Monitoring. To better understand the many uncertainties associated with blending Alamo River water and Salton Sea water to create wildlife habitat, the Red Hill Bay restoration project includes a multiple year monitoring program. This monitoring program, which would include input from the Service's Environmental Contaminants Program, is intended

to provide additional data to supplement and expand upon the results of research conducted at the USGS Reclamation Saline Habitat Ponds between 2006 and 2009 (Miles et al. 2009). This effort would provide an opportunity to further address areas of uncertainty and ultimately inform adaptive management of this and other similarly created habitats within the receding Salton Sea. In line with the Salton Sea Ecosystem Monitoring and Assessment Plan (MAP), monitoring at this site would address the biotic and abiotic functions of the created habitat. Water quality (e.g., pesticides, selenium, nutrient levels), bird use, and fish and invertebrate colonization would be monitored during the initial two years of operation, following the survey protocols outlined in the MAP (Case et al. 2013).

As part of this monitoring plan, USGS would be contracted to investigate selenium and pesticide exposure risk. Twenty sediment samples from the project site would be analyzed by the USGS Pesticide Fate Research Group (PFRG) in Sacramento, California for current-use and legacy pesticides. This data would inform Refuge staff of potential hazards that may be exposed with different construction methods and allow staff to make adjustments in the construction design or methods, if necessary. Water samples collected from the Alamo River every two weeks for a full year would be sent to PFRG 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, USGS Western Ecological Research Center (WERC) would conduct sample collection and selenium analysis in water, sediments, and invertebrates on a bi-annual basis for at least two years. During the breeding season, additional selenium monitoring to include bird eggs and nesting success would be implemented. As sufficient selenium data is collected a risk assessment would be made and used to advise future management and continued monitoring needs.

Comprehensive bird surveys would be conducted at least three times per season; the seasons being identified as late winter, spring migration, breeding season, and early fall to best capture bird use/phenology of the site during key periods of the year. Surveys of colonial nesting birds (i.e., gull-billed terns, black skimmers) would be conducted weekly throughout the breeding season to identify numbers of breeding pairs, fledgling 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 WERC and enumerated by lowest practical taxonomic group. The data provided from this monitoring program would be used to inform current and future management decisions.

Permits/Approvals. Implementation of this project will require compliance with the variety of Federal, State, and local regulations, as described below.

1) NEPA - Because the proposed project is a component of the larger CCP planning process for the Sonny Bono Salton Sea NWR, the Service proposes to comply with NEPA through the processing of this CCP and accompanying EA.

2) Compliance with Section 7 of the Federal Endangered Species Act - Evaluate the potential effects, if any, on the endangered Yuma Ridgway's rail and endangered desert pupfish.

3) Section 404 of the Clean Water Act - Based on the USACOE determination that the Section 404 Ordinary High Water Mark is the average elevation of the Salton Sea from the previous year, the proposed project is located within the ACOE jurisdictional boundaries and requires a Section 404 permit to allow the discharge of dredged material into Waters of the U.S.

4) Section 401 Water Quality Certification - A Water Quality Certification in accordance with Section 401 of the Clean Water Act is required from the Colorado River Basin RWQCB.

5) Section 106 of the NHPA - Compliance with Section 106 has been completed.

6) California Fish and Game Code Section 1602 Lakebed Alteration Agreement - The CDFW would be requested to issue a Section 1602 Lakebed Alteration Agreement because proposed work would take place in the footprint of the lakebed.

7) Compliance with air quality standards as regulated by the Imperial County Air Pollution Control District.

8) Encroachment Permit - An encroachment permit would need to be acquired from Imperial County to place culverts under Garst Road and Red Hill Marina Road. In addition, permission is needed from Red Hill Marina County Park to construct a saltwater intake channel on the park's southern property boundary.

9) Lease Agreement - A long-term lease with IID is required for the project area prior to construction to assure the project's long-term viability.

10) Electrical Connection Permits - Two new electrical connection permits must be obtained from IID to operate the Alamo River and saltwater delivery pumps.

**Salton Sea Species Conservation Habitat (SCH) Project**

The Refuge would continue to partner with other Federal and State agencies on the implementation of this project, as described in Alternative A.

### Endangered and Sensitive Species Management

The species management actions described under Alternative A would also be implemented under Alternative B. In addition, a number of new actions are proposed under Alternative B to ensure the long term protection of the Refuge's listed and sensitive species.

Step-Down Habitat Management Plan. Prepare a step-down habitat management plan for the Refuge that addresses the range of species supported on the Refuge. As part of the management plan, or as a separate plan, address habitat development, maintenance of suitable habitat conditions, and protection of habitat from human disturbances for the Yuma Ridgway's rail. Management planning for the rail should include an assessment of the degree of threat to adult rails and recruitment of young rails from existing and predicted selenium levels in current and future rail habitat areas on the Refuge, and, if necessary, present recommendations for actions to be implemented to control this threat.

Secure Adequate Long-Term Water Supplies. Work with IID to ensure that the Refuge will be provided with an adequate supply of water of appropriate quality to continue to provide

managed cattail marsh habitat to support the current population of Yuma Ridgway's rails on the Refuge, as well as to support current proposals to restore shallow water habitat within the Refuge to provide foraging and loafing areas for shorebirds.

Yuma Ridgway's Rail Monitoring and Research. Under Alternative B, annual Yuma Ridgway's rail surveys to tract population size within the Refuge's two units would continue. In addition, the Refuge would seek funding to study Ridgway's rail movement among established cattail marsh areas on the Refuge, the effect that prescribed burns may have on rail movement and productivity, and the effects, if any, of hunting-related disturbance on rail populations in marshes located adjacent to waterfowl hunting areas. The results of this work would be incorporated into a refuge-wide habitat management plan, and/or a step-down Yuma Ridgway's rail management plan.

Desert Pupfish Monitoring. Actively monitor the presence of desert pupfish on the Refuge and working with CDFW relocate populations discovered in managed ponds to appropriate habitat in the Salton Sea or adjacent drainage ditches.

Enhanced Seabird Nesting Site Management. Maintain water levels in managed permanent open water ponds that support seabird nesting islands at a depth of at least 18 inches throughout the breeding season; to identify predators and causes of disturbance to nesting colonies especially during nocturnal periods, install motion-activated cameras in nesting areas during the breeding season; evaluate the benefits of modifying nest site substrates on selected islands to discourage competing Caspian terns and California gulls from establishing nesting colonies in nesting areas favored by gull-billed terns and black skimmers; develop a monitoring program to evaluate the extent of predation and/or disturbance from California gulls on nesting gull-billed terns and black skimmers; and implement a predator management plan (described below) to improve gull-billed tern and black skimmer productivity.

The Refuge would also work to establish partnerships with other land management agencies (e.g., IID, CDFW Imperial Wildlife Area - Wister) to increase or enhance seabird nesting habitat around the Salton Sea in an effort to improve nesting success for various species of concern.

Predator Management Plan. Consistent with the purposes of the Sonny Bono Salton Sea NWR, Alternative B includes a proposal to implement, per available funding, a comprehensive and integrated predator management program that includes a range of management actions from vegetation control and other nesting habitat enhancements to implement non-lethal (deterrence) control of avian and mammalian predators and lethal control of individual mammalian predators (e.g., coyotes, raccoons, feral dogs and cats) that pose a threat to ground nesting birds. The primary purpose of this predator management plan is to improve productivity for two ground nesting seabird species, the western gull-billed tern and black skimmer, both of which annually nest on the Refuge. Both species are identified by the Service as Birds of Conservation Concern (USFWS 2008) and by the Service's Migratory Bird Program as Birds of Management Concern (USFWS 2011). In addition, the gull-billed tern is included on the Migratory Bird Program's list of focal species (USFWS 2011). Focal species, a subset of the Birds of Management Concern, are those species that the Migratory Bird Program believes need additional investment of resources to address pertinent conservation or management issues.

The most effective, selective, and humane techniques available to deter or remove individual predators that threaten nesting gull-billed terns and black skimmers would be implemented under this plan. The direct control of individual problem mammalian predators would be implemented as necessary to protect gull-billed tern and black skimmer breeding adults, chicks, and eggs. The primary measure to be used to deter predators would include maintenance of electrical fencing around nesting areas. The program is described in detail in Appendix H.

Habitat Protection. Installation of new gates, fences, signs, and other forms of traffic and access control to direct visitors through the Refuge to appropriate public use areas and to minimize unauthorized vehicular and pedestrian travel along the Refuge's many unpaved farm roads, as well as through sensitive habitat areas.

**Resident Native Species Management**

The management actions described under Alternative A to support resident native species would also be implemented under Alternative B. In addition, under Alternative B, the Refuge would work with IID to identify appropriate actions for reducing the incidence of bird strikes on existing power lines.

**General Habitat Management**

The management actions related to general habitat management, as described under Alternative A, would also be implemented under Alternative B. In addition, under Alternative B, the Refuge would seek funding and/or partners to develop a robust program for monitoring species abundance and diversity within the Refuge's various managed habitats. The results could then be used to identify trends and variations overtime that may be attributable to changing conditions in the Salton Sea, climate change, and/or modified management practices.

Integrated Pest Management. Under Alternative B, an Integrated Pest Management (IPM) Plan would be implemented for the Refuge. The IPM step-down plan is provided as Appendix G of this CCP. In accordance with 517 DM 1 and 569 FW 1, an IPM approach would be utilized, where practicable, to eradicate, control, or contain pest and invasive species (herein collectively referred to as pests) on the Refuge. Implementing the IPM Plan would involve using methods based upon effectiveness, cost, and minimal ecological disruption, which considers minimum potential effects to non-target species and the refuge environment.

Under the IPM Plan, pesticides may be used where physical, cultural, and biological methods or combinations thereof, are impractical or incapable of providing adequate control, eradication, or containment. If a pesticide is necessary for use on the Refuge, the most specific (selective) chemical available for the target species would be used unless considerations of persistence or other environmental and/or biotic hazards would preclude it. In accordance with 517 DM 1, pesticide usage would be further restricted because only pesticides registered with the USEPA in full compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and as provided in regulations, orders, or permits issued by USEPA may be applied on lands and waters under refuge jurisdiction. The types of pesticides that can be used on the Sonny Bono Salton Sea NWR are also limited to those products available for sale in the State of California. Before a pesticide product can be sold or offered for sale in California, is must be approved and registered by the State's Department of Pesticide Regulation.

The IPM Plan, which is provided in Appendix G, provides a detailed discussion of IPM techniques, including the selective use of pesticides for pest management on the Refuge, when deemed necessary. Throughout the life of the CCP, all pesticides proposed for use on the

Refuge, with the exception of mosquito-related pesticides which are addressed through a separate process, would be evaluated by the IPM Regional Coordinator for potential effects to refuge biological resources and environmental quality. The results of this evaluation, including the potential effects of each product, would be documented in "Chemical Profiles." Chemical profiles have already been completed for those pesticides that are currently approved for use on the Refuge and are available for review in Attachment B of Appendix G. Only those pesticides that are likely to result in only minor, temporary, and/or localized effects to species and environmental quality based upon non-exceedance of threshold values in Chemical Profiles would be approved for use on the Refuge. In all cases, BMPs would be implemented during the handling and application of pesticides, and in some cases, non-exceedance of threshold values may be achieved through the implementation of additional BMPs that further define how, when, where, and to what extent a specific pesticide may be applied.

Control of pest species is necessary when these pests are resulting in environmental harm. Environmental harm by pest species refers to a biologically substantial decrease in environmental quality as indicated by a variety of potential factors including declines in native species populations or communities, degraded habitat quality or long-term habitat loss, and/or altered ecological processes. In the case of this Refuge, environmental harm may be a result from direct effects to cultivated foraging plants or managed habitats that are managed to meet specific Refuge purposes (i.e., reducing depredation by foraging geese of surrounding commercial agricultural fields, protection of habitat to support listed species and migratory birds).

Environmental harm may involve detrimental changes in ecological processes. For example, invasive nonnative plant species such as salt cedar and common reed can outcompete and ultimately replace native species such as willows and mesquite, altering the function of the historic plant community. Environmental harm may also cause or be associated with economic losses and damage to human, plant, and animal health. For example, invasions by fire-promoting, non-native grasses that alter entire plant and animal communities can increase the frequency and intensity of wildland fires, which in turn increases fire-fighting costs and threats to adjacent development.

One or more methods may be employed to meet the objectives of the IPM Plan, including cultural, physical/mechanical, biological, and/or chemical control. These methods are summarized below and presented in detail in Appendix G.

Cultural control can involve the management and manipulation of competitive interactions so that weeds are placed at a disadvantage. This type of cultural control includes a broad range of normal management practices that can be modified or manipulated to manage one or more pest problems, either by minimizing the conditions those pests need to live (e.g., water, shelter, food), or minimizing opportunities for introduction. Cultural control can also mean modifying human behavior or activities in an effort to avoid invasive seed transport and the improper disposal of non-native and pest plant debris.

Physical control involves the removal, destruction, disruption of growth, interference with pest reproduction using treatments that can be accomplished by hand and hand tools (manual), power tools (mechanical), and the physical removal of plants by pulling, grubbing, digging out root systems, cutting plants at the ground level, and removing individual competing plants around desired species. Other methods may include "topping" annual weeds prior to seed set, placing mulch around desired vegetation to limit competitive growth, tilling/disking, cutting, swathing, grinding, sheering, girdling, mowing, or mulching of the pest plants. Other types of

physical control could include solarization, prescribed fire, and the use of flamers, where permitted.

Classical biological control involves the deliberate introduction and management of natural enemies (e.g., parasites, predators, pathogens) to reduce pest populations. The Service strongly supports the development, and legal and responsible use of appropriate, safe, and effective biological control agents for nuisance and non-indigenous or pest species. To date, the intentional use of biological control agents has not been implemented on this Refuge.

Under the IPM, pesticides may be used where physical, cultural, and biological methods or combinations thereof, are impractical or incapable of providing adequate control, eradication, or containment. If a determination is made that the most appropriate control for a particular pest or group of pests on the Refuge is the use of a pesticide, the most specific (selective) chemical available for the target species(s) would be used unless considerations of persistence or other environmental and/or biotic hazards would preclude its use.

Throughout the life of the CCP, pesticides proposed for use on the Refuge would be evaluated by the IPM Regional Coordinator for potential effects to refuge biological resources and environmental quality and the results of this evaluation, including the potential effects of each product, would be documented in "Chemical Profiles." The product would also require approval through the PUPS process, which is described under Alternative A.

When addressing the use of herbicide, it is also important to consider the method of application to be used. Liquid or powder pesticide formulations are normally applied to the target site in a mixture of water, pesticide active ingredient, other ingredients that make up the pesticide formulation, and adjuvants such as wetting agents, surfactants, and drift control agents. Water frequently constitutes 97 percent or more of the total mixture on a volume for volume or weight basis. Liquid formulations can be delivered or applied to a target site by many different application tools. They may be applied from the air by helicopters or on the ground by hydraulic sprayers mounted to tractors, trucks or ATVs, or with hand-held sprayers. The application method chosen depends upon the treatment objective (removal or reduction); the accessibility, topography, and size of the treatment area; the characteristics of the target species and the desired vegetation; the location of sensitive areas and potential environmental impacts in the immediate vicinity; the anticipated costs and equipment limitations; and the meteorological and vegetative conditions of the treatment area at the time of treatment.

The IPM also addresses a proposal to conduct aerial applications of certain herbicides. The products most likely to be applied aerially include Milestone VM (active ingredient: aminopyralid), WEEDAR 64 (active ingredient: 2,4-D DMA) Clarity (active ingredient: dicamba), and Stalker or Habitat (active ingredient: imazapyr). Other products may be considered for use in the future and would require updated Chemical Profiles. Application would most likely be conducted via helicopter, but could involve fixed-wing aircraft as well. All aerial applications would be conducted by a licensed aerial applicator. Helicopter applications are generally made using a boom sprayer. All aerial spraying is regulated by the USEPA, the State of California, and the Imperial Valley Agricultural Commission. Applications must be conducted in accordance with the specifications provided on the herbicide product label, which generally address under what conditions (e.g., wind speed, temperature, air inversion, precipitation) applications are permitted to occur, as well as all applicable Federal, State, and local regulations.

Approximately 870 acres of managed agricultural fields (refer to Figures 4-7 and 4-8), as well as areas supporting large infestations of salt cedar, such as adjacent to the Alamo River, along the Salton Sea shoreline, and within irrigation drains, could be aerially treated. Aminopyralid and dicamba would be used to control broadleaf weeds such as cheeseweed, goosefoot, puncture vine, and London rocket (*Sisybrium irio*) in agricultural fields and imazapyr would be used to control salt cedar. A mixture of the approved herbicide, as well as a surfactant and water conditioner (buffer) would be applied. In the case of Milestone VM, a surfactant (e.g., Agridex, Mor-Act) and a water conditioner (a combination of ammonium sulfate and Quest) would be included in the application mixture to enable the herbicide to stick to and penetrate the broadleaf weeds. Surfactants and water conditioners would also be used in aerial applications of imazapyr. A 100-foot buffer zone would be required between treatment areas and existing tree rows or wetland areas. The required buffer zone between treated areas and adjacent commercial cropland is generally a quarter mile, although larger buffers may be required when sensitive non-target crops are located in proximity to treatment areas. Aerial applications, which would occur between November and February, would be conducted once a year at each treatment site.

The location of pesticide handling and mixing operations prior to application varies according to the method of application. Mixing and handling operations for ground and aerial applications would occur on the Refuge. Helicopters and hydraulic sprayers would be accompanied by nurse trucks which supply bulk water for mixing with the pesticides and adjuvants on site (Technical Learning College 2011). The pesticides would either be mixed directly with water in a bulk tank, or poured into a small vessel connected to an injection system that automatically mixes the pesticide(s) with bulk water as the water flows through the application equipment to the spray nozzles. Cleaning aerial application equipment and disposal of any chemical residues would occur at the contract applicators primary mixing, handling and storage facilities which would be located off-refuge. For ground application equipment, cleaning and disposal of residues occurs within the Refuge headquarters area.

There are several drawbacks and limitations to herbicide use. Herbicides have the potential to injure or kill non-target plants even when the herbicide is not applied directly to the plant, through drift, runoff, and possibly through root leakage. The herbicides considered for use on the Sonny Bono Salton Sea NWR are regarded as posing relatively low risk for use in natural areas because they are not likely to contaminate groundwater if used properly and are of low toxicity to animals.

Restricted use herbicides must be applied by someone with a California Restricted Use License, or by a person under their direct supervision. Federal law states all herbicides must be applied according to the label. Herbicide treatments on the Refuge would be combined with other control methods, and may use any of the application methods listed above, depending on the situation. All applications would be conducted in accordance with the specifications described in the chemical profile and/or PUPS approval, and would adhere to any special BMPs listed in the chemical profile.

Due to differences in species tolerance and the variety of habitats within the Refuge, the ability to use a number of different herbicides is necessary in order to choose the one that is most effective for a particular species in a particular environment. The potential for weeds to develop a resistance to a particular herbicide over time is another reason for developing a variety of herbicide options, as rotating herbicides with different biochemical pathways (from different herbicide groups) can help delay the development of herbicide resistance.

Compounds referred to as adjuvants are often added to the herbicide formulation or tank mix to facilitate the mixing, application, or effectiveness of that herbicide. Spray adjuvants often improve spray retention and absorption by reducing the surface tension of the spray solution, allowing the spray droplet to spread more evenly over the leaf surface. Herbicide absorption may be further enhanced by interacting with the waxy cuticle on the leaf surface. They are sometimes included in the formulations of herbicides (e.g., RoundUp), or they may be purchased separately and added into a tank mix prior to use (Tu et al. 2001).

Adjuvants are chemically and biologically active compounds. Some adjuvants have the potential to be mobile and pollute water. The Material Safety Data Sheet for an adjuvant and the herbicide label (if the adjuvant is included in the formulation) should be checked for conditions in which the adjuvant should not be applied. If such conditions exist, the application of the product would be adjusted accordingly (e.g., by incorporating the appropriate buffers).

An essential element of the IPM Plan is monitoring the results of all activities implemented under the IPM Plan. Ongoing monitoring of invasive species' response to IPM treatment is critical in order to evaluate the effectiveness of different treatment methods and to apply adaptive management practices when deemed necessary.

Wildlife Monitoring. Under this alternative, funding and partnerships would be sought for the purpose of establishing baseline productivity data for the various managed habitats within the Refuge, as well as for implementing subsequent periodic monitoring to identify trends and variations in species abundance and diversity over time. Included would be a monitoring plan designed to document bird use and fish/invertebrate colonization at the Red Hill Bay restoration project. This effort would allow for adaptive management of the restored shallow water habitat. In addition, the Refuge would seek partners to monitor changes in avian and fish species composition and abundance in and around the Salton Sea to better understand and address the effects of receding water levels and climate change on the diversity and abundance of migratory and resident bird species in the region.

Monitoring Avian Disease on the Salton Sea. With respect to the Refuge's Wildlife Disease Program, the current activities described under Alternative A would continue under Alternative B. However, as the water levels in the Salton Sea have receded, adequate sites for launching the boats used in avian disease surveillance have been lost. Under Alternative B, the Refuge will coordinate with other agencies to identify and construct a sustainable site for launching boats used in avian disease surveillance.

Water Delivery System. Under this alternative, the Refuge would evaluate and where feasible construct independent water delivery and drainage ditch systems for various managed habitat areas in the Refuge to better distribute and conserve water within these management areas. Such a system would be particularly beneficial in Unit 2's Hazard Tract, where water for the pond complex is currently distributed by delivering water to the uppermost pond where it is then distributed via gravity flow from one pond to the next. With an independent water delivery system, water would be provided to each pond, resulting in a more efficient use of the water needed to support the desired habitats in each management area. More efficient use of water could also be accomplished in Unit 1's A and B ponds, where an independent drainage system would allow excess water from one pond to be fed into a downstream pond as needed, reducing the need to add new irrigation water into the downstream pond.

This proposal would identify those existing irrigation and drainages ditches providing water to ponds or between ponds that could be converted to pipelines to reduce erosion and water loss due to seepage and evaporation, as well as reduce overall ditch maintenance costs in terms of staff time and money. New pipelines would typically be buried no deeper than the existing ditches and would be placed in the same footprint as the previous infrastructure. The cost associated with the installation of these pipelines in 2012 was approximately $34 per linear foot for a 24-inch polyvinyl chloride (PVC) pipe.

Other water conservation measures that may be evaluated in the future include exploring the potential for using groundwater to provide water for some management areas; adding drainage boxes in the fields to allow tailwater to flow from one field to the next and/or to facilitate the pumping of tailwater back into the fields; using drain water from the managed ponds to irrigate farm fields; and blending Colorado River water with adequate quality drain water to increase the quantity of water available on the Refuge for habitat management.

**Public Use**

The opportunities for hunting, fishing, wildlife observation, photography, environmental education, and interpretation, described under Alternative A, would also be provided under Alternative B. Alternative B includes a number of proposals for improving existing public use facilities and adding new facilities to expand opportunities for wildlife observation.

Improved Trail Accessibility. Funds will be sought to improve accessibility along the existing interpretive trails in Units 1 and 2. The trail in Unit 1 is relatively flat but would benefit from resurfacing to ensure a firm and stable surface. The same is true for the interpretative trail in Unit 2 that leads from the visitor parking lot to the base of Rock Hill. Alternative B proposes to resurface both of these trails with a five to six-foot-wide stabilized soil trail tread. The improvements would be implemented using appropriately sized tractors and trucks that can travel along the existing trail alignment. Minor grading to smooth the existing trail surface may be necessary in some locations. This would be followed by the placement and compaction of four to six inches of stabilized soil over the existing trail alignment in a manner that results in a trail tread that is outsloped at 1.5 to 3.0 percent to allow for sheet flow across the trail.

Updated Interpretive Panels in Unit 1. Funds will be sought to design, manufacture, and install four new interpretive panels and two bird identification panels for the interpretive trail in Unit 1, as well as two interpretive panels for the recently constructed accessible observation deck in Unit 1. The proposed interpretive signs would address topics such as the purpose of the managed habitats in Unit 1, the importance of the Salton Sea to birds migrating along the Pacific Flyway, endangered species, the changes occurring within the Salton Sea, resident species, and foraging opportunities for birds within the managed habitats.

Seek funding to update the interpretive signs provided along the trail in Unit 1. The new signs should address issues related to the past and anticipated future conditions within the Salton Sea, the effect to migratory birds of these changes, and the role the Refuge can play in ensuring the availability of habitat essential to these species.

New Seasonal Birding Trail in Unit 2. A route for a 1.4-mile seasonal birding loop trail will be established within the Hazard Tract utilizing existing dirt roads. The trail alignment would then be improved to provide a firm and stable surface with an appropriate cross slope to ensure a sustainable trail. Other associated improvements include a four to six-car, unpaved parking area along Garst Road and a small kiosk for posting trail regulations, birding tips, and other information.

The trail would be open for use between March 1 and September 30 of each year. The closure period will ensure that any potential conflicts between trail use and hunting activities are avoided, and would provide wildlife using the area with a month of no disturbance immediately following the close of the hunting season.

Bird Watching Opportunities at the Red Hill Bay Restoration Site. The design for the Red Hill Bay Restoration project would incorporate an opportunity for bird watchers to observe birds in the restored habitat to the west of Garst Road. As currently proposed, the berm to be constructed along the eastern edge of the project (approximately 400 feet to the west of Garst Road) would be designed to accommodate bird watching. An all-weather surface would be provided on the top of the berm and two interpretive panels would be installed to address the purpose of the restoration project and its relationship to the receding Salton Sea. The parking area proposed for the new Hazard Tract seasonal birding trail would also be available to accommodate bird watchers in this new birding area.

Bird Watching Opportunities in Unit 1. To provide bird watchers with an opportunity to observe native and migratory songbirds utilizing a recently restored three-acre willow grove along Vendel Road in Unit 1, Alternative B proposes to construct a small public parking area adjacent to Vendel Road. From this location, visitors would have the opportunity to observe wintering geese and sandhill cranes in the adjacent managed farm field. Funding would also be sought to construct a bird observation blind in this location.

Expanded Environmental Education and Interpretive Programs for Kids. Under this alternative, the current environmental education programs provided by Refuge staff would be formalized and expanded. This would require assistance from an Outdoor Recreation Planner, who would be responsible for developing and implementing a volunteer training program to assist in environmental and interpretive programs. Topics to be addressed through these programs would include a variety of topics, including migratory birds, endangered species, climate change, and the changing conditions in the Salton Sea. In addition, volunteers would be recruited to help facilitate programs focusing on connecting children with nature.

Research. Under Alternative B, the Refuge would continue to develop research partnerships with academic institutions, and other public (e.g., USGS), private, and non-profit researchers to conduct research on the Refuge that would benefit Refuge management and/or Refuge resources. Potential research topics include but are not limited to: the effects of climate change and the receding Salton Sea on the diversity of avian species present at the Salton Sea over time; Yuma Ridgway's rail response to habitat modifications within managed cattail habitat; and nesting site selection by gull-billed terns and black skimmers. Other potential cooperative research projects may include working with researchers at USGS and/or CDFW to facilitate genetic studies of desert pupfish and the migration patterns of secretive marshbirds, and selenium monitoring in Refuge habitats including the restored Red Hill Bay.

**Refuge Operations**

Staffing. Based on the current and anticipated future level of management required to implement Alternative B and achieve Refuge purposes, Alternative B includes a proposal to expand the existing Refuge staff, per available funding, to include the following positions, several of which are existing positions that are not currently filled:

- **Irrigation Systems Operator** (1 FTE) - Needed to implement the responsibilities related to irrigation and water movement throughout the Refuge to achieve Refuge purposes related to waterfowl management, as well as to implement the new water management requirements associated with the Red Hill Bay Restoration Project (under this proposal, the temporary full time irrigation system operator [GS 5/6] position on the Refuge Complex organization chart would be filled, per available funding, as a permanent full time position).

- **Biological Technician** (1FTE) - Needed to meet current wildlife disease outbreak monitoring and response requirements (under this proposal, a temporary full time biological technician [GS 5/7] position on the Refuge Complex organization chart would be filled, per available funding, as a permanent full time position).

- **Outdoor Recreation Planner** (1FTE) - Needed to develop a formalized expanded interpretive and environmental education program for the Refuge, to assist with visitor contact, and expand the Refuge volunteer and public outreach programs (this is a new permanent full-time position that would be added to the Refuge Complex organization chart and filled per available funding).

- **Facilities Manager** (1 FTE) - Needed to manage and ensure appropriate maintenance of the Refuge headquarters facilities and other infrastructure throughout the Refuge (this is a new permanent full-time position that would be added to the Refuge Complex organization chart and filled per available funding).

Refuge Headquarters Compound. Management of the facilities within the Refuge headquarters compound would continue generally as described in Alternative A, although a number of improvements to existing facilities to address Refuge management and visitor services needs would be provided under Alternative B per available funding. These proposals are described below.

- **New Storage Facility** - The Refuge would seek funding for new prefabricated, stand-alone, steel chemical and flammable liquids storage buildings to improve storage and insure compliance with health and safety and environmental compliance requirements.

- **Carport Replacement** - Funds would be sought to replace the Refuge's existing Service vehicle carport to better protect vehicles from sun, heat, and wind damage.

- **Improved Security** - Measures such as improved lighting, fencing, and installation of security cameras will be implemented to improve security at the Refuge headquarters compound and within the visitor parking area. In addition, construct a secure, fenced area in Unit 1 that can be used to store tractors and other farm equipment.

- **New Public Restroom(s)** - Under Alternative B, the Refuge would seek funding to expand and/or refurbish the one-room public restroom at the visitor contact station.

- **Replace/Repair Public Walkway** - The walkway that extends from the visitor parking lot to the visitor contact station and around to the public restroom requires repair or replacement. Under Alternative B, funds would be sought to implement necessary improvements.

- **Shaded Visitor Parking** - Seek funds to design, purchase, and install a shade structure in the visitor contact station parking lot to provide shade for five visitor parking spaces.

Land Tenure. Alternative B proposes the preparation of a future step-down plan to evaluate current and future land and water needs for the Refuge in light of the changing circumstances in and around the Salton Sea (e.g., receding water levels, increased salinity levels, potential reductions in water availability) related to the implementation of the Quantification Settlement Agreement. Issues that would be explored in this step-down plan include potential land transfers and/or the removal of some lands from the Refuge boundary due the inability of these lands to support Refuge purposes.

Lands that might be considered for transfer to the Refuge would be those located between Refuge's submerged lands and the lands leased by the Refuge from IID. These are the areas that are slowly being exposed as the Sea recedes. As the sediments on the sea floor are exposed, the potential for air quality impacts are expected to rise. The creation of shallow water wetlands in these areas would reduce the potential for air quality impacts, while also providing important habitat for shorebirds and other waterbirds that would be displaced as the waters of the Salton Sea continue to recede.

Also under this alternative, Refuge staff would continue to work to resolve outstanding land status issues such as renewal of a long term lease with IID; renewal of the lease with CDFW for the Hazard Tract; extension of the lease agreement or acquisition of the Caltrans properties in Unit 1; and potential elimination of some IID land from future leases.

**Fire Management Plan**

This alternative proposes no changes to the Refuge's current Fire Management Plan.

**Mosquito Management**

No mosquito management is proposed under Alternative B.

**Cultural Resource Management**

Cultural resource management under Alternative B would include all of the actions described under Alternative A. Prior to implementing a new ground-disturbing project on the Refuge (ongoing disturbance related to site preparation in managed habitat areas do not fall into this category), Refuge staff would coordinate with the Service's Regional Cultural Resources team and the appropriate Tribal governments when deemed necessary in accordance with Service policy and other Federal regulations. The Sonny Bono Salton Sea NWR Complex would also work with the Regional Archaeologist to develop procedures (that would be formalized through a Memorandum of Understanding with the appropriate tribal representatives) to be implemented in the event of a NAGPRA-related discovery on the Refuge.

**Environmental Contaminants Coordination**

Under Alternative B, Refuge staff would continue to coordinate with the Service's Environmental Contaminants Program as described under Alternative A, but would also work with the Contaminants Program and other partners to seek funding for developing and implementing a water quality monitoring program for the managed wetlands located to the south of Bruchard Bay, as well as the restored open water habitat in Red Hill Bay; monitor selenium levels within restored habitat areas; and should monitoring indicate a need, develop measures that can be implemented to reduce selenium levels.

### Volunteers/Partners/Public Outreach

Under Alternative B, the Refuge would continue to work with partners and volunteers, as described under Alternative A, in an effort to address Refuge specific and region-wide issues and needs. Partnerships may be expanded to implement wetland restoration projects, including restoration of Red Hill Bay and implementation of a Salton Sea SCH project.

Per available staffing, a public outreach program would be developed to identify and recruit surrounding residents interested in volunteering once or twice a month a range of refuge enhancement projects, as well as assisting staff with environmental education programs, conducting bird walks, and implementing programs related to connecting children with nature.

## Alternative C – Restore and Enhance Habitat Quality; Improve the Quality of Existing Public Uses

Alternative C includes all of the proposals included in Alternative B that relate to wildlife and habitat management, habitat restoration, and general refuge operations. However, Alternative C proposes different public use proposals. The wildlife and habitat management actions proposed under Alternative C, which are the same as those proposed under Alternative B, are illustrated in Figures 2-7 and 2-8, while the public uses proposed for Alternative C are illustrated in Figure 2-13 and 2-14.

### Wildlife and Habitat Management

Wildlife and habitat management would be implemented as described in Alternative B.

### Habitat Restoration

Habitat restoration would be implemented as described in Alternative B.

### Endangered and Sensitive Species Management

The actions proposed in Alternative B to address endangered and sensitive species would also be implemented under Alternative C.

### Resident Native Species Management

The actions proposed in Alternative B to address resident native species would also be implemented under Alternative C.

### General Habitat Management

The general habitat management actions proposed in Alternative B would also be implemented under Alternative C.

### Public Use Program

The public use proposals in Alternative C include those uses described in Alternative A, as well as the improvements proposed for the interpretive trails in Units 1 and 2, as described in Alternative B. The seasonal birding trail proposed for the Hazard Tract and the bird watching area proposed as part of the Red Hill Bay restoration project, described in Alternative B, would not be provided under this alternative.

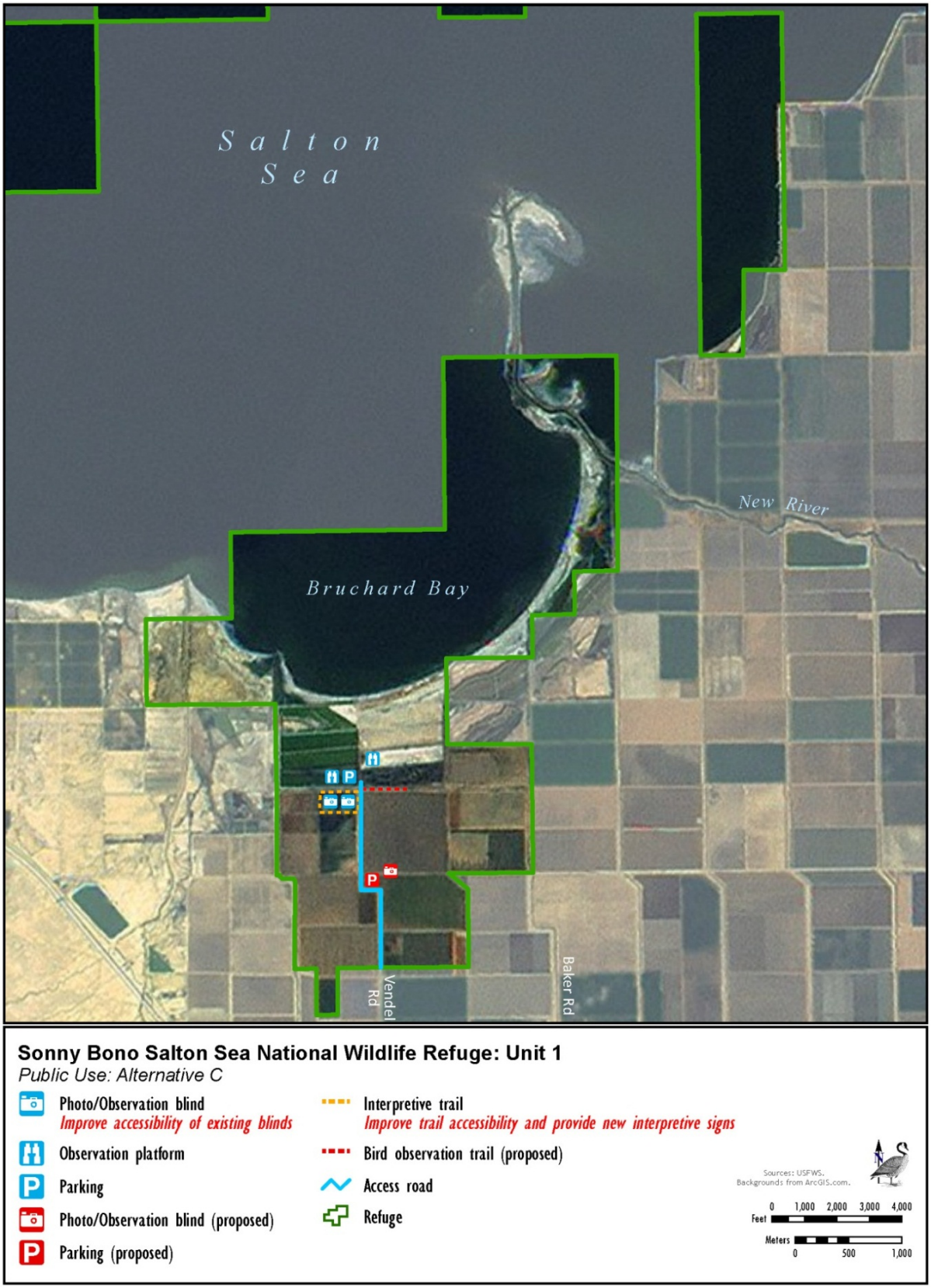



**Figure 2-13. Sonny Bono Salton Sea NWR, Alternative C – Public Use, Unit 1**

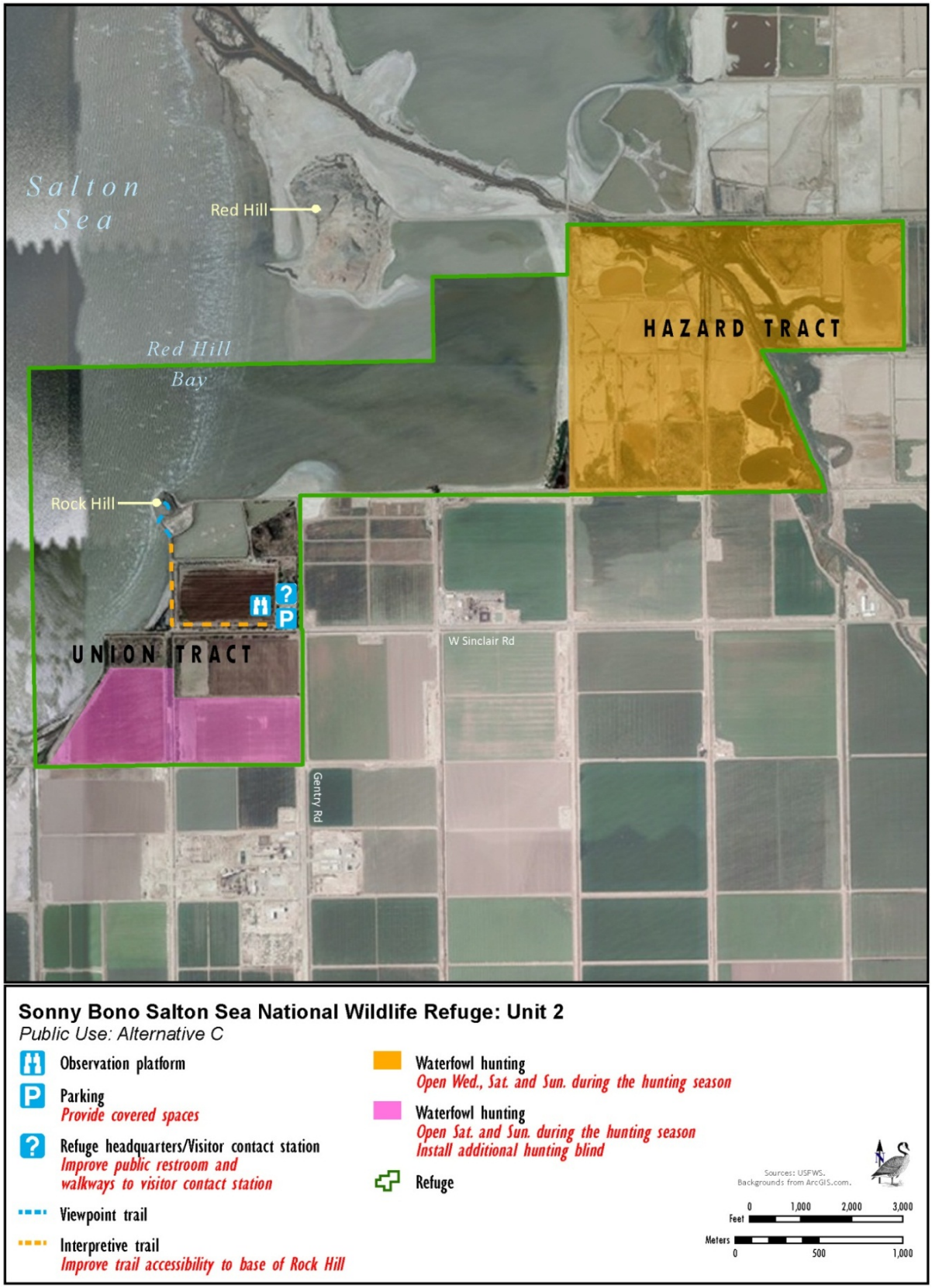



**Figure 2-14. Sonny Bono Salton Sea NWR, Alternative C – Public Use, Unit 2**

This alternative also proposes to modify the Refuge's current hunt program by reducing the number of days open to hunting on the Union Tract and adding an additional hunting blind within the area to accommodate up to four additional hunters on approved hunt days. Under this proposal, hunting would be permitted on Saturdays and Sundays, giving the geese five days of undisturbed foraging. The intent of this proposal is to support a larger number of geese in area during the hunting season, thus improving the quality of the hunt. The restoration of Red Hill Bay is also expected to improve the current quality of the hunt within both the Hazard Tract and the Union Tract.

To improve wildlife viewing opportunities in Unit 1, this alternative proposes to extend the existing interpretive trail to the east of the parking lot to create a short trail segment that would provide goose and sandhill crane viewing opportunities along the northern edge of a managed agricultural field.

Finally, this alternative includes a proposal to work with other partners to develop an auto tour route in the area south of the Salton Sea that guides visitors through the northern portion of the Imperial Valley where there are opportunities to interpret the resources on the Refuge, the importance of agriculture in the Valley, water management, geothermal development, and history and future of the Salton Sea.

**Refuge Operations**

Refuge operations would be conducted as described in Alternative B.

**Fire Management Plan**

Fire management under Alternative C would be conducted consistent with the actions described in Alternative B.

**Mosquito Management**

No mosquito management is proposed on the Sonny Bono Salton Sea NWR under Alternative C.

**Cultural Resource Management**

Cultural resource management would be implemented as described in Alternative B.

**Environmental Contaminants Coordination**

Environmental contaminants coordination would be implemented as described under Alternative B.

**Volunteers/Partners/Public Outreach**

The proposals described in Alternative B for expanding the Refuge's volunteer program and public outreach effort, as well as the proposal to continue to develop partnerships to address refuge and region wide issues, as would also be implemented under Alternative C.

#### *2.3.2.3 Alternatives Considered but Eliminated from Detailed Analysis*

The development of alternatives is designed to allow consideration of the widest possible range of issues and potential management approaches. During this process, several strategies or alternative methods for achieving the goals for the Sonny Bono Salton Sea NWR were considered but not selected for detailed study. Those alternatives that were eliminated from detailed study are presented below.

Increase the Acreage of Agricultural Fields within the Refuge. During the public scoping meetings, it was suggested that the exposed playa of the Salton Sea be converted to agricultural fields rather than left exposed or restored to shallow water habitat. Refuge staff considered this idea, but ultimately rejected it from further consideration because of excessive salinity levels present within the exposed playa. A significant volume of irrigation water would be required to reduce soil salinities to levels that would make cultivation feasible. In addition, cultivated fields would require the continued availability of irrigation water, whereas the restoration of shallow water habitat could rely on the drainage waters within the Alamo River. Finally, restoring the playa to shallow water habitat better meets the wildlife goals and purposes of the Refuge, particularly as the shallow waters of the Salton Sea continue to recede.

Expand Opportunities for Hunting on the Refuge. A number of commenters suggested expanding hunting opportunities on the Refuge to include goose hunting in Unit 1. Based on observations within the existing hunting areas in Unit 2 that support wintering geese, when hunting occurs within Unit 2, the geese tend to relocate to other areas of the Refuge to forage, including Unit 1 and adjacent privately owned parcels. One of the purposes of the Sonny Bono Salton Sea NWR is to provide adequate foraging opportunities on the Refuge to minimize crop depredation of commercial crops in the Valley. If Unit 1 were to be opened to hunting, it is likely that foraging geese would move to other areas of the valley seeking refuge from disturbance. The consequences of which would likely involve the depredation of commercial crops. As a result, expanding the hunting program into Unit 1 would interfere with the Refuge's ability to achieve Refuge purposes.

## 2.4 Coachella Valley NWR

### 2.4.1 Refuge Management History

Following Refuge establishment in 1985, Refuge staff implemented actions in partnership with other entities to protect the newly acquired lands from disturbance. BLM provided important law enforcement support, significantly reducing illegal off-road vehicle activity on the dunes. Efforts were also undertaken to address sand loss from the site, including the installation of sand fences. Refuge and other Service staff also coordinated with other entities over a number of years to develop various habitat planning and habitat management documents for the preserved lands within the Coachella Valley.

Prior to the completion of this CCP, management on the Coachella Valley NWR was guided by the goals and objectives of various management plans including the 1986 Management Plan for the Coachella Valley Preserve System, which was superseded by the 1995 Management Plan for the Coachella Valley Preserve System. In 2008, the Coachella Valley MSHCP superseded all previous planning documents for the Preserve System, although the overall management objectives remain generally the same. In 2012, the Reserve Management Unit Plan for the Valley Floor Reserve Management Unit was approved, which provides more detailed direction for addressing the threats, stressors, and other management issues affecting the habitats within the Refuge and other preserved areas within the Coachella Valley floor. A complete description of past and current management activities on the Refuge is provided in Chapter 3, Refuge Management, of the Final CCP.

### 2.4.2 Management Alternatives

The three management alternatives evaluated for the Coachella Valley NWR are summarized in Table 2-3 and described in greater detail in the sections that follow.

| Table 2-3<br>Summary of Major Management Actions for the Coachella Valley NWR under each Alternative | | | |
|---|---|---|---|
| **Refuge Management Activity** | **Alternative A (No Action)** | **Alternative B (Proposed Action)** | **Alternative C** |
| | | | |
| **Habitat Protection** | Continue current activities | Hire a dual function refuge manager/Federal wildlife officer to enforce regulations and manage Refuge resources | Same as Alt. B |
| **Habitat Enhancement or Restoration** | Implement occasional invasive plant control | Implement the phased control of invasive weeds on the old vineyard and reseed controlled areas with native species; restore mesquite hummocks | Implement a phased 400-acre restoration plan for the old vineyard site involving recontouring and planting of native vegetation; restore mesquite hummocks |
| **Listed Species Monitoring** | Continue current program | Expand Refuge staff involvement in monitoring activities | Same as Alt. B |
| **Invasive Plant Control** | Continue current invasive plant control | Implement an integrated appropriate to pest management | Same as Alt. B |
| **Environmental Education** | Continue current program | Same as Alt. A | Same as Alt. B |
| **Interpretation** | On-site interpretive signs are not provided | Same as Alt. A | Provide interpretive signs along the trail corridor |
| **Equestrian/Hiking Trail** | Continue current use | Same as Alt. A | Same as Alt. A |
| **Public Outreach** | Continue current efforts | Develop an interpretive element for permanent display off-site, as well as a traveling interpretive display | Same as Alt. B |
| **Research** | Continue current program | Expand opportunities consistent with Refuge purposes | Same as Alt. B |
| **Staffing** | Maintain current staffing levels | Expand staffing to achieve proposed management | Same as Alt. B |

#### *2.4.2.1 Similarities among the Alternatives for the Coachella Valley NWR*

Although there are differences among the range of alternatives presented for managing the Coachella Valley NWR, the alternatives also include features and management components that would be part of the CCP regardless of the alternative selected for implementation.

**Features Common to All Alternatives**

Features common to all alternatives are summarized here. To reduce repetition, those features that are common among all of the alternatives are described in detail only under Alternative A – No Action.

- *Habitat Protection* – Patrol and enforce access restrictions on the Refuge, opportunistically hand pull invasive Sahara mustard, and in partnership with others address issues related to sand transport, all to protect sensitive sand dune and sand field habitats.

- *Listed Species Monitoring* – Conduct listed species monitoring per the requirements of the Coachella Valley MSHCP.

- *Limited Public Access* – Restrict public access on the Refuge to the approved equestrian and hiking trail located along the western and within the northern portion of the Refuge and to specific guided tours.

- *Protection of Cultural Resources* – Manage recorded and any yet to be discovered cultural resources located within the Refuge in accordance with existing Federal laws and Service policies. Continue to consider the effects of all proposed actions on cultural resources and consult with the Regional Cultural Resources team, and, when appropriate, the SHPO, federally recognized Tribes, and interested parties.

- *Environmental Contaminants Coordination* – Work with the Service's Environmental Contaminants Program to ensure that trust resources are not adversely affected by contaminants originating from on- or off-site sources.

**Features Common to All Action Alternatives**

Features common to all action alternatives (Alternatives B and C) are summarized here.

- *Integrated Pest Management (IPM)* – Control invasive plants on the Refuge through the implementation of an integrated pest management approach.

- *Listed and Covered Species Monitoring* – Expand Refuge staff involvement in annual protocol monitoring of listed and other Coachella Valley MSHCP covered species known to occur on the Refuge, while continuing to work in partnership with other agencies and organizations in these regional monitoring efforts.

- *Sand Transport* – Work in partnership with others to develop and jointly implement a long-term sand transport monitoring plan for the Thousand Palms Conservation Area.

- *Monitor Changes Related to Climate Change* – In partnership with others, identify funding for developing and implementing a monitoring program that focuses on the effects of climate change on species population trends and habitat conditions within the Coachella Valley MSHCP planning area.

#### 2.4.2.2 Detailed Description of the Alternatives for the Coachella Valley NWR

## Alternative A - No Action

The No Action Alternative (Figure 2-15) proposes no changes to the present management or public use activities occurring on the Refuge.

**Wildlife and Habitat Management**

For the most part, the actions carried out on the Coachella Valley NWR are conducted by Refuge personnel stationed at the Sonny Bono Salton Sea NWR, although in 2013, the Refuge had a part-time worker (a college student through the student temporary employment program) to help implement some of the management actions on the Refuge, including maintenance of signs and fencing and assisting University of California, Riverside (UCR) researchers with species monitoring. The Refuge also receives management support from the Center for Natural Lands Management staff and volunteers who work out of the Thousand Palms Oasis Preserve site.

Habitat Protection. In contrast to the intensely managed habitats within Sonny Bono Salton Sea NWR, the management of the Coachella Valley NWR is significantly more passive. Of the actions implemented on this Refuge, protection of the sensitive sand dune and sand field habitats on the Refuge is critical to achieving Refuge purposes.

Surveillance, which is conducted in partnership with other agencies, is conducted to deter unauthorized access onto sensitive habitat areas and fencing and signs are maintained to deter off-highway vehicle activity.

Sand fences have been installed on the Refuge by CVAG over the years to help keep sand on the Refuge and enhance active dune formation to support the fringe-toed lizard, Coachella Valley milk-vetch, and other endemic dune species. These fences have not required any maintenance; those that are working as intended simply become covered by sand to form new dune habitat and slow the loss of sand from the Refuge.

Until recently, the County of Riverside Transportation Department (County DOT) assisted in sand management by disposing of accumulated sand from the Preserve on the Refuge. Specially, when sand accumulated on Washington Street and 38$^{th}$ Avenue, County DOT through an informal agreement with the Refuge would remove the sand from roadways adjacent to the Refuge and deposit it back onto the north end of the Refuge. This practice supported the blowsand habitats on the Refuge, while significantly reducing the driving time required by the County to dispose of the sand. In 2012, County DOT indicated that they were no longer interested in participating in this agreement.

Invasive Species Control. Sporadic, very local control of Sahara mustard by hand removal of plants has been implemented within the dune habitat and mechanical and chemical control of salt cedar has occurred at various times over the years. In 2011, a research investigation into the use of glyphosate to control Sahara mustard was conducted on the Refuge.

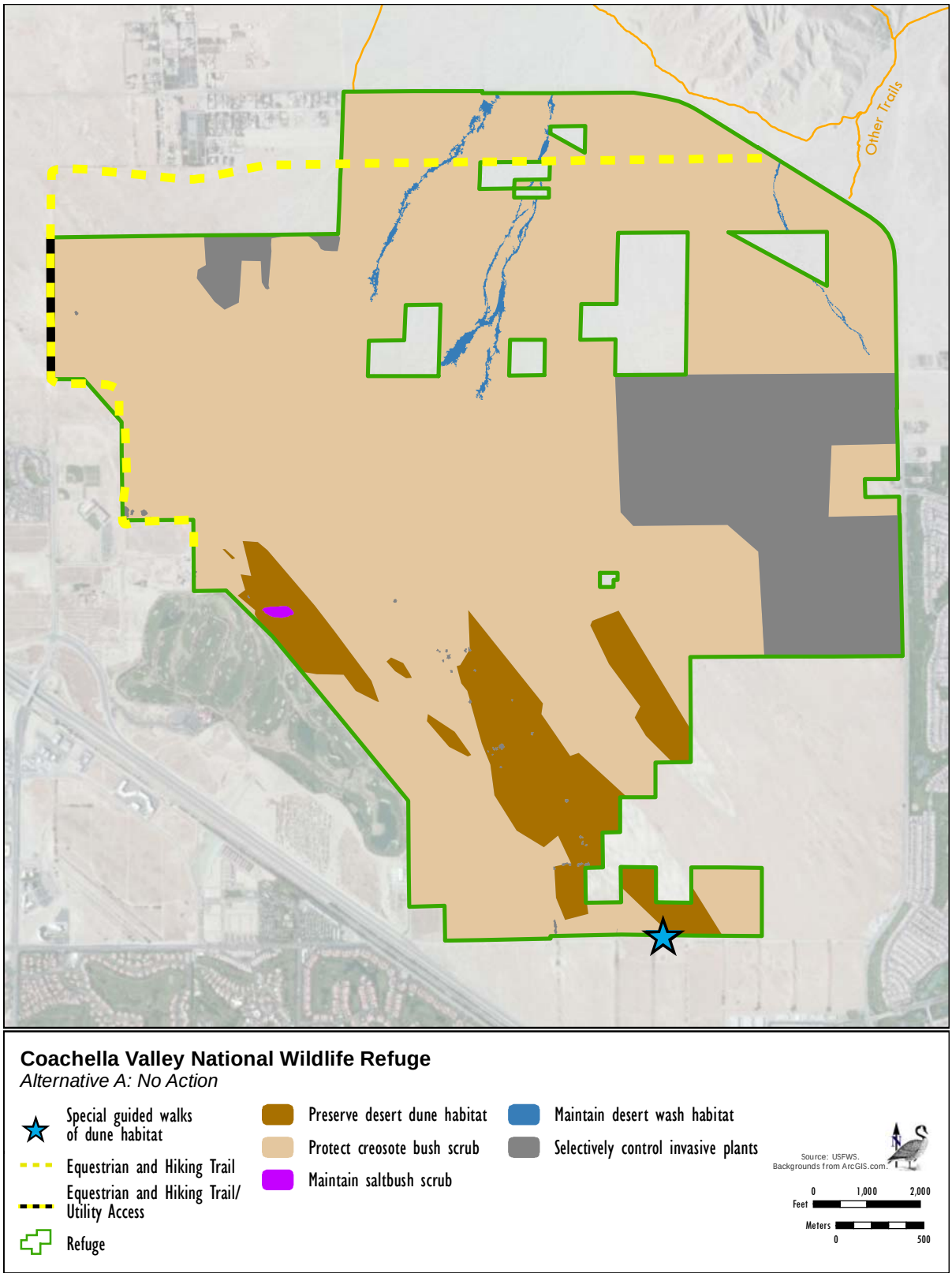



**Figure 2-15. Coachella Valley NWR, Alternative A – No Action**

Endangered Species Monitoring. Fringe-toed lizard monitoring is conducted annually on the Refuge by Dr. Cameron Barrows from UCR, who uses a passive monitoring method that involves track surveys. The Service's Ecological Services (ES) Program had been collecting data to assist in the development of monitoring protocols that involved an active monitoring program. The data collection part of the project was completed, but the associated analysis has yet to be completed. ES field data indicate that the track survey data collected by Dr. Barrows provides a good index of actual population, but additional analysis is required. As of 2012, monitoring protocols for this species had not yet been approved.

Coachella Valley milk-vetch counts are conducted by UCR staff within the Refuge's active sand dune habitat in association with their fringe-toed lizard surveys. A summary report of the results of these surveys is provided annually to the Coachella Valley Conservation Commission. Plant densities are low enough that total number of plants can be counted and converted to densities per 0.1 hectare for comparison with other habitats.

Coachella Valley MSHCP Reserve Management Unit Plan. In January 2012, a Reserve Management Unit Plan was approved for Reserve Management Unit 1 (Valley Floor). The Thousand Palms Conservation Area, of which the Refuge is a part, is included within this Management Unit. The purpose of the Reserve Management Unit Plan is to provide a framework for facilitating collaborative management by all of the involved management entities (i.e., Federal, State, local, non-profit organizations) within the Management Unit to provide for effective, efficient, and cooperative use of available resources. The management goals presented in the Reserve Management Plan include:

- Prevent the establishment of new infestations of invasive plants and animals and reduce or control current infestations;
- Maintain essential hydrological processes to support the species and natural communities addressed by the Coachella Valley MSHCP, with the primary targets of maintaining adequate ground water levels and sand source/transport mechanisms;
- Ensure that species have the ability to shift their range in response to the effects of climate change on habitat and the distribution of natural communities;
- Avoid or minimize the potential for and effect of habitat fragmentation from causes including infrastructure and other development in the Conservation Areas, and edge effects from adjacent development;
- Prevent damaging wildfires that reduce the ability of the Reserve Management Unit to support the species and natural communities addressed by the Coachella Valley MSHCP and evaluate and use prescribed fire in specified areas if determined appropriate;
- Minimize the impacts of existing and potential new power and gas lines in the Reserve Management Unit;
- Identify, restore, enhance, and protect key sand transport locations and processes;
- Identify, implement, and maintain appropriate habitat enhancement and restoration projects;
- Provide for public access and use of Reserve System lands consistent with the conservation goals and objectives of the Coachella Valley MSHCP and ensuring public safety; and
- Maintain the Reserve Area free of dumping and hazardous materials through prevention and quick clean-up of materials that are dumped on Reserve Lands.

Some of these goals can be addressed at the local preserve level, but several require the implementation of actions at the larger landscape level.

**Public Use**

At present, public access onto the Refuge is limited to occasional guide tours, which are regulated through the Refuge Special Use Permit process, as well as equestrian and hiking trail use on the designated trail routes established in 1990. The guide tours, which are generally conducted by Center for Natural Lands Management staff, facilitate wildlife observation, photography, and interpretation. Trail users have opportunities for wildlife observation and photography from the trail. To avoid adverse effects to listed species, trail users are required to stay on the designated trail at all times and dogs and other pets are prohibited on Refuge trails. Some informal interpretation of the resources protected on the Refuge also occurs at the Center for Natural Lands Management's Thousand Palms Oasis Preserve site.

A few outside research projects and resource surveys have been conducted on the Refuge, most related to listed species. Research projects and surveys conducted on the Refuge by outside individuals, organizations, or agencies that are not directly related to Refuge management may only be conducted after a Special Use Permit (SUP) has been issued by the Refuge Manager that documents the purposes of the work to be conducted and includes specific conditions intended to protect trust resources and ensure adherence to applicable Refuge regulations and policies.

**Refuge Operations**

The equipment needed to support this Refuge is maintained at the Sonny Bono Salton Sea NWR or at facilities maintained by Center for Natural Lands Management. No buildings, utilities, or parking areas are present on the Refuge. The only structures or facilities present on the Refuge are perimeter fences, sand fences, signs, and the existing equestrian and hiking trail. Sand fences were most recently installed in 2006 by CVAG.

The Sonny Bono Salton Sea NWR Complex does not have a Federal wildlife officer on staff; instead law enforcement on the Refuge is conducted by the Service's Southern California Zone Officer, as well as BLM, California State Parks, and local law enforcement staff under an interagency agreement established through Coachella Valley MSHCP.

**Fire Management Plan**

The Coachella Valley NWR does not currently have a fire management plan. In 2003, the Service exempted the Refuge from developing a Fire Management Plan due to lack of burnable vegetation, lack of ignition sources, no established fire management program, and no reason or plans to conduct prescribed burning.

**Mosquito Management**

No mosquito management is conducted on the Refuge.

**Cultural Resource Management**

As described previously, as part of the CCP process, a Cultural Resources Review was conducted to provide the Refuge Manager with pertinent information about the cultural resources within the Refuge Complex, including the Coachella Valley NWR. Because there is the potential for undiscovered cultural resources to be present within the Refuge, any ground disturbing activities proposed within the Refuge boundary are reviewed by the Service's

Cultural Resources Program for compliance with Section 106 of the Historic Preservation Act. The review process involves the preparation of a Request for Cultural Resources Compliance which is submitted to the Regional Cultural Resources Office for review. Those projects that would result in only minor impacts to subsurface materials could fall under the Service's programmatic agreement with SHPO, while other projects requiring greater ground disturbance would require SHPO review and concurrence.

### Environmental Contaminants Coordination

The Service's Environmental Contaminants Program is available to assist the Refuge Manager in issues related to contaminants, as well as to conduct studies related to the effects of contamination on Refuge trust resources. The Service's Environmental Contaminants Program also assists the Refuge on pre-acquisition environmental contaminants surveys.

### Volunteers/Partners/Public Outreach

Partnerships play an important role in the management of this Refuge. Over the years, Federal, State, local, and non-profit organizations have assisted in the management and operation of the Refuge. This assistance has ranged from law enforcement assistance from BLM to sand fence installation by CVAG. Staff and volunteers from the Center for Natural Lands Management, and before that from The Nature Conservancy, have assisted with weed control, interpretation, and public outreach.

## Alternative B (Proposed Action) - Expand Management Actions to Support Listed and Sensitive Species; Expand Public Outreach

Under Alternative B (Figures 2-16), the wildlife and habitat management activities described in Alternative A would be expanded to include more intensive invasive plant control, increased participation in species monitoring, initiation of habitat enhancement to support the flat-tailed horned lizard, and implementation of applicable management actions included in the 2012 Reserve Management Unit Plan for the Valley Floor Reserve Management Unit. No changes in the types of public uses allowed on the Refuge are proposed.

### Wildlife and Habitat Management

In addition to implementing the actions described under Alternative A, the following new actions would be initiated under Alternative B.

Integrated Pest Management. Invasive plant species, particularly annual weeds, represent a threat to listed and sensitive species on the Refuge because of the impact they can have on habitat quality and individual native plants. Invasive plants can cause impacts through the physical alteration of the environment, as well as through completion with native plants for water, space, and sunlight. The invasive species of particular concern on the Refuge is Sahara mustard, although other nonnative species including cranesbill (*Erodium circutarium*) and various nonnative annual grasses are also present and could impact the productivity of the Refuge's native plant species. The nonnative shrub, salt cedar, is also an invasive species of concern within the Refuge's dune habitat.

Alternative B proposes the implementation of an Integrated Pest Management (IPM) Plan to address these invasive species issues. This proposal addresses the Valley Floor Reserve Management Unit Plan's invasive species goal of preventing new invasive species infestations within the larger Reserve and reducing or controlling current infestations.

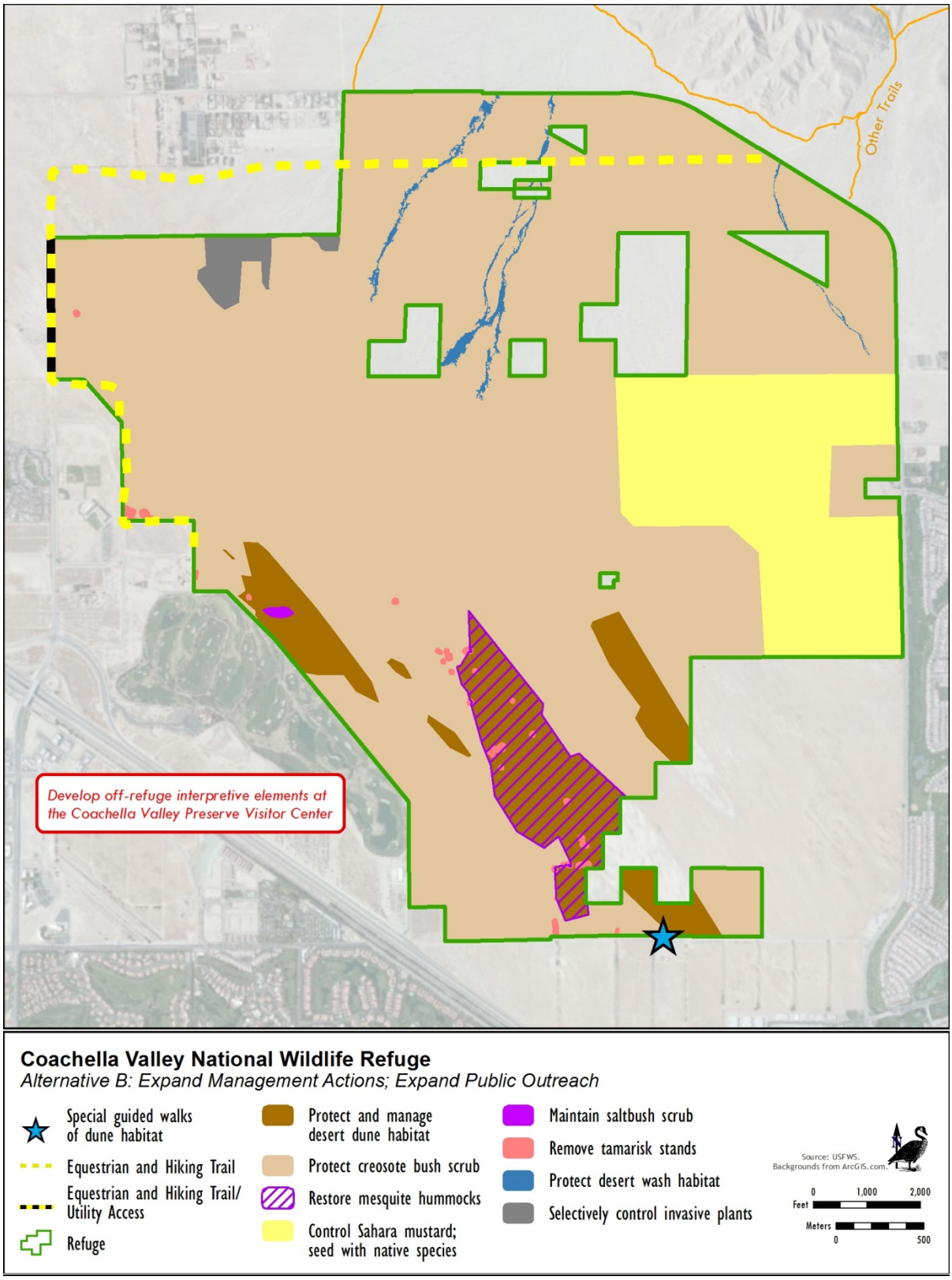



**Figure 2-16. Coachella Valley NWR, Alternative B (Proposed Action)**

An IPM Plan, a step-down plan that has been incorporated into the CCP process, has been prepared to address both Refuges within the Sonny Bono Salton Sea NWR Complex. A general summary of the IPM Plan has been previously provided. Those aspects of the IPM Plan that specifically relate to the Coachella Valley NWR are presented here.

Tackling the Sahara mustard infestation on the Refuge requires a long-term approach to control that would require a combination of both physical/mechanical control and chemical control. Physical/mechanical control would involve primarily the hand pulling of weeds, although the use of hand tools and the occasional use of power tools may also occur when deemed appropriate by the Refuge wildlife biologist.

Under this alternative, hand pulling of Sahara mustard plants would continue, but would be supplemented with localized application of herbicide. Initially, the Refuge proposes to use glyphosate to provide local control of Sahara mustard in areas most vulnerable to impacts from infestation. Using backpack sprayers, the herbicide would be applied to the leaves and stems of the mustard plants prior to flowering. Because Sahara mustard germinates earlier than the Refuge's native annuals, herbicide application would occur in late winter or early spring depending upon the particular year's rain pattern. Depending upon the rainfall pattern in the spring, additional treatment may be necessary if new mustard plants are found to be germinating.

Outside of the dune habitat, efforts to hand hoe large stands of mustard when the plants are in the rosette or early stages of flowering may be attempted in an effort to reduce the plant's seed bank on the Refuge (Graham et al. 2005). Weed whipping and mowing in areas that do not support sensitive habitat would only be considered if it could be implemented in association with the application of herbicide immediately following mechanical control. Mechanical control would remove flowers before fruit could be produced on the plants, but without chemical control, the mustard plants would continue to grow producing new flowers and fruit stalks. In some cases, this form of mechanical control has been shown to stimulate vigorous regrowth in Sahara mustard. Following control of a particular area, an appropriate native annual seed mix would be distributed over the site.

Research on the most effective control techniques for Sahara mustard without impacting the native plants that occur in the same areas is being conducted by various universities in California, Nevada, and Arizona, as well as by USGS. Appropriate research will be supported on the Refuge and the results of the various research efforts in the region will be considered in developing a long-term control plan of this invasive plant on the Refuge.

Herbicides proposed for use on the Refuge would be evaluated by the IPM Regional Coordinator for potential effects to Refuge biological resources and environmental quality. The results of this evaluation, including the potential effects of each product, would be documented in "Chemical Profiles." Chemical profiles have already been completed for the herbicides approved for use on the Sonny Bono Salton Sea NWR through the PUP process and are available for review in Attachment B of Appendix G.

Current research indicates that the herbicides glyphosate and triclopyr have varying degrees of effectiveness on the control of Sahara mustard (Graham et al. 2005). Additional research may identify new, more effective herbicides in the future. Herbicides are also an effective tool for controlling individual salt cedar shrubs present in sensitive habitat areas. Whenever herbicides are considered for use on the Refuge, only those herbicides likely to result in minor, temporary, and/or localized effects to species and environmental quality based upon non-

exceedance of threshold values in Chemical Profiles would be approved for use on the Refuge. In addition, BMPs would be implemented during the handling and application of all pesticides. For some herbicides, non-exceedance of threshold values may be achieved through the implementation of herbicide specific BMPs that further define how, when, where, and to what extent a specific pesticide may be applied. Table 2-4 lists those herbicides that currently have the potential for use on the Refuge. As stated here, additional herbicides may be proposed in the future that would be evaluated through the procedures described in the IPM Plan (Appendix G).

Another form of invasive plant control that would be implemented on the Refuge involves surveillance and prevention. Early identification and control of new invaders can prevent the establishment of nonnative species within the Refuge. New invaders identified during surveillance should be removed well before they flower and produce seed. To reduce the potential for invasion, soil disturbance by vehicles, equipment, or other activities would be minimized, and movement of vehicles, people, and soil between infested and uninfested areas would be avoided.

**Table 2-4**
**Pesticides that May be Proposed for Use on the Coachella Valley NWR**

| Active Ingredient | Common Product Name(s) | Target Pests | Habitat Type | Application Method(s) | Application Equipment(s) |
|---|---|---|---|---|---|
| **Glyphosate** | Roundup, Roundup Pro | Sahara mustard, cranesbill | sand dune, sand field | foliar | backpack sprayer |
| **Imazapyr** | Stalker | salt cedar | sand dune, sand field | foliar<br>cut stump | backpack sprayer<br>hand-held sprayer |
| **Triclopyr** | Garlon 3A, Remedy | Sahara mustard | sand dune, sand field | foliar | backpack sprayer |

Species Monitoring. Under Alternative B, Refuge staff would take a more active role in the annual protocol monitoring of listed and other Coachella Valley MSHCP covered species known to occur on the Refuge, while continuing to work in partnership with other agencies and organizations in these regional monitoring efforts.

Habitat Enhancement of the Old Vineyard Site. The old vineyard site, a disturbed area of approximately 400 acres located in the eastern portion of the Refuge, has been severely impacted by Sahara mustard. This infestation limits the habitat quality of the area for most native species, including the flat-tailed horned lizard. In an effort to restore habitat value in this area, the phased control of mustard, per available funding and staffing, would be implemented using a combination of mechanical and chemical control. Following control of an area, native seeds would be distributed. Individual creosote and mesquite bushes in the area would be protected in place. The specifics of this phased habitat enhancement project would be more fully defined in a step-down Habitat Management Plan (HMP) for the Refuge.

Sand Transport. Under Alternative B, the Refuge would work with other agencies and research partners to develop and jointly implement a long-term sand transport monitoring plan for the Thousand Palms Conservation Area. In addition, the effectiveness of existing sand fences on the Refuge would be evaluated and those fences that were installed some years ago

that continue to remain exposed would be considered for removal and possible relocation within the Refuge.

Another proposal that would be explored under Alternative B to address sand transport issues involves the reestablishment of native honey mesquite shrubs on the Refuge to facilitate the creation of mesquite hummocks. Mesquite hummocks, which were historically supported on the Refuge, can reduce the rate at which blowsands are carried off the Refuge. Mesquite vegetation on the Refuge has been lost as a result of the significant lowering of the groundwater table under the Refuge due to groundwater pumping to support development and agriculture in the region. As a result, restoration of mesquite on the Refuge would require some form of irrigation (e.g., extension of water lines, use of a water truck) or an alternative source of water such as DRiWATER or similar time-release water product. The successful reestablishment of honey mesquite on the Refuge would promote the creation of mesquite hummocks, slow sand loss from the site, and assist in preserving blowsand habitat to support the Coachella Valley fringe-toed lizard and a number of other sensitive species.

Climate Change. Under Alternative B, Refuge staff would work in partnership with other land managers and researchers to identify funding for developing and implementing a monitoring program that focuses on the effects of climate change on species population trends and habitat conditions within the Coachella Valley MSHCP planning area.

**Public Use Program**

No changes to the current public uses provided on the Refuge are proposed under Alternative B; however, Alternative B does propose to seek funding to develop off-refuge interpretative elements that could be displayed at the Coachella Valley Preserve Visitor Center and other public facilities in the area.

The Refuge would continue to develop research partnerships with academic institutions, and other public (e.g., USGS), private, and non-profit researchers to conduct research on the Refuge that would benefit Refuge management and/or Refuge resources. Potential research topics include but are not limited to: the effects of climate change on the Refuge's listed and sensitive species; the effects of invasive species on the Refuge's listed species populations; and the effects of herbicide use on annual plant production in blowsand habitats.

**Refuge Operations**

To implement the proposal described for Alternative B, as well as to achieve the MSHCP objectives for protecting core habitat areas to support listed and sensitive species, this alternative proposes to expand the staff of the Sonny Bono Salton Sea NWR Complex to include a dual function refuge manager/Federal wildlife officer, who would dedicate a minimum of 25 percent of the time to law enforcement activities on both the Coachella Valley and Sonny Bono Salton Sea NWRs. The remaining time would be dedicated to management activities on the Coachella Valley NWR, including habitat and species management, species surveys and monitoring, general site maintenance and protection, managing and expanding current partnerships, and coordinating with the Valley Floor Resource Management Committee and Coachella Valley Conservation Commission.

**Fire Management Plan**

As described under Alternative A, a fire management plan is not currently required for this Refuge.

### Mosquito Management
No mosquito management is proposed under Alternative B.

### Cultural Resource Management
Cultural resource management under Alternative B would include all of the actions described under Alternative A. Prior to implementing any project on the Refuge that would involve a new ground disturbing activity, Refuge staff would coordinate with the Service's Regional Cultural Resources team and the appropriate Tribal governments when deemed necessary in accordance with Service policy and other Federal regulations and policies. Also under Alternative B, the Sonny Bono Salton Sea NWR Complex would work with the Regional Archaeologist to development procedures (that would be formalized through a Memorandum of Understanding with the appropriate tribal representatives) to be implemented in the event of a NAGPRA-related discovery during the implementation of a Refuge-related project.

### Environmental Contaminants Coordination
Under Alternative B, Refuge staff would continue to coordinate with the Service's Environmental Contaminants Program as described under Alternative A.

### Volunteers/Partners/Public Outreach
Under Alternative B, the Refuge would continue to work with existing partners and volunteers, as described under Alternative A, in an effort to address Refuge specific and region-wide issues and needs. When staff is available, a public outreach program would be developed to identify surrounding residents interested in volunteering for activities related to weed control and habitat enhancement. Additionally, volunteers would be sought to assist the Refuge in disseminating information at various off-refuge locations that addresses the importance of the Refuge in preserving the area's listed species and blowsand habitats.

## Alternative C - Expand Management Actions to Include Restoring Creosote Bush Scrub; Expand Environmental Interpretation

### Wildlife and Habitat Management
The wildlife and habitat management actions proposed under Alternative C would be the same as those proposed for Alternative B, with the exception of the action proposed for the old vineyard site on the Refuge (Figure 2-17). Under Alternative C, rather than simply reseeding the site following the control of invasive plants, as proposed under Alternative B, this alternative proposes the comprehensive restoration of the site. This restoration would involve the reestablishment of site's natural contours and drainage pattern; actions to reduce site's invasive species seed bank; and revegetation of the prepared area with annual and perennial plant species native to the historical creosote bush scrub habitat that once occupied the site. This restoration project would be more fully defined in a step-down Habitat Management Plan (HMP) for the Refuge.

### Public Use Program
The public use proposals included in Alternative B would also be implemented under Alterative C. In addition, Alternative C proposes to design and install interpretive signage at an appropriate location along the existing trail corridor within the Refuge. This signage would interpret the species and habitats present in the Refuge and the importance of protecting these resources and the other resources preserved within the larger Coachella Valley MSHCP planning area. Opportunities for research would be the same as those described under Alternative B.

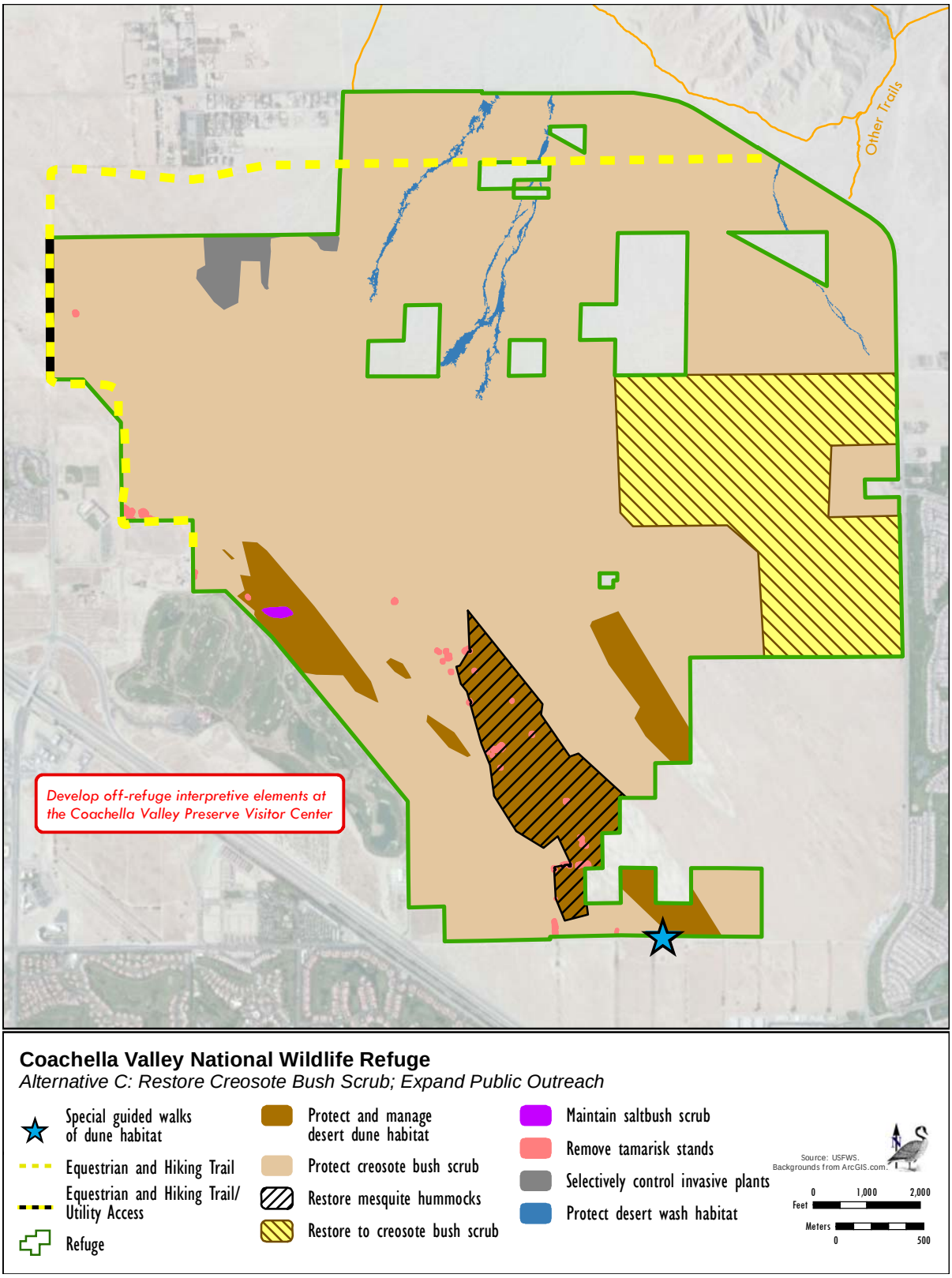



**Figure 2-17. Coachella Valley NWR, Alternative C**

**Refuge Operations**
Refuge operations under Alternative C would be the same as those described under Alternative B.

**Fire Management Plan**
As described under Alternative A, a fire management plan is not currently required for this Refuge.

**Mosquito Management**
No mosquito management is proposed under Alternative C.

**Cultural Resource Management**
Cultural resource management under Alternative C would include all of the actions described under Alternative B.

**Environmental Contaminants Coordination**
Under Alternative C, Refuge staff would continue to coordinate with the Service's Environmental Contaminants Program as described under Alternative A.

**Volunteers/Partners/Public Outreach**
Proposals involving volunteers and public outreach, as described in Alternative B, would also be implemented in Alternative C. Existing partnerships would continue to be an importance aspect of Refuge management, as described in Alternatives A and B.

#### *2.4.2.3 Alternatives Considered but Eliminated from Detailed Analysis*

The alternatives development process is designed to allow consideration of the widest possible range of issues and potential management approaches. During this process, various objectives and strategies for achieving the goals for the Coachella Valley NWR were considered but not selected for detailed study. Those alternatives that were eliminated from detailed study are presented below.

Expand the Opportunities for Public Use. There were several suggestions provided during public scoping for expanding public use on the Refuge, including providing opportunities for wildlife observation and upland bird hunting. These proposals were considered but eliminated from detailed analysis for a variety of reasons, including the lack of any facilities on this Refuge to accommodate public use, the limited availability of Refuge personnel to manage public use at this Refuge, the scarcity and fragile nature of the habitat protected on the Refuge, and the requirements of the Coachella Valley MSHCP to protect core habitat areas for Coachella Valley fringe-toed lizard, Coachella Valley milk-vetch listed, and other covered species in order to accommodate development elsewhere within the MSHCP planning area.

# 3 Affected Environment

Relevant information regarding the affected environment in and around the Sonny Bono Salton Sea NWR and Coachella Valley NWR is provided in Chapter 4 of the Final CPP.

# 4. Environmental Consequences

## 4.1 Introduction

This chapter provides an analysis and evaluation of the environmental consequences of implementing the alternatives described in Chapter 2. Impact evaluation has been conducted for each aspect of the environment described in Chapter 4 – Refuge Resources of the Final CCP. 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. 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.

## 4.2 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 watercourses, 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 due to 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.

## 4.2.1 Effects to Topography and Visual Quality

### *4.2.1.1 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 in response to 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 from 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 2-12). 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 only 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 resulting from the implementation 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 from the implementation 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.

### *4.2.1.2 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 result from 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.

## 4.2.2 Effects Related to Geology, Soils, and Geological Hazards

### *4.2.2.1 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 Storm Water 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 lacusterine 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 following 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 from 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.

#### *4.2.2.2 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 resulting from 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 an 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 resulting from the implementation of 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.

## 4.2.3 Effects to Paleontological Resources

### *4.2.3.1 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 resulting from the implementation of 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 resulting from 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.

#### *4.2.3.2 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.

### 4.2.4 Effects to Alternative Energy Resources

#### *4.2.4.1 Sonny Bono Salton Sea NWR*

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

**Wildlife and Habitat Management, Public Use, and Refuge Operations**
As indicated in Figure 4-5 of the Final CCP, the refuge lands located in Unit 2 occur within the boundaries of the Salton Sea geothermal field (Hulen et al. 2002), with geothermal energy exploration and development activities occurring in the vicinity of Red Hill Bay. The design and layout of the restoration proposal included in Alternatives B and C for the Red Hill Bay restoration project were revised early in the design process to address concerns from CalEnergy regarding access to geothermal resources. The Refuge will continue to coordinate with IID and CalEnergy to ensure that all design elements associated with current or future geothermal energy production can be accommodated outside of the restoration boundary.

Based on the existing leases for geothermal development in the vicinity of Unit 2, geothermal development or/and associated infrastructure could be proposed on lands currently leased to the Refuge from IID. If energy development is pursued in these areas in the future, adjustments to the Refuge lease with IID may be required as energy development and associated infrastructure are likely not compatible with the purposes for which the Refuge was established.

Continued coordination with IID and geothermal interests in the area will avoid potential conflicts between Refuge uses and the development of geothermal energy within this 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.

#### *4.2.4.2 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.

## 4.2.5 Effects to Agricultural Resources

### *4.2.5.1 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.

### *4.2.5.2 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.

## 4.2.6 Effects to Hydrology

### *4.2.6.1 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 2007). 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 from 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 due to a flood event is therefore considered 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 due to 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.

#### *4.2.6.2 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.

### 4.2.7 Effects to Water Quality

#### *4.2.7.1 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 because 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 watercourses. 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 2 of the Final CCP.

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 4-1.

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. 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.

| Table 4-1<br>Environmental Fate of Herbicides Presently Used or Proposed for Use<br>on the Sonny Bono Salton Sea NWR Complex | | | | | |
|---|---|---|---|---|---|
| **Active Ingredient** | **Product Name(s)** | **Application Details** | **Solubility in Water** | **Volatility** | **Behavior in the Environment** |
| **Imazapyr** | 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 |
| **2,4-D DMA (amine salt formulation)** | 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. |
| **Dicamba** | 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 |
| **Tribenuron-methyl** | 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 4-1**
**Environmental Fate of Herbicides Presently Used or Proposed for Use on the Sonny Bono Salton Sea NWR Complex**

| Active Ingredient | Product Name(s) | Application Details | Solubility in Water | Volatility | Behavior in the Environment |
|---|---|---|---|---|---|
| **Halosulfuron-methyl** | 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 |
| **Glyphosate** | 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 |
| **Glyphosate** | 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 |
| **Aminopyralid** | 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 |
| **Triclopyr (ester)** | 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 |

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 (Koc). 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 ($\mu$g/g), and can range from near zero to the thousands.

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 watercourses 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 from the continued implementation 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 waterways 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 corps 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 watercourses 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 is 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 Salton Sea Ecosystem Monitoring and Assessment Plan (Case et al. 2013). These data would provide a measure of the risk from pesticides and/or selenium that could then be used to inform management decisions. Additional information regarding this monitoring program is provided in Chapter 2. 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 G. 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 G).

- 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 provide 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 2006a).

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 2006a). 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. 2002) 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 2006a). 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.

#### *4.2.7.2 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.

### 4.2.8 Effects from Climate Change

#### *4.2.8.1 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.

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 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 21st 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 (Friggens et al. 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 likely exacerbate this problem. Any additional reductions in water discharge to the Salton Sea due to expanded water conservation measures within the Sea's drainage basin, drought, and other factors are expected to result in 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 not 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.

## 4.2.9 Effects to Air Quality

### *4.2.9.1 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 ($PM_{10}$) 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 [$PM_{10}$]), 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 $PM_{10}$ Non-Attainment Areas, and are intended to reduce the impact of varies 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 $PM_{10}$ and $NO_{x.}$

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 4-1, 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 from 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 related to 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 G) 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.

#### *4.2.9.2 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 in 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.

## 4.2.10 Effects Related to Greenhouse Gas Emissions

### *4.2.10.1 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 $CO_2$-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 $CO_2$ equivalent emissions, which represent a single metric that embodies all GHGs, including $CO_2$, 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 $CO_2$, 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 $CO_2$ equivalent associated with vehicle fuel and 13.1 metric tons of $CO_2$ 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 $CO_2$ 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 photovoltaic 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.

## 4.2.11 Contaminants

### *4.2.11.1 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.

#### *4.2.11.2 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.

## 4.3 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 due to 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 due to 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.

### 4.3.1 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 from current 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 from 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 from this restoration project are considered less than significant.

#### Pest Management

Potential effects to native vegetation, sensitive plant species, and overall habitat quality from 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 G 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 4-2, 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.

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.

**Table 4-2**
**Relative Toxicity of Herbicides Presently Used or Proposed for Use on the Sonny Bono Salton Sea NWR Complex**

| Active Ingredient | Toxicity to Birds | Toxicity to Mammals | Toxicity to Reptiles and Amphibians | Toxicity to Fish and Aquatic Invertebrates | Risk to Non-target Plants | Toxicity of Soil Bacteria and Fungi | Safety Issues |
|---|---|---|---|---|---|---|---|
| Imazapyr | 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 |
| 2,4-D DMA | 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 |
| Dicamba | 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 |

**Table 4-2**
**Relative Toxicity of Herbicides Presently Used or Proposed for Use on the Sonny Bono Salton Sea NWR Complex**

| Active Ingredient | Toxicity to Birds | Toxicity to Mammals | Toxicity to Reptiles and Amphibians | Toxicity to Fish and Aquatic Invertebrates | Risk to Non-target Plants | Toxicity of Soil Bacteria and Fungi | Safety Issues |
|---|---|---|---|---|---|---|---|
| **Tribenuron-methyl** | Practically nontoxic | Low toxicity | No data | Practically nontoxic | Potential for non-target effects via spray drift | Limited data | Moderate eye irritation |
| **Halosulfuron-methyl** | Low toxicity | Low toxicity | No data | Low toxicity | Potential for non-target effects via spray drift | No data | Skin irritation |
| **Glyphosate (aquatic)** | 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 |
| **Glyphosate (terrestrial)** | 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 |
| **Aminopyralid** | 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 |
| **Triclopyr (ester)** | 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

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.

### 4.3.2 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.

## 4.4 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 Ridgway's rails with removal of marsh habitat that supports Yuma Ridgway's 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.

### 4.4.1 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 from 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 4-2, 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 that 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 2-4). 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 4-3.

**Table 4-3**
**Sonny Bono Salton Sea NWR - Hunting Season and Bag/Possession Limits for 2012-2013**

| 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:<br>- 2 female mallards,<br>- 2 pintails (either sex)<br>- 1 canvasback (either sex)<br>- 2 redheads (either sex)<br>- 7 scaup (either sex)<br><br>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<br><br>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<br><br>Possession Limit: 25 |
| Black Brant | From Nov 10 through Dec 9 on Saturdays, Sundays, and Wednesdays only | Daily Bag Limit: 2<br><br>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 4-4 presents additional harvest data.

**Table 4-4**
**Duck Harvest Estimates for California, Pacific Flyway, and US**

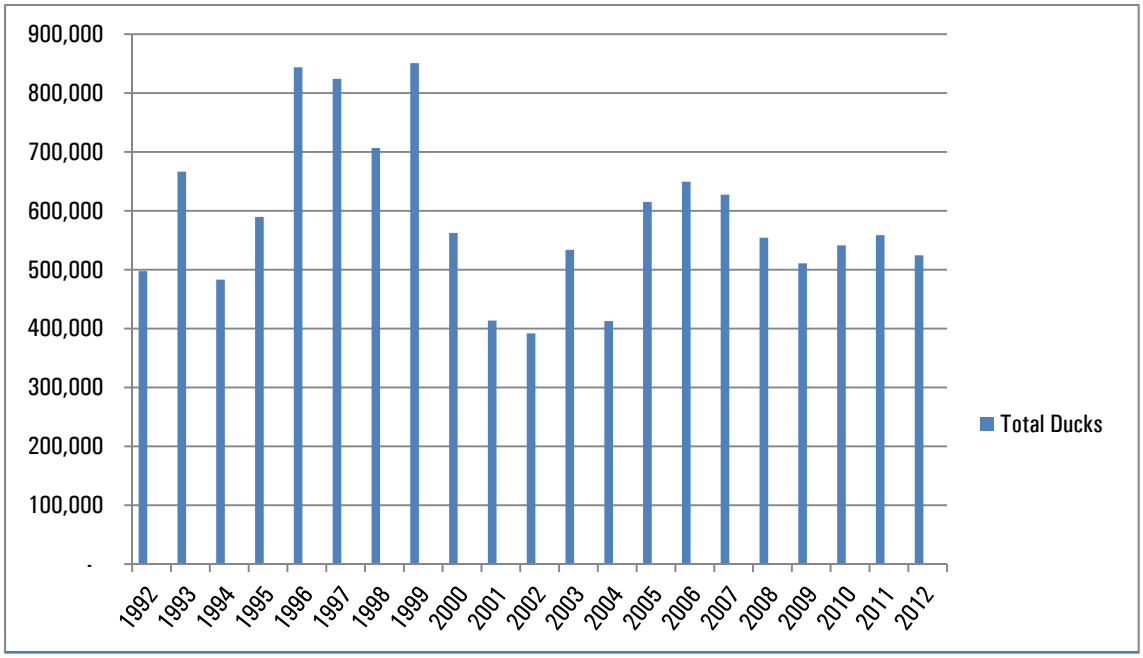
| | All Ducks | Mallard | Northern Pintail | Canvas-back | Lesser Snow Goose | Ross' Goose |
|---|---|---|---|---|---|---|
| Total harvested in US (2010) | 14,867,000 | 4,166,013 | 704,668 | 145,686 | 320,020 | 45,084 |
| Percent change in US harvest from 2009 | +13.1% | +0.7% | +41.3% | +107% | -6.3% | +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. 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 4-1, 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 4-1. 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 4-5. 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.

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 2010/2011season.

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.

**Table 4-5**
**Results of Winter Waterfowl Surveys Conducted between 2011 and 2013 for the Salton Sea and the Sonny Bono Salton Sea NWR**

| | 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 |

| Table 4-5<br>Results of Winter Waterfowl Surveys Conducted between 2011 and 2013<br>for the Salton Sea and the Sonny Bono Salton Sea NWR | | | |
|---|---|---|---|
| - 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 |
| TOTAL DUCKS | 85,643 | 40,785 | 65,467 |
| Geese | | | |
| - Snow/Ross' Undifferentiated | 22,201 | 17,412 | 18,673 |
| - Western Canada goose | 10 | 0 | 25 |
| - "Canada" Undifferentiated | 0 | 3 | 29 |
| TOTAL GEESE | 22,211 | 17,415 | 18,782 |
| **TOTAL DUCKS AND GEESE** | **107,854** | **58,200** | **84,249** |
| Coots | 8,854 | 9,821 | 8,826 |

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 extend 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 $\mu$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 $\mu$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 $\mu$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 $\mu$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 Salton Sea Ecosystem Monitoring and Assessment Plan (available at http://pubs.usgs.gov/of/2013/1133/). 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 that 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 G). 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 H, 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 from continuing the current waterfowl hunting program 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.

### 4.4.2 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 monitoring could occur. Such impacts are minimized by ensuring that biological monitors and other researches 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 because 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 from 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.

## 4.5 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.

### 4.5.1 Sonny Bono Salton Sea NWR

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

**Yuma Ridgway's 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 2-1 and 2-2). These habitat areas are managed to benefit the Yuma Ridgway's 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 Ridgway's 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 Ridgway's 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 Ridgway's 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 shotguns 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 Ridgway's 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 from 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 from 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 from implementing the proposed restoration 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 from 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 from the continuation 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 from 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 from 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 Ridgway's rail, and the mitigation measures proposed to minimize impacts to Yuma Ridgway's 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 in the Final CCP) 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 Ridgway's 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 Ridgway's Rail**

Under Alternatives B and C, a step-down management plan for Yuma Ridgway's 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 Ridgway's 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 Ridgway's rails and would benefit the rails by ensuring that appropriate, quality habitat is always available.

Yuma Ridgway's rails do not occupy habitat to be affected by the restoration proposals for Red Hill Bay, therefore, no adverse effects to Yuma Ridgway's rails are anticipated from 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 IPM Plan (Appendix G). 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 Ridgway's 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 Ridgway's 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 Ridgway's 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 Ridgway's 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 Ridgway's 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 ¼-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 Hidrostal 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. Hidrostal Ltd. has published a review of the differences between Archimedes screw pumps and vertically suspended axial flow pumps using the Hidrostal screw centrifugal pump (Jackson 2010). Another review of the Hidrostal pump was performed by the Bureau of Reclamation at the Tracy Fish Collection Facility at Tracy, California. In this review, the Hidrostal 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 maritma*) 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 that 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 due to future research on the Refuge would be addressed as presented under Alternative A.

**California Least Tern**

The potential for impacts to California least tern from the implementation 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 Ridgway's 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 from the implementation 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 Ridgway's 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 from actions associated with the restoration of Red Hill Bay or Bruchard Bay, and there is no potential for adverse effects to California black rail because 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 4-14 in the Final CCP) 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.

### 4.5.2 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 blowsand 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.

## 4.6 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.

### 4.6.1 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.

### 4.6.2 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.

## 4.7 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.

## 4.7.1 Effects to Land Use

### *4.7.1.1 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 2007).

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 windbreaks, 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*)*. To ensure that no adverse effects to IID lands or facilities would occur as a result of Refuge activities, Refuge staff would consult with the appropriate departments at IID prior to implementing refuge projects located adjacent to IID facilities or easements.

  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. As discussed previously, 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.

### 4.7.1. 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.

## 4.7.2 Effects to Recreational Opportunities

### *4.7.2.1 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 under 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 alterative 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.

#### *4.7.2.2 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.

### 4.7.3 Transportation/Traffic Circulation

#### *4.7.3.1 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.

#### *4.7.3.2 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.

### 4.7.4 Effects to Public Utilities/Easements

#### *4.7.4.1 Sonny Bono Salton Sea NWR*

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

The effects to public utility easements from implementing 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.

#### *4.7.4.2 Coachella Valley NWR*

**Coachella Valley NWR - Alternatives A, B, and C**
The effects to public utilities and public utility easements from implementing the management and public use proposals included under any of 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.

### 4.7.5 Health and Safety

#### *4.7.5.1 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 the potential for exposure to these existing safety issues by either the public or Refuge personnel. In addition, under all alternatives, the Refuge would continue to cooperator 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.

#### *4.7.5.2 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, therefore, as of 2014, no surveillance or control of mosquitoes occurs or is proposed on the Refuge.

### 4.7.6 Effects to Population and Employment

#### *4.7.6.1 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 because 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.

#### *4.7.6.2 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.

### 4.7.7 Effects to Environmental Justice

#### *4.7.7.1 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.

## 4.8 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.

## 4.9 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.

## 4.10 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.

## 4.11 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.

### 4.11.1 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. If expanded, these types of projects could help improve water quality used from the Alamo River at Red Hill Bay.

Water Conservation Agreement. In 1988, IID and MWD executed an agreement for the funding and implementation of water conservation measures within IID's service area. Following the completion of several conservation projects, the parties agreed that the program was conserving an average of 105,000 afy, which could be transferred for use by the junior priority water rights holders under the California Seven Party Agreement of 1931, including CVWD, which would receive up to 20,000 afy, and MWD, which would receive the balance. Ongoing agricultural water conservation practices continue to be implemented in the Imperial Valley, resulting in reduced water flows in the Alamo River. The potential effects of these reduced flows could include increased nutrient and selenium levels in drainage water that flows into the Salton Sea.

Quantification Settlement Agreement (QSA). The QSA is a consensual reallocation of Colorado River water based on a series of agreements related to water conservation, transfer, and exchange projects among IID, CVWD, MWD, the State of California, and the Department of the Interior. In addition to the 105,000 acre-feet of water being conserved under the 1988 IID/MWD Conservation Program, these more recent agreements define an additional 303,000 acre-feet per year to be conserved by IID from on-farm and distribution system conservation projects for transfer to SDCWA, CVWD, and MWD (www.iid.com/index.aspx?page=121, accessed on 11/27/13).

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 (i.e., Alamo and New River wetland sites, 1988 Water Conservation Agreement, QSA) are being implemented and the project effects are ongoing. 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 identified 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 4.1 through 4.10 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 projects be approved and the construction schedules converge, we would work with partners to ensure that the projects 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.

### 4.11.2 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 from 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.

## 4.12 Summary of Effects

Provided in Table 4-6 is a summary of the potential effects associated with each of the alternatives evaluated for the Sonny Bono Salton Sea NWR.

**Table 4-6**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Sonny Bono Salton Sea NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| Physical Environment | | | |
| 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 |
| 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 | Same as Alternative A | Same as Alternative A |

**Table 4-6**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Sonny Bono Salton Sea NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| | farmlands. In addition, the Refuge is managed to protect adjacent commercial crops from depredation by geese. | | |
| 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 from current 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 in 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 |
| 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 | 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 | Same as Alternative B |

**Table 4-6**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Sonny Bono Salton Sea NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| | reduce the effects of Refuge operations on air quality to below a level of significance. | quality would be implemented per the requirements of the IPM Plan and Chemical Profiles. | |
| 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 |
| Biological Resources | | | |
| 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 |
| Federally Listed Species | Current activities on the Refuge do not adversely affect Yuma Ridgway's rail or its habitat; desert pupfish are not actively managed on the Refuge, but BMPs are implemented to protect water | Same as Alternative A plus a step-down Yuma Ridgway's rail habitat management plan will be prepared to address long term management of rail habitat on the Refuge and measures to minimize impacts to rails | Same as Alternative B. |

**Table 4-6**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Sonny Bono Salton Sea NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| | 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. | 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. | |
| 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. |
| **Cultural Resources** | | | |
| 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 |
| **Social and Economic Environment** | | | |
| 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. |
| 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. |

**Table 4-6**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Sonny Bono Salton Sea NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| 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 4-7 provides a summary of the potential effects associated with each of the alternatives evaluated for the Coachella Valley NWR.

**Table 4-7**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| Physical Environment | | | |
| 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 4-7<br>Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR | | | |
|---|---|---|---|
| **Resource** | **Alternative A** | **Alternative B** | **Alternative C** |
| 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 |

**Table 4-7**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| 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 |

**Table 4-7**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| 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 |
| Biological Resources | | | |
| 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. |

**Table 4-7**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| 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 |
| Cultural Resources | | | |
| 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 |
| Social and Economic Environment | | | |
| 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 4-7**
**Summary of Potential Effects of Implementing Management Alternatives A, B, or C for the Coachella Valley NWR**

| Resource | Alternative A | Alternative B | Alternative C |
|---|---|---|---|
| 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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