

1. Introduction

1.1 Introduction and Background

The Sonny Bono Salton Sea National Wildlife Refuge Complex (Complex or NWRC) consists of the Sonny Bono Salton Sea National Wildlife Refuge (NWR) and the 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 approximately 37,660 acres, is situated at the south end of the Salton Sea, approximately 20 miles north of El Centro in Imperial County, California (Figure 1-2). Its purposes relate to 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 approximately 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 dune and sand field habitats in the Coachella Valley.

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

This document addresses a range of Service legal mandates, policies, and goals, as described below. It also incorporates the requirements of the National Environmental Policy Act (NEPA) of 1969 (P.L. 91-190, 42 U.S.C. 4321-43470), as amended, which requires Federal agencies to consider the effects to the environment of all actions they take. In accordance with NEPA, a joint draft CCP/Environmental Assessment (EA) has been prepared to analyze the potential effects to the environment of managing the Sonny Bono Salton Sea NWRC under several different management alternatives. This joint CCP/EA includes the following chapters: Chapter 1, Introduction; Chapter 2, The Comprehensive Conservation Planning Process; Chapter 3, Affected Environment; Chapter 4, Refuge Management; Chapter 5, Environmental Consequences; and Chapter 6, Plan Implementation.

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.

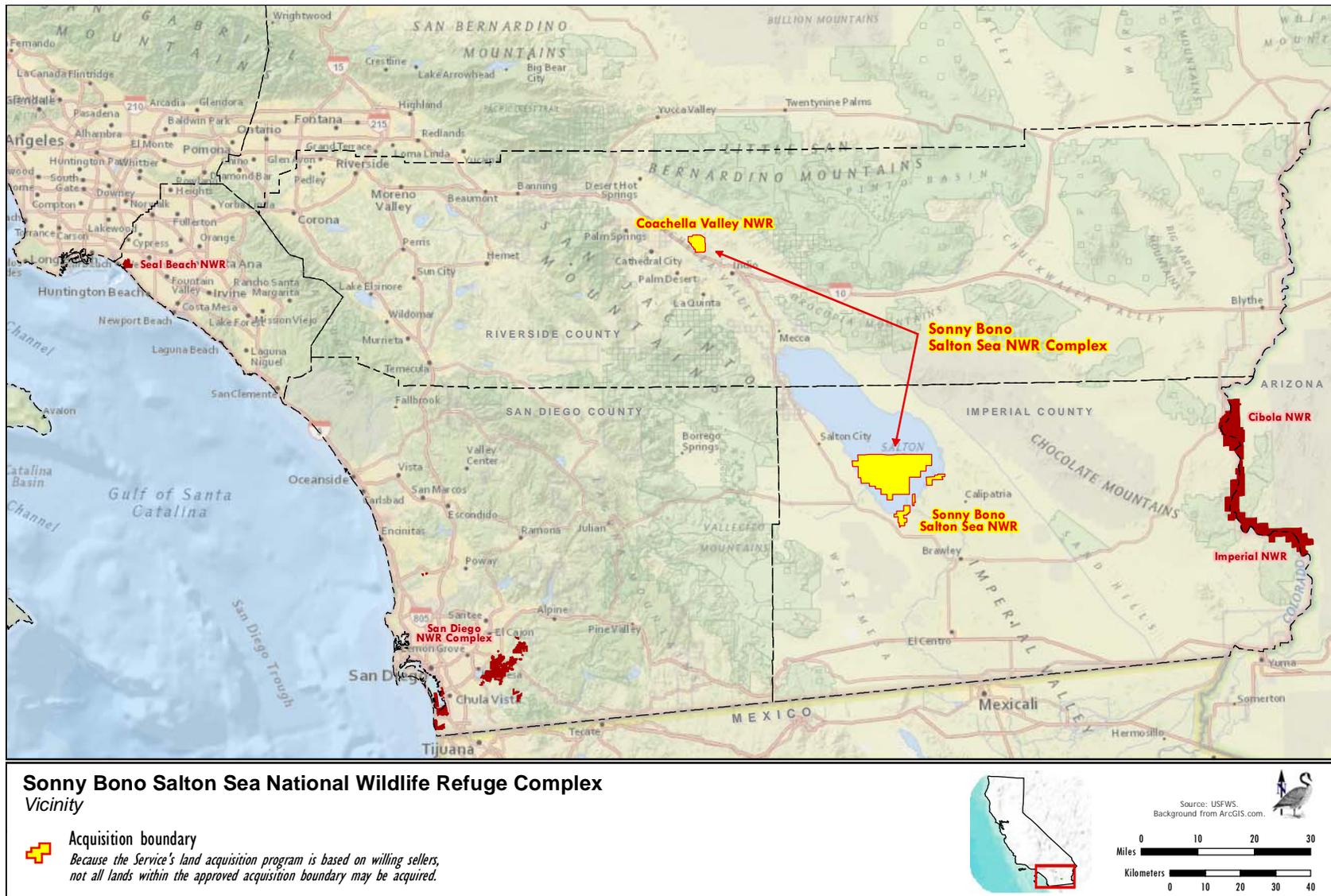


Figure 1-1. Regional Vicinity Map - Sonny Bono Salton Sea National Wildlife Refuge Complex

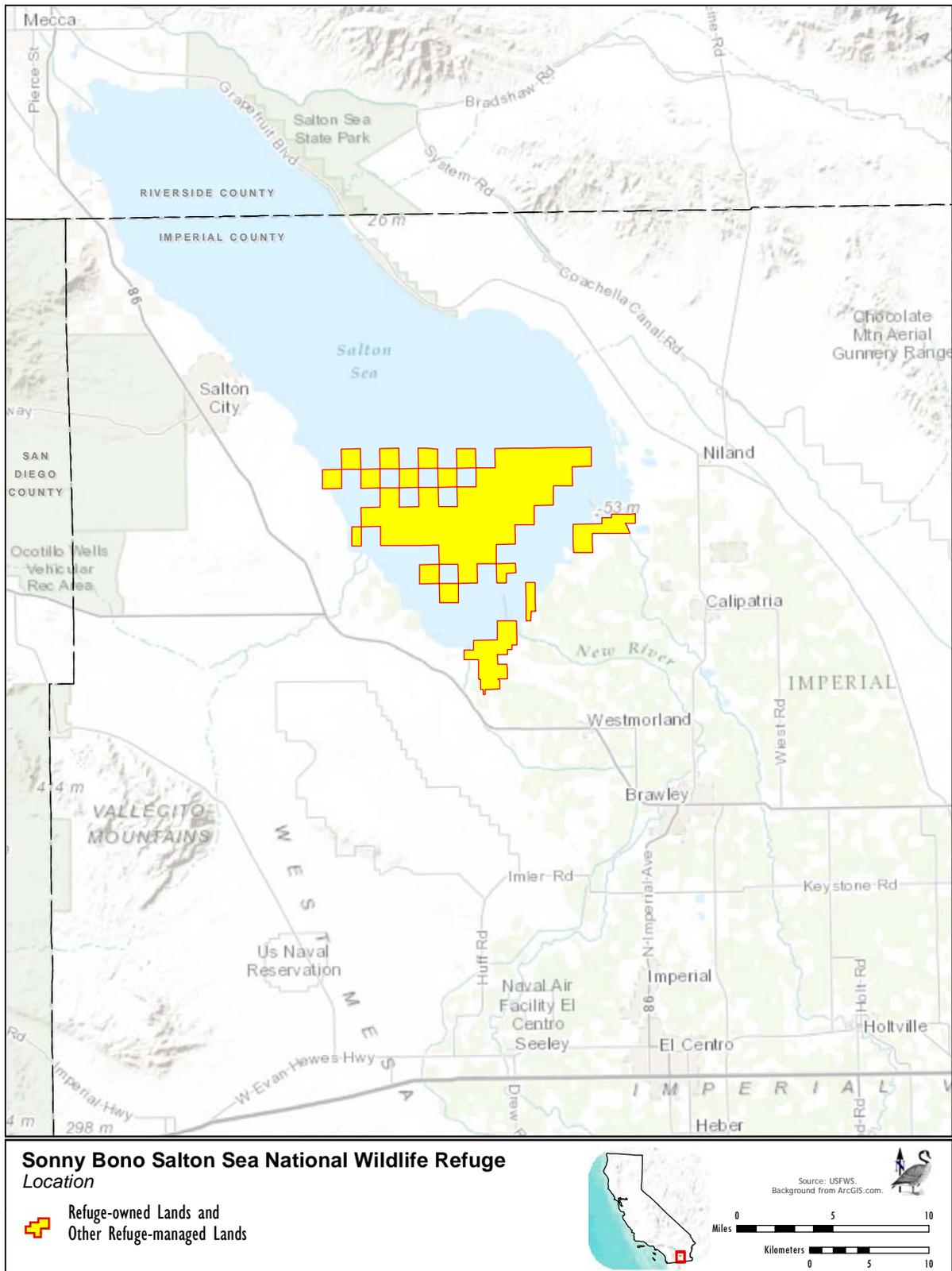


Figure 1-2. Location Map - Sonny Bono Salton Sea National Wildlife Refuge

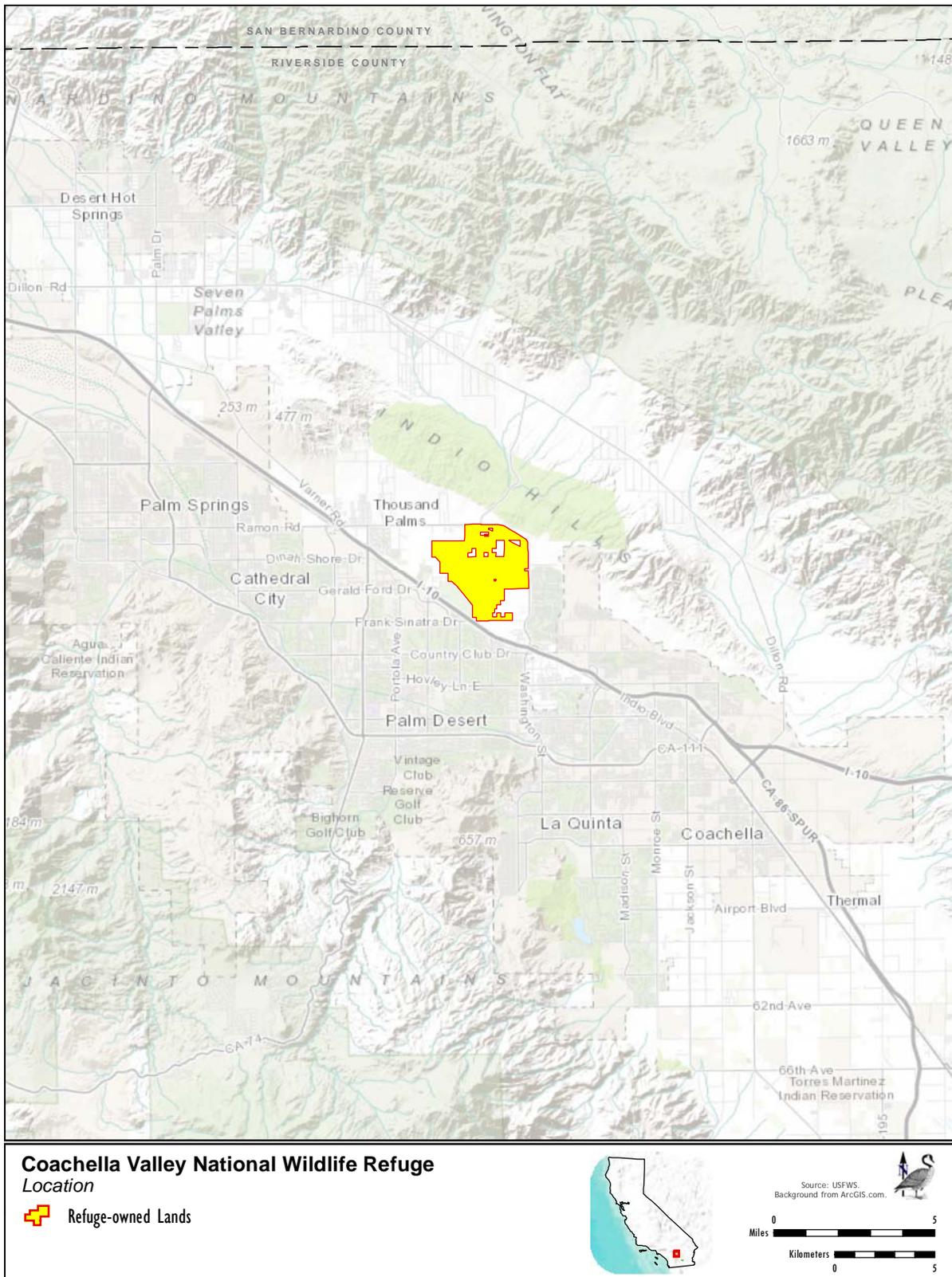


Figure 1-3. Location Map - Coachella Valley National Wildlife Refuge

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 part of this joint CCP/EA.

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

Refuges are guided by the purposes of the individual refuge, the mission and goals of the Refuge System, Service policy, various Federal laws, and international treaties. Relevant guidance includes the Refuge Recreation Act of 1962 (16 U.S.C. 460k-460k-4), 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 (Improvement Act, 16 U.S.C. 668dd-668ee), and selected portions of the Code of Federal Regulations and the U.S. Fish and Wildlife Service Manual (Service Manual).

Refuges are also governed by a variety of other Federal laws, Executive orders (EOs), treaties, interstate compacts, regulations, and policies pertaining to the conservation and protection of natural and cultural resources (see Service Manual 602 FW 1 (1.3)). Federal laws and Executive orders relevant to the management of the Refuges within the Sonny Bono Salton Sea NWRC are summarized in Table 1-1 and addressed in greater detail in Appendix F.

Table 1-1 Federal Laws and Executive Orders Applicable to the Management of the Sonny Bono Salton Sea NWRC	
Agency Coordination	
<ul style="list-style-type: none"> • Executive Order No. 12372, Intergovernmental Review of Federal Programs 	
Refuge Uses	
<ul style="list-style-type: none"> • The National Wildlife Refuge System Administration Act of 1966 (16 USC 668dd-668ee), National Wildlife Refuge System Improvement Act of 1997 (P.L.105-57) • The Refuge Recreation Act of 1962, as amended • Fish and Wildlife Improvement Act of 1978 • Executive Order No. 12996, Management and General Public Use of the NWRS 	
Biological Resources	
<ul style="list-style-type: none"> • Endangered Species Act of 1973 (16 USC 1531 et seq.), as amended (ESA) • Fish and Wildlife Act of 1956 (16 USC 742a-743j, not including 742d-742l) • Fish and Wildlife Conservation Act of 1980 (16 U.S.C. §661-667e), as amended • Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (10, Jan. 2001) • Migratory Bird Treaty Act of 1918, as amended (MBTA) • The Bald and Golden Eagle Protection Act of 1940 (16 USC 668 et seq.) • Fish and Wildlife Coordination Act of 1958 	
Resource Protection	
<ul style="list-style-type: none"> • National Environmental Policy Act of 1969 (42 USC 4321 et seq.) (NEPA) • Executive Order 13112, Invasive Species • Federal Noxious Weed Act of 1990 • Executive Order No. 11990, Protection of Wetlands • Emergency Wetlands Resources Act of 1986 • Executive Order No. 11988, Floodplain Management • Farmland Protection Policy Act (7 USC 4201 et seq.) 	
Cultural Resources	
<ul style="list-style-type: none"> • Antiquities Act of 1906 • Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001 et seq.)(NAGPRA) • Executive Order 13007, Indian Sacred Sites (24 May, 1996) • American Indian Religious Freedom Act 1978 (42 USC 1996) • Executive Order No. 11593, Protection and Enhancement of the Cultural Environment • Archaeological Resources Protection Act of 1979 (16 USC 470aa-47011), as amended (ARPA) • National Historic Preservation Act of 1966 (16 USC 470 et seq.; 36 CFR 800), as amended (NHPA) • Archaeological and Historic Preservation Act of 1974 (16 USC 469) • Curation of Federally-Owned and Administered Archaeological Collections (36 CFR 79) 	

Table 1-1 Federal Laws and Executive Orders Applicable to the Management of the Sonny Bono Salton Sea NWRC	
Tribal Coordination	
<ul style="list-style-type: none"> • Executive Order 13175, Consultation and Coordination with Indian Tribal Governments 	
Paleontological Resources	
<ul style="list-style-type: none"> • Paleontological Resources Preservation Act of 2009 (P.L. 111-11, Title VI, Subtitle D) 	
Human Rights	
<ul style="list-style-type: none"> • Executive Order 12898, Environmental Justice • Architectural Barriers Act of 1968, as amended (42 USC 4151 et seq.) 	
Contaminants and Hazardous Materials	
<ul style="list-style-type: none"> • Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (P.L. 96-510; 42 USC 9601, et seq.) (CERCLA) • Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (P.L. 80-104; 7 USC 136 et seq.) 	
Air Quality	
<ul style="list-style-type: none"> • Clean Air Act of 1970, as amended (P.L. 91-604; 42 USC 1857 et seq.) 	
Water Quality	
<ul style="list-style-type: none"> • Clean Water Act of 1972, Section 404 (33 USC 1344 et seq.), as amended • Clean Water Act, Section 401 	

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. 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. The Improvement Act also states that the, “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 1-2.

Table 1-2 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.
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 A 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 A contains the draft CDs for proposed uses on Sonny Bono Salton Sea NWR and the Coachella Valley NWR. The draft CDs are available for public comment with the Draft CCP.

Table 1-2 Key Service Policies Related to the Management of National Wildlife Refuges	
Policy	Purpose
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 establishing purpose(s). The wilderness inventory for the Refuges within the Sonny Bono Salton Sea NWRC is provided in Appendix G.

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 that can accompany or be integrated into the draft CCP. This CCP has been 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 to be integrated into the CCP process at the earliest possible time, an EA has been integrated directly into the draft CCP document for the Sonny Bono Salton Sea NWRC. The primary components of the EA (Section 1508.9 of the CEQ NEPA regulations), as presented in this document include: Chapter 1, which addresses the purpose and need for the CCP; Chapter 3, which describes the affected environment; Chapter 4, which presents the various management alternatives; Chapter 5, which presents the environmental consequences of implementing each alternative; and Appendix B, which lists the agencies and persons consulted.

1.5 Sonny Bono Salton Sea National Wildlife Refuge Complex

1.5.1 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 Geronio Pass in the north through the Coachella, Imperial, and Mexicali valleys to the Gulf of California (refer to Figure 1-1).

1.5.1.1 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 owned and/or managed within the Refuge occur in three general locations as described below and illustrated in Figure 1-4.

- 1) Approximately 32,410 acres of fee title (Service-owned) lands, consisting almost entirely of the open waters of the Salton Sea, are located in the southern portion of the Salton Sea; when the Refuge was established, this area consisted of both wetland and upland habitat that was 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, approximately 560 acres are owned in fee title by 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 owned in fee title by the Service, about 1,247 acres are leased from IID, and 615 acres are leased from the California Department of Fish and Wildlife (CDFW).

1.5.1.2 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.

1.5.2 Refuge Setting

1.5.2.1 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 flood waters 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.

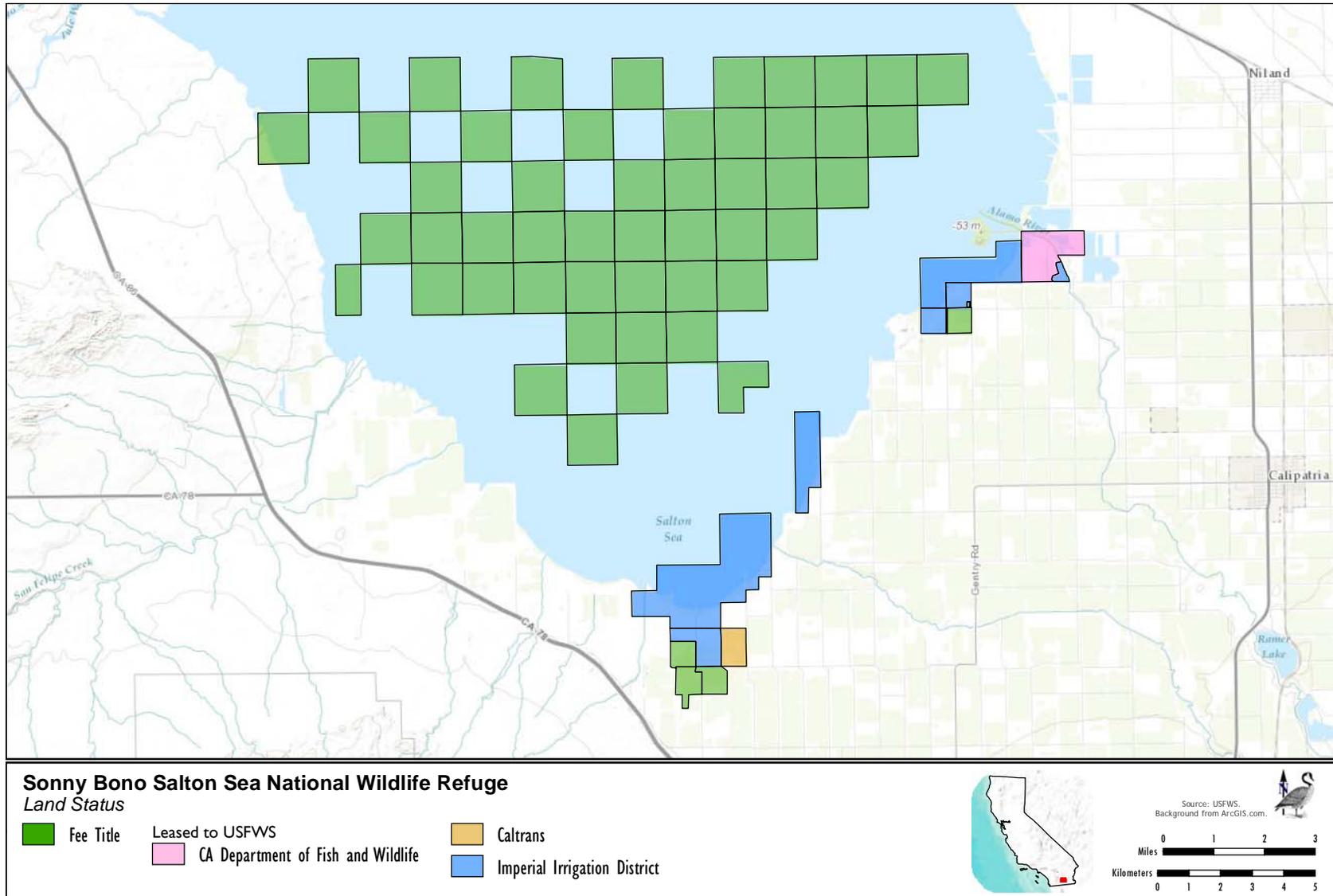


Figure 1-4. Land Status Map – Sonny Bono Salton Sea NWR

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 clapper rail (*Rallus longirostris yumanensis*).

1.5.2.2 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 blow-sand habitats such as those protected within the Coachella Valley NWR.

1.5.3 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 area is topographically complex, including three different deserts (Mojave, Sonoran, and Chihuahuan), grasslands and valley bottoms, and isolated mountain ranges. The richness of the topography supports a diverse species composition; including many endemic species.

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 are summarized below.

Sonoran Joint Venture Bi-national Bird Conservation

The Sonoran Joint Venture is a partnership of diverse organizations and individuals from the southwestern United States and northwestern Mexico that share a common commitment to bird conservation within the region. The Strategic Plan for the Sonoran Joint Venture presents a regional strategy to protect, conserve, restore, and enhance bird populations and their habitats. The strategic plan and the Joint Venture's actions in general are intended to address and integrate the conservation recommendations of the North American Waterfowl Management Plan, Partners in Flight North American Landbird Conservation Plan, North

American Waterbird Conservation Plan, and other bird conservation plans for the areas included within this joint venture. Bird conservation plans are discussed further in Chapter 3. Sonny Bono Salton Sea NWR and Coachella Valley NWR are located within the Arid Borderlands Region of the Sonoran Joint Venture Bird Conservation Plan. This plan identifies 81 areas within this Region as focus areas (Sonoran Joint Venture Technical Committee 2006). Focus areas are locations that have been identified as having significant bird populations and habitat values, and/or the potential to be restored to a condition that supports bird populations. The Salton Sea is identified as one of these focus areas.

California Wildlife Action Plan

The Refuge Complex is included within California's Colorado Desert Region as designated by the California Wildlife Action Plan (California Department of Fish and Game [CDFG] 2007). The Plan's conservation actions that apply to the management of the Sonny Bono Salton Sea NWR include maintaining and restoring the Salton Sea ecosystem in a form that provides vitally important aquatic habitats. Conservation actions relevant to the Coachella Valley NWR include eradicating or controlling invasive species and implementing actions such as monitoring recreational uses, trespass, and other activities that could impact the habitats and species protected on the Refuge.

Habitat Conservation Plans/Natural Community Conservation Plans

Habitat Conservation Plans (HCPs) are Federal planning documents required as part of an application for an incidental take permit under the Endangered Species Act of 1973 (ESA). They describe the anticipated effects of the proposed taking; how those impacts will be minimized, or mitigated; and how the HCP is to be funded. The preparation of HCPs, which are authorized under section 10(a)(1)(B) of the ESA, provide for partnerships with non-Federal parties to conserve the ecosystems upon which listed species depend, ultimately contributing to their recovery.

Natural Community Conservation Plans (NCCP) are planning documents prepared to provide for effective protection and conservation of the State of California's wildlife resource while continuing to allow appropriate development, growth, and other activities. The purposes of NCCPs, as described in the Fish and Game Code section 2801, are to provide for the conservation of biological diversity by protecting biological communities.

To address a range of species for which future development proposals could result in incidental take, the Service and the State often work together to develop multiple species habitat conservation plans that can adequately address the requirements of both the ESA and the State's requirements for protecting the natural biological communities of California.

The Coachella Valley NWR, which was included within the Coachella Valley Fringe-toed Lizard Preserve in 1986, was incorporated into the Thousand Palms Conservation Area of the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) in 2007 (CVAG 2007a). In addition to providing core habitat for the Coachella Valley fringe-toed lizard, the Refuge also provides core habitat for Coachella Valley milk-vetch, Coachella Valley giant sand-treader cricket (*Macrobaenetes valgum*), flat-tailed horned lizard (*Phrynosoma mcallii*), Coachella Valley round-tailed ground squirrel (*Xerospemophilus tereticaudus chlorus*), and Palm Springs pocket mouse (*Perognathus longimembris bangsi*). The Coachella Valley MSHCP, which emerged out of the habitat conservation planning process implemented in the 1980s to ensure the long-term protection of the Coachella Valley fringe-toed lizard, provides a regional vision for balanced growth to meet the requirements of Federal and State listed endangered species laws, while promoting enhanced opportunities for recreation, tourism, and job growth.

With the approval of the Coachella Valley MSHCP in 2007, the MSHCP Reserve System was established. This Reserve System includes 21 Conservation Areas, including the Thousand Palms Conservation Area, that collectively are intended to conserve 27 species and 27 natural communities (CVAG 2007c). Management and monitoring activities implemented by the Service on the Coachella Valley NWR that relate to the conservation of listed and covered species and their habitats are expected to be consistent with the management and monitoring objectives and protocols developed as part of the Coachella Valley MSHCP.

In the Imperial Valley, the IID is currently in the process of preparing a HCP and NCCP in consultation with the Service and CDFW (formerly the California Department of Fish and Game [CDFG]). The IID's HCP/NCCP permit is anticipated to cover a number of listed and non-listed fish, wildlife, and plant species. Because the Refuge leases land from the IID for management as part of the NWR, it is possible that the objectives of the HCP/NCCP developed for IID Covered Activities could apply to some IID lands currently managed by the Service.

1.5.4 Refuge Purposes

1.5.4.1 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]).

1.5.4.2 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.]).

1.5.5 Refuge Vision Statement and Goals

1.5.5.1 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 clapper 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.

1.5.5.2 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 CVMSCP 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.

1.5.6 History of Refuge Establishment, Acquisition, and Past Management Practices

1.5.6.1 Sonny Bono Salton Sea NWR

Events Leading Up to Refuge Establishment. The geographical area occupied by the current Salton Sea has for most of the last several millennia been a naturally occurring wetland receiving flood waters from the nearby Colorado River. That was the situation that was repeating itself in the spring of 1905 when Colorado River flood waters burst through a diversion structure built to bring irrigation water to the Imperial Valley for agricultural development. For most of 18 months the Colorado River flowed into the Salton Sink. Birds were attracted to the re-flooded wetland, taking advantage of this inland water source, just as they had done in the past, as documented by analysis of bird bones from Native American midden sites in the area. The original massive re-flooding of the Salton Sink gradually abated, but with agriculture expanding in the Imperial Valley and a steady flow of Colorado River irrigation water to supply that need, the Salton Sea would remain a flooded inland sea by virtue of the continuous supply of drainage water flowing from the growing agricultural enterprises within the Valley.

The birds observed at the Salton Sea in 1908 seemed to forecast the unusual and unlikely diversity of birdlife for which the Salton Sea would later become well-known. Bird species present at that time included pelagic cormorants (*Phalacrocorax pelagicus*), Brandt's cormorants (*Phalacrocorax penicillatus*), nesting double-crested cormorants (*Phalacrocorax auritus*), pigeon guillemots (*Cepphus columba*), tufted puffins (*Fratercula cirrhata*), black oystercatchers (*Haematopus bachmani*), and more commonly phalaropes (*Phalaropus* spp.), long-billed curlews (*Numenius americanus*), various types of sandpipers, and great blue herons (*Ardea herodias*). Many gulls found and used the Sea at this early stage of its new incarnation, but what impressed ornithologist Joseph Grinnell most were the more than 2,000 American white pelicans (*Pelecanus erythrorhynchos*) he discovered nesting on the Salton Sea's Echo Island (Bent 1922).

As the use of irrigation water to support farming in the Imperial and Coachella Valleys expanded, the region became dependent upon the Salton Sea as a recipient of the waters that flowed from the irrigated fields. As a result, in the early 1920s, the IID petitioned the U.S. Government to withdraw the lands around the Salton Sea for use as a water reserve. In response to the petition, the use of the Sea as a repository for agricultural drainage water was formalized on March 10, 1924, when President Coolidge issued an Executive order withdrawing all land within the Salton Sea basin below elevation -244 feet and placing it in a public water reserve (Public Water Reserve No. 90). In February 1928, President Coolidge issued a subsequent Executive order that withdrew additional lands around the Salton Sea, designating the lands within the Salton Basin below elevation 220 feet below MSL as storage for wastes and seepage from irrigated lands in the Imperial Valley (Public Water Reserve No. 114).

Refuge Establishment. As the water level within the Salton Sea increased, so too did the diversity and abundance of bird life in and around the Sea. The importance of this area to birds and wildlife was recognized by the Federal government in 1930, when President Hoover on November 25, 1930 issued Executive Order 5498 establishing the "Salton Sea Wild Life Refuge." Per the Executive order, the 32,766-acre Salton Sea Wild Life Refuge was set aside as a sanctuary and breeding ground for birds and other wildlife. At the time of establishment, nearly 60 percent of the Refuge consisted of open saline lake. The remaining areas included shoreline alkali flats, freshwater marshes, native desert scrub, and farm fields. In 1940, management of federal wildlife refuges was shifted from the Department of Agriculture to the Department of the Interior and the refuge name was changed by President Franklin D. Roosevelt on July 30, 1940 to the Salton Sea National Wildlife Refuge. The refuge name was changed again in 1998 in memory of Congressman Sonny Bono, who was very active in the efforts to restore the health of the Salton Sea.

The lands and waters managed as part of the Sonny Bono Salton Sea NWR have been acquired at various times under one or more of the following authorities: Executive Order, the Migratory Bird Conservation Act (16 U.S.C. 715-715d, 715e, 715f-715r) of 1929, the Lea Act of 1948 (16 U.S.C. 695-695e), and the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j, not including 742 d-l).

Past Management Actions. Between 1930 and 1947, approximately 32,400 acres located in the southern portion of what is now the Salton Sea where managed to protect ducks, geese, and shorebirds. In 1930, approximately 60 percent of the Refuge consisted of open saline lake with the balance of the area comprised of shoreline alkali flats, freshwater wetlands, native desert scrub, and agricultural fields (USFWS 1972). As agricultural development expanded in both the Imperial and Coachella valleys, the inflow of drainage water to the Sea also increased, resulting in a significant rise in the water level within the Salton Sea.

In the mid-1940s, the IID made available for leasing 24,000 acres of land located between what was then the south end of the Salton Sea and private farmlands to the south (USFWS 1963). Under the lease agreement, the lands could be reclaimed and improved for Refuge management purposes. The first of the IID lands to be leased were located in what is referred to today as Unit 1 and were acquired under the authorities of the Migratory Bird Conservation Act. This lease, which was approved in 1945, involved lands that had either never been farmed or had not been farmed since 1924. As a result, major work (e.g., land leveling, ditch and canal construction) was required to prepare these lands for cultivation. The Refuge lands located within the area referred to today as Unit 2 were acquired for management in 1949 via a lease with IID. These lands were already in agricultural production when they were leased to the Refuge (USFWS 1963). Once acquired by the Refuge, cereal grains such as barley and milo were initially cultivated to support geese foraging during the winter. In 1956, the Service acquired 637 acres of upland, including the site of the current Refuge headquarters, from the IID under the authorities of the Lea Act.

Between 1947 and 1963, the areas leased from the IID were gradually submerged below the rising waters of the Salton Sea, reducing the area available for producing forage for wintering geese to about 4,415 acres. As more land was lost to the Sea, Refuge staff found it difficult to provide adequate foraging and resting areas to support the area's transient and wintering waterfowl. This situation was of particular concern during the 1940s and 1950s when waterfowl crop depredation in the Imperial Valley was a serious problem for farmers. By 1963, only 1,630 acres were still suitable for farming or marsh management, and the size of the wintering Canada goose flock was increasing. In fact, the goose flock increased from 1,000 geese in 1959 to 9,000 geese in 1966.

By the 1960s, the Refuge was cultivating barley, millet, and bulrush, all to support wintering geese and waterfowl. The type of crop selected for cultivation was directly related to the salinity levels in the soil, with barley planted in areas with the lowest salinity levels. All farming operations were performed by Refuge personnel and involved two types of operations: production of cereal grains primarily in the form of green barley for forage, and management of artificial impoundments that supported millet, bulrush, and cattails (USFWS 1963). The planting of barley was timed to ensure that adequate forage was available as soon as the geese arrived in the area. A few areas were also planted with millet, and in some years other crops such as alfalfa, milo, and other sorghums were planted in some tracts.

In 1962, the Refuge implemented an experimental artificial marsh project in Unit 1 in an effort to supplement available forage for waterfowl. Alkali bulrush (*Schoenoplectus maritimus*) was planted within this 80-acre impoundment. The project was very successful in attracting foraging ducks and geese. In 1964, the Service reached an agreement with CDFW in which the Refuge would manage the habitat within the CDFW's Hazard Tract (located in the eastern portion of Unit 2) to support waterfowl. This agreement enabled the Refuge to better achieve its purpose of reducing depredation on commercial cropland.

A Refuge office had been maintained on Unit 1, but in 1964, the office was moved to Unit 2 because the Salton Sea was encroaching on the facility. In 1968, the State of California enacted a statute (Stats 1968, Ch. 392, Sec. Z) declaring the collection of agricultural drainage water, seepage, leaching, and control waters as the primary use of the Salton Sea, formally recognizing the Salton Sea as a repository for agricultural drainage. As a result, during the late 1970s and the early 1980s, agricultural drainage in the Salton Sea increased and, between 1983 and 1988, discharge from the New and Alamo Rivers into the Sea nearly doubled. The combination of increases in total discharge into the Sea from agricultural uses and above average precipitation within the Salton Basin resulted in excessive water levels.

In 1972, the manageable part of the Refuge was a narrow corridor of land bordering the southern shoreline of the Sea where about 1,500 acres of farmed crops and marsh habitat were maintained to provide forage for wintering waterfowl. Ryegrass, barley, and milo were planted under a system of double cropping. Because of the limited area available to provide green browse, the Refuge was at the time also distributing harvested grain in the fields to supplement the available food for waterfowl in an effort to achieve the Refuge purpose of reducing depredation in adjacent private farm fields (USFWS 1972). The planting and maintenance of alkali bulrush in areas too saline to grow green forage, which was initiated in 1962, continued and was of adequate success that millet production in these areas was reduced.

In 1974, the Refuge partnered with IID to construct a seawall at Unit 2. Another wall was constructed in 1987 in Unit 1 with the Westmorland Duck Club to keep the expanding Salton Sea from flooding productive refuge habitats. Areas saved from flooding by the Salton Sea included impoundment areas and croplands in Unit 1 and the Refuge office facilities and surrounding cropland acreage at Unit 2. In 2004, it was estimated that the Refuge office would be inundated with two to three feet of water should the seawall fail.

In 1984, the water elevation was 226.0 feet below sea level, the highest elevation attained in the Sea since its formation in 1905. The results of this increase in elevation were inundation of existing private structures, loss of productive agricultural lands, impacts to recreational facilities, and a renewed call for water conservation to stabilize the water level within the Sea.

Throughout the 1960s and 1970s, the Service pursued a variety of options for purchasing lands suitable for farming, including various parcels owned by IID and all or a portion of the Salton Sea Test Base, which was declared surplus government property in 1962. For various reasons, these acquisition efforts either did not work out or were ultimately deemed inappropriate for Refuge use.

For the most part, the lands owned by the Federal government that have been set aside for management as part of the Sonny Bono Salton Sea NWR are located under the current Salton Sea. Despite a number of unsuccessful attempts to acquire additional farm land, a few parcels have been acquired to the south of the Salton Sea. These parcels were acquired in the 1970s and 1980s. Approximately 160 acres (referred to as the Union Tract), located in the southeast corner of Unit 2, were acquired in 1972. In 1973, 178 acres in the southeast corner of Unit 1 were acquired, while 160 acres were acquired in 1982 and 193 acres were acquired in 1985 at the southwestern corner of Unit 1. All of these acquisitions expanded the total acreage available to the Refuge for producing green forage for wintering geese and other waterfowl.

In 1988 Ducks Unlimited provided assistance to the Refuge to help restore wetland management capability at Unit 1 (Tracts 1A and 2B). These wetland units had been terraced by small levees and had been partially inundated by the Salton Sea. Land leveling and levee construction reduced the number of impoundments from about 19 in each tract to about four, greatly reducing the amount of salt cedar control needed on levees and expanding the pond sizes for improved waterfowl use. These tracts were renamed in the early 1990s to “A” ponds and “B” ponds. From 2006 through 2011, Ducks Unlimited also helped improve wetland management in the Hazard Tract by improving pond drainage and water delivery, constructing islands for waterfowl loafing, and adding a new pond at the north end of the tract.

Avian disease has been documented at the Salton Sea since 1917. As is the case in many other western wetland areas, avian botulism type C is the primary disease affecting birds at the Salton Sea. Avian mortality has fluctuated between decades from high to low with no apparent pattern.

However, in the 1990s the magnitude of bird losses exceeded all prior records, with the frequency of large scale and individual disease events and the variety of avian diseases greater than all other previous decades.

In 1989, salmonellosis was first diagnosed in the Salton Sea ecosystem. In 1992, an unknown disease killed approximately 155,000 eared grebes (*Podiceps nigricollis*) and 45,000 ruddy ducks (*Oxyura jamaicensis*). Again in 1994 approximately 20,000 grebes died of an unknown disease. In 1996, about 20,000 eared grebes died from avian botulism, along with over 8,500 American white pelicans and over 1,100 California brown pelicans (*Pelecanus occidentalis*). The first case of Newcastle Disease in the Salton Sea was documented in 1997, when approximately 2,500 double-crested cormorants died. Avian cholera killed approximately 8,000 birds in 1997.

The cause for this increased prevalence of avian disease at the Salton Sea has not been specifically determined, however, suspected stressors and contributors include the high use of this wetland by migratory birds (which helped to spread disease), degraded environmental quality of the Salton Sea (e.g., increased salinity, excessive nutrients) and harsh physical conditions (e.g. hot summer temperatures). In response to the increased incidence of avian disease at the Salton Sea, the Refuge established a Site Health and Safety Plan and defined Airboat Operating Procedures specific to avian disease monitoring; entered into a Memorandum of Understanding (MOU) with the Salton Sea Authority for sustained disease monitoring on the Salton Sea; and set up regular coordinated patrols with the CDFW Imperial Wildlife Area to search for sick and dead birds and remove them from the environment.

Water conservation practices around the Salton Sea began in the 1950s, but greatly expanded in the 1980s. In 1988, IID and the Metropolitan Water District of Los Angeles signed an agreement to transfer just over 100,000 acre-feet (one acre-foot is about 326,000 gallons) of Colorado River water annually from agricultural uses in the Imperial Valley to urban uses in southern California. Around that same general timeframe, Congress authorized the lining of portions of the All-American Canal, making an additional 100,000 acre-feet of water from the Colorado River available for use in southern California. As a result, in recent years, there has been a significant drop in the amount of drainage water flowing into the Salton Sea. Consequently, the water levels in the Sea are dropping. The Salton Sea's average elevation in 2000 was 227 feet below sea level; in 2011, the elevation had dropped by five feet to an elevation of -232 feet MSL. According to the Pacific Institute (2006), a five-foot drop in elevation at the Salton Sea “translates into the exposure of more than 26 square miles of land” previously submerged under the Salton Sea. Starting in 2018, the rate of water loss is predicted to increase significantly, as is described in Chapter 2 (Management Challenges).

The areas and acreages that have been managed to support wetlands or farmed to produce green forage have changed throughout the years due to various factors. Many changes were due to the recurring flooding and drying cycles of the Salton Sea and budgetary constraints. Refuge records indicate multiple instances of Refuge lands being flooded and crops lost, as well as detail efforts made by IID to remedy flooding. Previously farmed lands that were flooded by the rising Salton Sea and then left to dry when the Sea receded were often too salty for cultivation. To address this situation, Refuge staff would attempt to reclaim these lands by leaching salts from the soils with irrigation. Although for the most part, the Refuge has had sole responsibility for managing and cultivating winter foraging areas, the Refuge farming program has also gone through cycles of cooperative farming, whereby neighbors or other cooperators would farm Refuge lands under agreements that allowed some use of their crop for wildlife.

As of 2012, the Sonny Bono Salton Sea NWR included about 1,785 acres of manageable habitat; the remainder of the Refuge remains inundated by the waters of the Salton Sea. As the Sea continues to recede, additional areas of Refuge land may be exposed. Of the manageable habitat areas, approximately 904 acres are managed as wetlands to support resident and migratory birds, another 870 acres are farmed to provide forage for wintering geese and other migratory birds, and approximately 500 acres represent recently exposed playa proposed for restoration to shallow water habitat. The remaining areas of the Refuge located above the current level of the Salton Sea include dikes, roads, administrative facilities, shoreline, nesting islands, and salt flats.

With respect to public uses, when the Refuge was established in 1930, the intent was to set aside the original acreage as a reserve and breeding ground for birds and wild animals, with little if any public use. As this area became inundated and other lands were acquired through leases to meet Refuge purposes, the potential for providing opportunities for public use was greater. Duck and goose hunting has occurred on portions of the Refuge at various times over the years and is currently permitted on some portions of the Refuge today. In the 1960s, participation in wildlife observation, particularly birdwatching, began to expand. In the early 1970s, the need for an office and interpretive center, public parking area, and foot trails to specific observation areas was acknowledged. The 1972 Master Plan for the Salton Sea (USFWS 1972) included the following objective and rationale for the objective:

Provide opportunity for quality wildlife-oriented public enjoyment based on natural beauty, unique environment, and compatible wildlife management objectives.

Since the Refuge is located within a two hour drive of population centers of San Diego and Los Angeles, the public's demand for the wildlife-oriented activity could easily reach 50,000 to 100,000 visitors annually.

Today, the Refuge provides opportunities for hunting, fishing, wildlife observation, photography, environmental education, and interpretation.

1.5.6.2 Coachella Valley NWR

Events Leading Up to Refuge Establishment. Before the Coachella Valley was developed for urban uses, there was an estimated 200 square miles of loose, wind-blown sand that provided abundant habitat for species like the Coachella Valley fringe-toed lizard and Coachella Valley milk-vetch (England 1983). The source of this sand is the San Jacinto, San Bernardino, and Little San Bernardino Mountains, as well as the Indio Hills. During torrential rain events, the sandy soils present within these mountainous areas are carried in floodwaters down the Whitewater River and its tributaries to the San Gorgonio Pass, as well as through Thousand Palms Canyon in the Indio Hills to the base of the valley (England 1983). Once deposited, the sand is available to be carried further into the Coachella Valley by strong winds that blow in a southeasterly direction. As the winds dissipate, the sand is deposited within the valley, only to be moved again when winds from the west blow existing sand further to the southeast as new sand is moved into valley. These sand deposits support species endemic to this unique and ever-changing environment.

In the early 1900s, the valley had less than 1,000 permanent residents. With the availability of abundant groundwater, which was later supplemented by delivered Colorado River water, agriculture quickly became a dominant industry in the valley, spurring growth and community development. With mild winter temperatures and beautiful scenery, the area became a popular winter tourist spot, as well as a popular place to build winter homes. As a result, over the years community development and agricultural uses have replaced significant areas of the wind-blown sand habitat.

By 1979, approximately half of this habitat (100 square miles) had been converted to agriculture uses or community development (England 1983). In 2007, this area supported a population of over 418,000 (CVAG 2007b) with significant potential for additional growth.

Refuge Establishment. The loss of large areas of sand dunes and sand fields in the Coachella Valley changed the physical appearance of the landscape, but more significantly changes to the landscape were eliminating habitat essential to the survival of the area's endemic blowsand dependent species. As a result, one of these endemic species, the Coachella Valley fringe-toed lizard, was listed as endangered by the State of California in June 1980, and federally listed as a threatened species in September 1980. At the time of listing, the vast majority of the Coachella Valley was privately owned, making it difficult to protect and manage the blowsand habitat in which the lizard occurred, as well as the sand source areas needed to ensure the long-term persistence of blowsand habitat in the southeastern portion of the valley.

To prevent the extinction of the Coachella Valley fringe-toed lizard, several public agencies, nonprofit organizations, and groups of concerned citizens (e.g., CDFW, Coachella Valley Ecological Reserve Foundation, The Nature Conservancy), initiated efforts to acquire lands within the Coachella Valley that would protect habitat occupied by the fringe-toed lizard, as well as protect those lands on which the source of the sand for the downwind occupied sand dunes and sand fields were located. Protection focused on three areas including a portion of the Whitewater River floodplain, Edom Hill/Willow Hole (located at the western toe of the Indio Hills), and the Thousand Palms area of the Coachella Valley. By 1982, CDFW had acquired approximately 230 acres of Coachella Valley fringe-toed lizard habitat from willing sellers within the Thousand Palms area of the Coachella Valley and additional acquisitions were proposed for future years.

Efforts to protect sensitive blowsand habitat to support the Coachella Valley fringe-toed lizard continued and in 1985, the Coachella Valley Fringe-toed Lizard Habitat Conservation Plan was completed and subsequently approved by the Service in 1986 (BLM 1986). This was the first HCP developed under the authority of the 1982 amendment to the ESA.

Of the three areas proposed as preserves for the Coachella Valley fringe-toed lizard and its associated blowsand habitat, the Thousand Palms area of the Coachella Valley was the largest, most complicated to establish, and most critical to the continued survival of the lizard (USFWS 1986). As a result, efforts to protect the lizard and its blowsand habitat included appeals by concerned citizens and non-governmental organizations for the Service's involvement in the development of the Preserve. Through these efforts, an appropriation was provided to the Service in the FY 1985 budget to establish a Refuge within the Coachella Valley for the protection of the Coachella Valley fringe-toed lizard. The Service completed a Land Protection Plan (LPP) that addressed the establishment of the Coachella Valley NWR in 1986.

The LPP proposed to acquire approximately 2,000 acres of privately owned lands from willing sellers in the Coachella Valley. The lands to be acquired were to be located within designated Critical Habitat for the Coachella Valley fringe-toed lizard; consist of blowsand habitat known to support the lizard, as well as other plant and animal species characteristic of the Coachella Valley ecosystem; and located within and contribute toward the establishment of the Coachella Valley Preserve. In March 1986, the LPP was amended to permit the acquisition of an additional 1,000 acres of land from The Nature Conservancy for inclusion in the Refuge.

The Coachella Valley NWR was officially established under the authorities of the Endangered Species Act on August 28, 1985 when approximately 1,384 acres were acquired from The Nature Conservancy using Land and Water Conservation Funds. Additional acquisitions involving The Nature Conservancy, State of California, and several private willing sellers occurred between 1986 and 1997. As of September 2012, the total acreage of the Refuge was 3,577.61 acres.

Past Conservation Planning Actions. In 1986, the Service, U.S. Bureau of Land Management (BLM), CDFW, and The Nature Conservancy signed an Implementing Agreement (IA) for Management of the Coachella Valley Preserve. This IA defined the goals and responsibilities of the four principal landowners within the Coachella Valley Preserve, as well as two associated satellite preserves (Willow Hole/Edam Hill and Indian Avenue). The area covered by the IA was referred to as the Coachella Valley Preserve System. The overriding goal of the IA is to conserve the fringe-toed lizard and implement the HCP through maintenance of unimpeded sand sources, protection of all suitable fringe-toed lizard habitat, and rehabilitate of impacted fringe-toed lizard habitat. Other goals of the IA include promoting and approving research projects on the Preserve System; monitoring the fringe-toed lizard and other sensitive species populations; promoting public awareness of the resource values within the Preserve through on and off-site interpretation; enforcement of rules and regulations; and regulations of activities occurring within the Preserve System. As part of the provision of the IA, the Service agreed among other things to develop and coordinate research needs within the Preserve System, review and update the status of the fringe-toed lizard and research results annually, and provide increased patrols of the Refuge during high use periods. The IA was amended in January 1991 (now a Memorandum of Understanding) to include the California Department of Parks and Recreation as a major land owner.

The first management plan for the Preserve System was also prepared in 1986 by The Nature Conservancy. The goals of 1986 Coachella Valley Preserve Management Plan were consistent with the IA, addressing issues such as maintenance and enhancement of natural conditions, vehicle access restrictions; control of exotic plants and animals, restrictions on the use of firearms, establishment of a hiking and equestrian trail system, public outreach, monitoring listed and sensitive species, and encouraging research.

In 1989, the BLM prepared an EA to evaluate the potential effects of a system of public equestrian and hiking trails in the southern portion of the Coachella Valley Preserve that were proposed by the Ivey Ranch Equestrian Center and the Coachella Valley Association of Governments (CVAG) (BLM 1989). Several trail alternatives were evaluated that crossed lands included within the Coachella Valley NWR. In 1990, the Service issued a biological opinion indicating the implementation of BLM's preferred alternative was not likely to jeopardize the continued existence of the Coachella Valley fringe-toed lizard provided that the following reasonable and prudent measures were implemented: trail users limited their activities to the designated trail; no pets are permitted on the trails; and monitoring is implemented to identify potential adverse effects to the fringe-toed lizard or its habitat and to implement corrective measures, if required.

The Coachella Valley Preserve System Management Plan, prepared in 1986, was superseded in 1995 when the management plan was updated to address new issues related to recreation, trails, and the introduction of the desert pupfish on a portion of the Preserve Area located outside of the Refuge boundary. The overall goal for the Coachella Valley Preserve System remained essentially the same: maintain in perpetuity, a self-sustaining ecosystem, of which the Coachella Valley fringe-toed lizard is an integral part, through enhancement and maintenance of the lizard's habitat and protection of sand sources and sand transport corridors (BLM 1995).

While the 1995 Management Plan was being prepared, a scoping study was conducted by the Coachella Valley Mountains Conservancy for CVAG that recommended the preparation of a Multiple Species Habitat Conservation Plan for the entire Coachella Valley and surrounding mountains to address current and potential future state and federal Endangered Species Act issues. This recommendation ultimately resulted in the signing of a Memorandum of Understanding (“Planning Agreement”) in 1995 and 1996 by numerous Federal, State, and local agencies to govern the preparation of the MSHCP. The Planning Agreement was later amended to indicate that the MSHCP would meet the intent of the Natural Community Conservation Planning (NCCP) Act as well as the California Endangered Species Act (CESA) and the Federal ESA. The Coachella Valley MSHCP, completed in 2008, continues to provide a regional vision for balanced growth to meet the requirements of Federal and State endangered species laws, while promoting enhanced opportunities for recreation, tourism and job growth. The intent of the plan is to protect 27 plant and animal species. The Coachella Valley NWR is just one component of the much larger MSHCP conservation planning area.

When the Coachella Valley MSHCP was approved, the Coachella Valley Preserve System (Coachella Valley, Whitewater Floodplain, and Willow Hole/Edom Hill) were subsumed into the MSHCP Reserve System to be managed in accordance with the MSHCP. The Refuge, which was included within the Coachella Valley Preserve, became part of the Thousand Palms Conservation Area and management of the Refuge is intended to be consistent with the Conservation Goals and Conservation Objectives of the MSHCP.

The establishment of the MSHCP Reserve System combined with the MSHCP’s Monitoring and Management Programs are designed to achieve the following conservation goals:

- Represent native ecosystem types or natural communities across their natural range of variation in a system of conserved areas;
- Maintain or restore self-sustaining populations or metapopulations of the species included in the MSHCP to ensure permanent conservation;
- Sustain ecological and evolutionary processes necessary to maintain the functionality of the conserved natural communities and habitats for MSHCP-covered species;
- Maximize connectivity among populations and avoid habitat fragmentation within conservation areas to conserve biological diversity, ecological balance, and connected populations of covered species;
- Minimize adverse impacts from off-highway vehicle use, illegal dumping, edge effects, exotic species, and other disturbances per the Management and Monitoring Programs; and
- Manage the conservation areas adaptively to be responsive to short-term and long-term environmental change and new science (CVAG 2007a).

The Thousand Palms Conservation Area, which contains approximately 25,900 acres, constitutes the largest unfragmented habitat area on the Coachella Valley floor. For management purposes, it is part of the Valley Floor Reserve Management Unit. In accordance with the Coachella Valley MSHCP, Reserve Management Plans are to be prepared for each Reserve Management Unit and coordination of management within the Reserve Management Unit is the responsibility of the Reserve Management Unit Committee. The Reserve Management Unit Plan for the Valley Floor Reserve Management Unit was approved in 2012. This plan includes a variety of recommended management actions related to invasive species, hydrological processes, climate change, habitat fragmentation, fire management, off-highway vehicle trespass, and public use and access. The Refuge staff participated in the development of the MSHCP and continues to be an active participant in this larger planning effort.

Past and Present Management Actions. Since the Refuge was established, management has focused on habitat protection with minimal manipulation. Protection is achieved by preventing or discouraging vehicle travel on the Refuge through signage, public contact, and perimeter fencing. Partners in the protection of the public lands within the larger Thousand Palms Conservation Area include BLM and CDFW.

The monitoring of listed species on the Refuge has been conducted by the Carlsbad Fish and Wildlife Office and/or by contractors for the Coachella Valley Conservation Commission. In 2009 and 2010, the Coachella Valley Conservation Commission funded baseline surveys of plant and animal species including the flat-tailed horned lizard, Coachella Valley milk-vetch, and other species associated with the sand dune ecosystem.

Habitat manipulation within the fragile dune habitat has been limited to the occasional removal of invasive plants to maintain quality habitat for the fringe-toed lizard. Invasive plant control has involved hand pulling of invasive annual weeds and the mechanical and chemical control of salt cedar (*Tamarix* sp.) that has colonized portions of the sand dunes. This work typically occurs once a year for a period of about one week.

An important aspect of protecting the sensitive species on the Refuge is the protection and preservation of the “aeolian” (wind-blown) sand communities. At the landscape level, efforts are underway to preserve open space and sand sources upwind of the Refuge. At the Refuge level, managers are focused on maintaining the biological integrity provided by the aeolian communities.

Through 2012, the County of Riverside assisted in “recycling” sand that blew off the Refuge and onto adjacent roads by transporting the sand from the roadways back to the north end of the Refuge where it could become part of the sand source again. This action also benefited the County by providing a convenient disposal site for the sand. Unfortunately, at the writing of this document, the County was proposing to stop depositing the sand back onto the Refuge.

Most recently, Sahara mustard (*Brassica tournefortii*), a persistent invasive species, has blanketed the Refuge along with much of the low southwestern deserts. This plant has the potential to stabilize sand dunes, thereby reducing the shifting sand environment that the Coachella Valley fringe-toed lizard depends on. Furthermore, it may compete with endangered or threatened plants present on the Refuge. Sahara mustard also provides the fine fuels that may carry wildfire throughout an area where little fine fuels historically existed. Limited control of this species in the form of hand removal has been implemented in the past few years on the Refuge.