

6. Implementation

6.1 Introduction

This chapter presents the details of how the preferred alternative (Alternative D) for the San Diego NWR would be implemented if it were to be selected as the preferred management action in the Final CCP for the San Diego NWR. As noted previously, we will make our final determination as to which management alternative or combination of actions from the various management alternatives analyzed in this document will be implemented after we have considered the comments provided during the public comment period.

Alternative D acknowledges the need for conserving the existing intact ecological communities on the Refuge, most importantly protecting the Refuge's many imperiled species and habitats. Proposals include enhancement and restoration of those habitats that have been altered by human activity or wildland fire, as well as expansion of current monitoring efforts to detect changes in habitat quality, wildlife and plant populations, and population trends over time. In addition to habitat and wildlife protection, this alternative addresses the desire to instill a stewardship ethic among Refuge visitors for the habitats and species being conserved on the Refuge and elsewhere in the region. To accomplish this objective, various compatible public uses are proposed that will provide the public with opportunities to discover and enjoy the diversity of wildlife and plants on the Refuge.

Refuge goals and objectives, as well as the specific strategies (projects) for achieving the goals and objectives, are presented in this chapter. Although it is our intent to implement the proposed strategies by the dates presented in this chapter, the timing of implementation may vary depending upon a variety of factors, including funding, staffing, partnerships, compliance with Federal regulations, and information gained from the evaluation of monitoring results. Some strategies, such as those related to habitat restoration, hunting, and public trails, will require the preparation of step-down plans and compliance with NEPA and Section 7 of the ESA.

The CCP will serve as the primary reference document for all Refuge management actions, operations, and step-down planning. The strategies presented would be implemented with assistance from new and existing partners, including public agencies, tribes, non-governmental organizations, and the public. Consistent public outreach and continued coordination with Refuge constituents are essential components of this implementation process. Some of the partnership opportunities to be explored are described here, as are the step-down plans, monitoring responsibilities, and staffing and funding requirements needed to successfully implement the CCP.

CCPs are intended to evolve with each refuge, and the Improvement Act requires that these plans be formally reviewed and updated as necessary at least every 15 years. This review process will follow steps similar to those implemented for this initial CCP process and will encourage continued public involvement. Until a formal revision is initiated, the Service will periodically review and update the CCP (at least as often as every five years) to address needs identified as a result of monitoring or in response to adaptive management procedures. This CCP will also be informally reviewed by Refuge staff while preparing annual work plans and updating the Refuge databases. It may also be reviewed during routine inspections or programmatic evaluations. Results of any or all of these reviews may indicate a need to modify the plan. The goals described in this CCP will not change until they are reevaluated as part of a formal CCP revision process. Objectives and

strategies may, however, be revised to better address changing circumstances or to take advantage of increased knowledge of Refuge resources.

6.2 Refuge Goals, Objectives, and Strategies

The development of the Refuge vision and goals, which is defined in greater detail in Chapter 2, is one of the most important components of the CCP process. It is through this process that we establish the desired future conditions of the Refuge.

Our vision of the future conditions on the San Diego NWR is:

Large, connected, healthy stands of southern California coastal lowland and foothill habitats, including coastal sage scrub, maritime succulent scrub, native grassland, chaparral, riparian woodland, and vernal pools, are conserved through an ecosystem approach to management and monitoring that draws on the talents of Federal, State, and local agencies and other conservation partners to leverage and maximize funds and staffing. Listed and sensitive plant and animal species are protected, and species that historically occurred on Refuge lands are reestablished. One of the last expanses of open space in coastal southern California, with exceptional biological, social, historical, and economic values, is protected as a sanctuary not just for plants and animals but also for people.

Goals and objectives are the unifying element of Refuge management, intended to identify and focus management priorities and provide a link between management actions, Refuge purposes, and NWRS mission and goals. The objectives, which are concise statements of what will be achieved to meet a particular goal, are derived from the goals and provide the basis for determining strategies and monitoring Refuge accomplishments. Refuge strategies describe specific actions, tools, and techniques that can be used to meet Refuge objectives. In some cases, strategies describe specific projects in enough detail to assess funding and staffing needs. In other cases, further site-specific detail is required to implement a strategy. This additional detail takes the form of a step-down management plan, restoration plan, or site plan.

Although the goals are the same for each of the four alternatives described for the San Diego NWR, there is a variety of ways in which to achieve these goals. Therefore, the objectives and strategies for each goal vary among alternatives. The following discussion presents objective statements and associated strategies for each Refuge goal. The objectives have been written to address the preferred alternative (Alternative D). In addition, the various strategies that would implement the objective in whole or in part are provided in a table format that allows the reader to determine which strategies would be implemented under each alternative. Specific acreage figures, time frames, and other measurable elements presented in the objectives may change depending upon which alternative is ultimately selected for implementation.

The Refuge goals, objectives, and strategies are presented here.

Goal 1: Protect, manage, and, where appropriate, enhance or restore habitat to support the recovery of the federally and State listed endangered and threatened species and other species of concern currently or historically present on the Refuge.

Objective 1.1: Coastal California Gnatcatcher

By 2028, provide 3,500 acres of very high-quality gnatcatcher habitat consisting of gentle slopes (less than or equal to 40 percent) dominated by coastal sage scrub or coastal sage scrub/needlegrass grassland ecotone vegetation to support coastal California gnatcatchers at an occupancy rate of 0.48.

Rationale: The MSCP (City of San Diego 1998a) identifies the need to maintain ecosystem functions and extant populations of covered species, including the federally listed threatened coastal California gnatcatcher, as an essential goal of the program. The San Diego NWR was established in part to support the goals of the MSCP and the recovery of the gnatcatcher by conserving large blocks of occupied gnatcatcher habitat (USFWS 1995a). The acquisitions of very high-quality gnatcatcher habitat that have been completed to date for the San Diego NWR represent contributions by the Service towards the implementation of the MSCP (USFWS 1997a) and support the objective for the western San Diego County region of conserving approximately 30,000 acres of very high value gnatcatcher habitat (City of San Diego 1998a).

For the purpose of designing a reserve network in San Diego County, a habitat model (Technology Associates International Corporation [TAIC] 2002) was developed to qualify areas as low, medium, high, and very high-quality habitat for California gnatcatchers. The model, which used presence only data, weighed several variables, including vegetation type (i.e., California sagebrush presence or absence), patch size, slope, and climate (i.e., temperature, precipitation) as an accumulation of scores, with higher values indicating gnatcatcher preference (Winchell and Doherty 2008). Based on results from a large-scale survey effort for gnatcatchers in 2002, Winchell and Doherty (2008, 2010) found that their occupancy modeling supported the habitat categories in the reserve design model initially developed by TAIC. However, their study results suggested the variables associated with slope and climate are stronger influences on occupancy than patch size. The 2002 study also provided data used to develop quantitative estimates of occupancy for each habitat quality category, including an estimate of 48 percent area occupied for very high-quality habitat; 28 percent for high-quality habitat; 8 percent for medium-quality habitat; and essentially no probability of occupancy in low-quality habitat (Winchell and Doherty 2008).

Objective 1.1 – Coastal California Gnatcatcher Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓				Continue current fire management practices that support full fire suppression.
	✓	✓	✓	Explore the potential for incorporating into the Fire Management Plan the limited use of controlled burns on the Refuge where necessary to enhance habitat for gnatcatchers or to modify fuels to protect existing habitat.
✓	✓	✓	✓	Continue to participate in MSCP-wide monitoring of gnatcatcher populations and trends consistent with accepted monitoring protocols.
	✓	✓	✓	Restore coastal sage scrub habitat on sites where conditions indicate this habitat type occurred in the past.
	✓	✓	✓	Expand current invasive non-native plant control to include unburned areas along habitat edges, trails, and roads.
	✓	✓	✓	When developing a designated trail plan for the Otay-Sweetwater Unit, ensure the retention of large blocks of coastal sage scrub vegetation undissected by trails, to support gnatcatchers and other species.

Objective 1.1 – Coastal California Gnatcatcher Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
	✓			To minimize disturbance to gnatcatchers, prohibit dogs on the Refuge.
		✓		To minimize disturbance to gnatcatchers from dogs, prohibit off-leash dog activity, except hunting dogs accompanying hunters with a current reservation.
			✓	To minimize disturbance to gnatcatchers from dogs, prohibit off-leash dog activity, except hunting dogs accompanying hunters in the Otay Mesa and Lakes area, and limit leashed dog activity to designated multiple use trails.

Objective 1.2: Least Bell’s Vireo and Southwestern Willow Flycatcher

Over the next 15 years, actively manage the riparian vegetation along approximately four linear miles of the Sweetwater River to provide suitable breeding habitat for the least Bell’s vireo and southwestern willow flycatcher that consists of structurally diverse areas of native shrub and tree cover along the watercourse, including patches of dense shrubs (e.g., mulefat, sandbar willow) within three to six feet (0.9 to 1.8 meters) of the ground (Goldwasser 1981, Salata 1983a, USFWS 1998b), some at least 10 feet (3.0 meters) tall (Sogge et al. 2010), and a dense, stratified canopy of mature native trees (e.g., arroyo and Goodding’s willow, cottonwoods, western sycamore, coast live oak) all interspersed with small openings and shorter, sparser native vegetation.

Rationale: The portion of the Sweetwater River that extends through the Otay-Sweetwater Unit is designated by the Service as critical habitat for the least Bell’s vireo (59 FR 4845) and southwestern willow flycatcher (78 FR 344). The target habitat to support these species, particularly the vireo, is early to mid-successional dense riparian vegetation. Prior to human modification of rivers and streams, the streambed-scouring effects of episodic flood events within riparian habitats resulted in the availability of a range of successional vegetation phases. Today, water flow within the section of the Sweetwater River that extends through the Refuge is influenced by the activities of the Sweetwater Authority. The potential for significant flood events through this portion of the Sweetwater River are greatly reduced due to the presence of the Loveland Reservoir upstream of the Refuge. As a result, the vegetation community has continued to mature, perhaps reducing habitat quality for nesting vireos and willow flycatchers. In the future, active management of this riparian vegetation to mimic natural succession after flood disturbance may be conducted to improve nesting conditions for these species, which will in turn support their recovery. Potential benefits of management to mimic natural disturbance to benefit the vireo will be weighed against the potential impacts to other wildlife and habitat resources on the Refuge.

Objective 1.2 – Least Bell’s Vireo and Southwestern Willow Flycatcher Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to control invasive exotic vegetation within the Sweetwater River corridor.
✓	✓	✓	✓	Continue monitoring least Bell’s vireo populations along the Sweetwater River, while also conducting incidental surveys for southwestern willow flycatcher.

Objective 1.2 – Least Bell’s Vireo and Southwestern Willow Flycatcher				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
	✓	✓	✓	Develop and implement a riparian habitat management plan for the Refuge that includes management, restoration, and enhancement actions necessary to support the listed and sensitive species currently or historically supported on the Refuge, including actions that will result in the availability of areas of early to mid-successional riparian vegetation to support vireos and flycatchers.
	✓	✓	✓	Manage some portions of the riparian habitat within the McGinty Mountain and/or Sweetwater River management areas to mimic the natural disturbance regime to optimize habitat value for least Bell’s vireo.
	✓	✓	✓	If local monitoring indicates that cowbird numbers or parasitism levels on least Bell’s vireos exceed 20 percent (Kus and Whitfield 2005), support additional cowbird trapping operations in partnership with others where it is likely to reduce nest parasitism.
	✓	✓	✓	If monitoring results warrant, support investigations of the frequency of West Nile virus disease in least Bell’s vireo.
	✓	✓	✓	Incorporate adequate buffers between future refuge public use facilities and riparian areas to minimize disturbance to listed and sensitive nesting birds.

Objective 1.3: Quino Checkerspot Butterfly

Over the next 15 years, protect and maintain 30 Quino checkerspot focal habitat patches, consisting of hilltop or ridge top areas supporting at least 200 square meters of contiguous, high-quality open-canopy coastal sage scrub or chamise chaparral habitat that include primary and secondary larval host plants, multiple species of annual nectar plants for adult feeding, and bare soil overlain with cryptobiotic crust.

Rationale: One of the recovery criteria for Quino checkerspot butterfly involves the permanent protection of suitable habitat within occurrence complexes (estimated occupied areas based on habitat within 0.6 mile [1 kilometer] of recent butterfly occurrences) in a configuration designed to support resilient populations (USFWS 2003b). The San Diego NWR includes areas known to support and/or are capable of supporting Quino checkerspot butterfly. These areas, described here as focal habitat patches, include the basic habitat requirements of the subspecies during its four distinct life stages: egg, larva (caterpillar), pupa (chrysalis), and adult. Each of these life stages has fairly specific habitat requirements: open areas with high solar exposure for basking, specific host plants for larval feeding (e.g., erect plantain, owl’s clover, thread-leaved birds’ beak), and flowering plants appropriate for feeding by butterflies (i.e., low-growing plants with short corollas). Protection of these areas from disturbance and management to control invasive plants are consistent with proposed recovery actions for this species.

Objective 1.3 – Quino Checkerspot Butterfly				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓				Continue targeted surveys for Quino checkerspot butterfly in areas of known historical occurrences and other sites with appropriate habitat.

Objective 1.3 – Quino Checkerspot Butterfly				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
	✓	✓	✓	Expand Quino checkerspot butterfly monitoring to include all habitat with the potential to support this butterfly in an effort to increase our understanding of its status and distribution within the Refuge.
	✓	✓	✓	Seek funding to implement Quino checkerspot butterfly habitat restoration and/or enhancement projects that will result in improved connectivity within and between known species occurrences.
	✓	✓	✓	Develop and implement a program to control non-native invasive weeds in focal Quino checkerspot butterfly habitat patches.
	✓	✓	✓	Identify potential threats to focal habitat patches from public use activities and take appropriate actions to alleviate these threats (e.g., trail closure/realignment, fencing, posting area closed signs, enforcement).
	✓	✓	✓	Assess the susceptibility of focal habitat patches to wildfire and, if warranted, implement measures (e.g., creation of firebreaks, mechanical thinning of shrubs, chemical control of weeds) to reduce the likelihood for and/or intensity of wildfire in habitat patches.
	✓	✓	✓	As part of the annual monitoring efforts for this species, identify and assess potential sites for population augmentation using captive-bred Quino checkerspot butterflies.
	✓	✓	✓	Support research related to this species and its habitat that would assist the Refuge in the management and recovery of the species.

Objective 1.4: Vernal Pools on the Otay-Sweetwater Unit

Protect, maintain, and, as necessary, enhance the integrity of at least 60 hydrologically functional vernal pools on 30 acres within the Otay-Sweetwater Unit by controlling invasive plants, minimizing soil disturbance through access control (e.g., fencing, signage), addressing issues associated with past disturbance (e.g., altered topography and associated changes in drainage patterns, loss of species previously known to be present in the pools) to increase resilience to environmental stochasticity, maintain genetic diversity, and ensure persistence of a range of site-appropriate vernal pool species, including San Diego fairy shrimp, Otay mesa mint, spreading navarretia, San Diego button-celery, and California Orcutt grass over the long term (>100 years) in ecologically sustainable vernal pool habitat.

Rationale: The recovery goal for listed vernal pool species, as presented in the Vernal Pools of Southern California Recovery Plan (USFWS 1998a), is to conserve and enhance southern California vernal pool ecosystems, with specific emphasis on stabilizing and protecting existing populations of the listed species supported in these ecosystems (i.e., San Diego button-celery, California Orcutt grass, San Diego mesa mint, Otay mesa mint, spreading navarretia, Riverside fairy shrimp, San Diego fairy shrimp). Conserving the vernal pools located within the Shinohara parcel on the Otay-Sweetwater Unit will assist in achieving this goal. Proposals to secure and protect existing vernal pools and their associated watersheds, reestablish vernal pool habitat to its historical structure, and manage and monitor habitat and listed species are all identified as recovery actions in the vernal pools recovery plan (USFW 1998a). Monitoring of habitat quality and species populations within the pools will inform Refuge staff of potential threats that require action. Such threats include unauthorized off-trail activity (e.g., hikers, equestrians, mountain

bikers) and illegal access by OHVs, all of which can result in habitat trampling, direct loss of vernal pool plants and animals, alteration of drainage patterns, and the introduction of invasive plants (USFWS 2010g). Additional threats that could require future research and/or changes in current management approaches include the movement of nonnative plants from adjacent areas into the site, the limited population size of some of the species present in the pools, loss of pollinators, and changes in climatic conditions (e.g., drought).

Objective 1.4 – Vernal Pools on the Otay-Sweetwater Unit				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
	✓	✓	✓	Control weeds in and around the pools through an integrated approach to pest management (e.g., mechanical, chemical, cultural).
	✓	✓	✓	Distribute seed or otherwise inoculate unoccupied vernal pools with appropriate listed vernal pool species.
✓	✓			Prohibit access into the Shinohara vernal pool restoration site to avoid trampling and other disturbance to sensitive species.
		✓	✓	Develop an interpretive boardwalk trail within the Shinohara vernal pool restoration site to accommodate guided interpretive and environmental education programs to increase the public's understanding of this rare habitat and the sensitive species it supports, while avoiding impacts related to trampling.
✓	✓	✓	✓	Encourage research that will assist the Refuge in optimizing habitat values, controlling threats (e.g., invasive plants), and ensuring genetic variability.

Objective 1.5: Vernal Pools on the Del Mar Mesa Vernal Pool Unit

Over the next 15 years, partner with the other landowners at the Del Mar Mesa Preserve to cooperatively conserve approximately 12.5 acres of vernal pool habitat, including the vernal pool habitat located within the Del Mar Mesa Vernal Pool Unit to support a range of site-appropriate vernal pool species, including San Diego Mesa mint, San Diego button-celery, and San Diego fairy shrimp.

Rationale: Protecting and enhancing (e.g., controlling invasive plants, correcting past impacts to the microtopography and drainage patterns) the existing vernal pools and associated watersheds on Del Mar Mesa is consistent with the recovery actions in the Recovery Plan for the Vernal Pools of Southern California (USFWS 1998a). These recovery actions involve securing existing vernal pools and their associated watersheds and reestablishing vernal pool habitat, where necessary, to its historical structure. Many vernal pool creation and enhancement projects on other portions of the Refuge and elsewhere in San Diego County have proved successful in establishing or restoring the function and characteristics of natural undisturbed pools and supporting some of the listed vernal pool species populations historically present in the project areas (Black and Zedler 1996, AECOM 2010). Conserving listed species within these vernal pools will also assist in achieving the Recovery Plan objective of conserving and enhancing southern California vernal pool ecosystems, with specific emphasis on stabilizing and protecting existing populations of San Diego button-celery, San Diego Mesa mint, and San Diego fairy shrimp.

Objective 1.5 – Vernal Pools on the Del Mar Mesa Vernal Pool Unit				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	In cooperation with other partners at the Del Mar Mesa Preserve, control access (including motor vehicle, bicycle, equestrian, and pedestrian), trash dumping, and general habitat disturbance within vernal pool habitat.
✓	✓	✓	✓	Support rare plant monitoring on the Refuge and throughout the MSCP Preserve using the City of San Diego's revised rare plant monitoring protocols.
	✓	✓	✓	In cooperation with other partners at the Del Mar Mesa Preserve, reduce edge effects along trails and roads through fencing and/or signage or realign trails or roads to avoid impacts; monitor the effectiveness of these measures and implement additional measures (e.g., enforcement when necessary) to protect sensitive species and habitat.
	✓	✓	✓	Implement non-native plant removal strategies that are site-specific and prioritize habitat patches that support sensitive species.
	✓	✓	✓	Restore and/or enhance vernal pool habitat (e.g., restore natural hydrology, reintroduce species) per available funding.
	✓	✓	✓	Conduct a baseline vegetation survey of Refuge lands.

Objective 1.6: Conserve Other Federally Listed Plant Species

Over the 15 year life of the CCP, protect and manage existing occurrences of Otay tarplant, San Diego thornmint, San Diego ambrosia, Mexican flannelbush, and Del Mar manzanita on the Refuge and, where appropriate, reintroduce, translocate, or otherwise enhance populations of these species to lower the probability for extinction.

Rationale: National wildlife refuges have been established, in part, to conserve America's fish, wildlife, and plants. The establishment of many refuges, including the San Diego NWR, takes this a step further by focusing conservation efforts on listed species, while also managing for the range of native plants and wildlife supported on the Refuge. As described in the preamble of the Endangered Species Act of 1973, as amended, endangered and threatened species of wildlife and plants “are of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people.” Therefore, efforts are proposed on the San Diego NWR to protect and aid in the recovery of those listed species plant species that are known to occur on the Refuge or have historically occurred in and around the Refuge. Conservation will be implemented in accordance with the management recommendations and recovery actions outlined in specific species recovery plans and the San Diego MSCP Plan.

Objective 1.6 – Conservation of Federally Listed Plant Species				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue management of Otay tarplant on the Otay Tarplant Preserve portion of the Refuge to ensure the long-term protection of this population.

Objective 1.6 – Conservation of Federally Listed Plant Species				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to monitor known occurrences of listed plant species on the Refuge, as well as conduct opportunistic inspections of areas with the potential to support the Refuge’s listed plant species to determine species presence or absence.
	✓	✓	✓	Establish populations of Mexican flannelbush on alluvial benches of low-gradient canyons within the McGinty Mountain and San Miguel Mountain management areas.
	✓	✓	✓	Where listed plant species occur in proximity to public use areas, implement actions (e.g., fencing, trail closure/realignment, signage, enforcement) to minimize the potential for trampling and other disturbance.
	✓	✓	✓	Monitor exotic plant invasion in areas supporting listed plant species, and, when necessary, implement weed control measures (e.g., hand weeding or herbicide application) within or surrounding these areas.
	✓	✓	✓	Work with biologists at the Carlsbad Fish and Wildlife Office and other species experts to determine whether reintroduction, translocation, or other propagation of listed plant species currently or historically present on the Refuge should be implemented to assist in the recovery of the species.
	✓	✓	✓	Assess the occurrence of native pollinators on the Refuge, and, where appropriate, implement actions to ensure presence and/or persistence of these pollinators to support listed and sensitive plant species.

Goal 2: Protect, manage, and restore the Refuge’s native habitats, MSCP-covered species, and other species of concern for their inherent value and to contribute to the regional effort of conserving the biological diversity of southwestern San Diego County.

Objective 2.1: Coastal Sage Scrub

For the life of the CCP, protect and manage 3,500 acres of coastal sage scrub dominated by low, soft-woody subshrubs (i.e., California sagebrush, California buckwheat, black sage, white sage, bush monkey flower, and sawtooth goldenbush along with laurel sumac and lemonade berry) with less than 30 percent coverage of non-native herbs.

Rationale: As stated in the Coastal Scrub and Chaparral Bird Conservation Plan (CalPIF 2004), the protection of large blocks of high-quality coastal sage scrub habitat is essential to the conservation of a diverse assemblage of native California plants and animals, including such focal species as the California gnatcatcher, coastal cactus wren, and orange-throated whiptail. In fact, coastal sage scrub habitat supports more than 100 species of plants and animals that are considered endangered, threatened, rare, or sensitive by the Service or CDFG (Atwood 1993, McCaull 1994). Many of these plant and wildlife species, including 19 species (refer to Table 3-7) covered by the San Diego MSCP, occur within coastal sage scrub habitat on San Diego NWR.

Human activity has resulted in substantial losses of coastal sage scrub vegetation throughout southern California. O’Leary (1995) estimated that urban and agricultural development accounted for 66 to 90 percent of this loss. The State of California recognized the potential biological effects of these losses in the Southern California Coastal Sage Scrub NCCP Process Guidelines, prepared

in 1993, which stated that coastal sage scrub habitat has been reduced “to the point where conservation action is crucial to prevent endangerment of many species.” The Service, in approving the San Diego MSCP, also recognized that adequate areas of connected coastal sage scrub habitat had to be preserved to ensure the long-term conservation of a number of MSCP-covered species. Many of the parcels acquired for inclusion in the San Diego NWR, which was established in part as the Federal government’s contribution to the MSCP, were targeted for acquisition because they supported high-quality coastal sage scrub habitat. Managing the Refuge in a manner that protects the quality of the coastal sage scrub habitat present on the Refuge is essential to achieving the purpose and goals of the Refuge, as well as the conservation goals of the MSCP.

Objective 2.1 – Coastal Sage Scrub Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Periodically monitor areas of coastal sage scrub habitat to identify potential threats (e.g., signs of unauthorized activity, presence of invasive species, edge effects from activities on adjacent parcels) to habitat quality and implement actions as necessary to address these threats.
	✓	✓	✓	When developing a designated trail plan for the Otay-Sweetwater Unit, ensure the retention of several large blocks (e.g., greater than 300 acres) of coastal sage scrub vegetation undissected by trails.
	✓	✓	✓	Review the current Fire Management Plan to ensure that it includes adequate measures to protect areas of high-quality coastal sage scrub habitat on the Refuge.
	✓	✓	✓	Expand current invasive non-native plant control to include areas along coastal sage scrub habitat edges, trails, and roads to prevent their spread into larger habitat areas.
	✓	✓	✓	Restore disturbed areas on the Refuge to coastal sage scrub habitat where conditions (e.g., soil type, slope aspect, percent slope) indicate that it likely occurred there in the past.
	✓	✓	✓	Support the continued MSCP-wide monitoring of coastal sage scrub habitat quality.
	✓	✓	✓	Support the development and implementation of methods to reduce cover of exotic invasive species in coastal sage scrub on the Refuge.

Objective 2.2: Chaparral

For the 15-year life of the CCP, protect and manage approximately 2,100 acres of chaparral vegetation to preserve the characteristic species composition, structure, and distribution of the four associations of chaparral present on the Refuge including southern maritime chaparral (open, low growing, coastal vegetation dominated by Del Mar manzanita, wart-stemmed ceanothus, and summer-holly), southern mixed chaparral (dominated by broad-leaved sclerophyllous [i.e., hard-leaved] shrubs or small trees, including chamise, mission manzanita, Ramona lilac, and laurel sumac, that occupy protected north-facing slopes and canyon slopes or ravines), chamise chaparral (nearly monotypic stands of chamise occupying areas of shallow, dry soils on xeric slopes and ridges), and scrub oak chaparral (a tall, dense, evergreen chaparral association, dominated by scrub oak, occupying more mesic sites than other chaparral associations and often found at slightly higher elevations).

Rationale: Chaparral, which is the most widespread shrub vegetation community in California (CalPIF 2004), is considered an integral part of California’s historical natural landscape. It is drought tolerant, has evolved with fire, and where present is an important component of a healthy watershed. Although its density, uniform cover, and general lack of herbaceous understory limit the overall wildlife diversity of this habitat, chaparral vegetation is important to several shrubland birds including wren-tit, western scrub-jay, California towhee, spotted towhee, and California thrasher, all of which occur on the Refuge. The Refuge’s chaparral habitat also supports a number of reptiles, including San Diego horned lizard and orange-throated whiptail, both of which are identified as California Special Status Species. In all, 17 species of plants and wildlife covered by the San Diego MSCP (refer to Table 3-7) are found on the Refuge in one or more of the Refuge’s four chaparral associations.

Conservation recommendations for this habitat in the Coastal Scrub and Chaparral Bird Conservation Plan (CalPIF 2004) include: 1) preservation or protection of large blocks of coastal scrub and chaparral habitats to maximize the long-term viability of many shrubland bird species in California; and 2) management of fire to promote habitat conditions favorable to native species, which in most cases means extending the interval between fires to promote development of late seral stage habitat. The San Diego MSCP (City of San Diego 1995) also addresses the need to protect chaparral habitat.

Objective 2.2 – Chaparral Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Support ongoing MSCP preserve-wide monitoring of chaparral habitat quality.
	✓	✓	✓	Monitor chaparral habitat to identify potential threats (e.g., signs of unauthorized activity, presence of invasive species, edge effects from adjacent trail activity) to habitat quality; implement actions to address these threats.
	✓	✓	✓	When developing a designated trail plan for the Otay-Sweetwater Unit, ensure the retention of large blocks (e.g., greater than 200 acres) of chaparral undissected by trails.
	✓	✓	✓	Control invasive species as necessary to protect habitat quality.
	✓	✓	✓	Restore disturbed areas on the Refuge to chaparral habitat where conditions (e.g., soil type, slope aspect, percent slope, surrounding vegetation) indicate that it likely occurred there in the past.
	✓	✓	✓	Expand current invasive non-native plant mapping and control to include areas along chaparral habitat edges, trails, and roads to prevent their spread into larger habitat areas.
	✓	✓	✓	Review the current Fire Management Plan to ensure that it includes adequate measures to protect areas of high-quality chaparral habitat on the Refuge.

Objective 2.3: Riparian and Other Wetland Plant Communities

Within five years of CCP approval, complete and begin to implement a step-down habitat management plan that addresses specific management actions for the riparian and other wetland habitats present in the Otay-Sweetwater Unit to support the suite of listed and sensitive plant and animal species that occur or historically occurred along approximately five linear miles of the Sweetwater River and Steele Canyon Creek, as well as within the wetland habitat present around the Refuge's man-made ponds.

Rationale: Riparian and other wetland plant communities provide habitat for a diversity of resident and migratory terrestrial and aquatic wildlife, including endangered, threatened, and sensitive species. In terms of bird diversity and abundance, mature cottonwood-willow riparian forests of the Southwest are among the richest habitats in North America (Carothers et al. 1974, Anderson and Ohmart 1977). On the Refuge, this habitat supports nesting endangered least Bell's vireo and historically supported the endangered arroyo toad, California red-legged frog, and southwestern willow flycatcher, as well as the southwestern pond turtle and yellow-billed cuckoo.

The Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004), Riparian Bird Conservation Plan (Riparian Habitats Joint Venture 2004), and the Sonoran Joint Venture Bird Conservation Plan (Sonoran Joint Venture Technical Committee 2006) identify habitat conservation and restoration needs throughout the region. Refuge management strategies for protecting, restoring, and enhancing riparian and other wetland habitats will support these objectives. This objective is also consistent with the management goals established for the San Diego MSCP (City of San Diego 1995) and Statewide Conservation Action G in the California Wildlife Action Plan (CDFG 2005).

Objective 2.3 – Riparian and other Wetland Plant Communities				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to control invasive plants within riparian areas, as well as around man-made ponds.
✓	✓	✓	✓	Continue to monitor riparian and other wetland areas to identify potential threats (e.g., signs of unauthorized activity, presence of invasive species, edge effects from activities on adjacent parcels) to habitat quality and implement actions necessary to address these threats.
✓	✓	✓	✓	Prohibit fishing to avoid disturbance in sensitive wetland habitats.
	✓	✓	✓	Prepare a step-down habitat management plan to address the habitat protection, management, restoration, and enhancement needs of the Otay-Sweetwater Unit, including actions to support listed and sensitive riparian-dependent species that are currently present (e.g., least Bell's vireo), could recolonize (i.e., arroyo toad, southwestern willow flycatcher, yellow-billed cuckoo, Harbison's dun skipper, southwestern pond turtle), or could be reintroduced (i.e., California red-legged frog) in the future.
	✓	✓	✓	Manage portions of the riparian habitat within the McGinty Mountain and/or Sweetwater River management areas to mimic the natural disturbance regime.
	✓	✓	✓	Provide adequate buffers to protect sensitive wetland areas when developing a designated trail plan for the Otay-Sweetwater Unit and determining locations for other public use amenities.

Objective 2.4: Oak Woodland

For the life of the CCP, protect 90 acres in the Otay-Sweetwater Unit that support oak woodland (dominated by coast live oak with Engelmann oak and/or scrub oak also present in some areas), including all seral stages and dominated by mature oaks and an established understory of appropriate native herbaceous, vining, and shrubby vegetation.

Rationale: Mature oaks provide thermal cover and an abundance of acorns, nest sites, and trunk hollows that shelter wildlife. This habitat type, although widespread throughout California and in other western states, is relatively rare in southwestern San Diego County, when compared to the acreages of other native habitat types in the region (City of San Diego 1995). Oak woodlands currently account for less than one percent (approximately 114 acres) of the overall vegetation in the Otay-Sweetwater Unit (although historically the Unit likely supported larger areas of oak woodlands). This habitat supports species (e.g., oak titmouse [*Baeolophus inornatus*], Hutton's vireo [*Vireo huttoni*], acorn woodpecker [*Melanerpes formicivorus*]) not found in other vegetation types on the Refuge. The Oak Woodland Bird Conservation Plan (CalPIF 2002) includes a series of conservation recommendations for oak woodlands that focus on protection, restoration, and management of this habitat to preserve existing mature stands of oak woodland, as well as facilitate and promote natural recruitment of oaks and oak woodland-obligate species within existing and restored oak woodland. On the Refuge, this habitat supports three MSCP-covered species (i.e., western bluebird, mountain lion, southern mule deer).

Objective 2.4 – Oak Woodland Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Monitor oak woodland areas to identify potential threats (e.g., signs of unauthorized activity, presence of invasive species, edge effects from activities on adjacent parcels) to habitat quality and implement actions as necessary to address these threats.
	✓	✓	✓	In appropriate locations, plant acorns within the Otay-Sweetwater Unit, watering them and controlling weeds as necessary.
	✓	✓	✓	Monitor oaks for evidence of infestation by goldspotted oak borer and take any appropriate action if identified.
	✓	✓	✓	Ensure that short and long-term impacts to oak woodlands will be minimized through sensitive trail planning, the implementation of sustainable trail construction techniques, and avoidance of this habitat type when siting other public use amenities (e.g., parking areas, visitor contact station).

Objective 2.5: Hermes Copper Butterfly

Over the 15 year life of the CCP, maintain existing large expanses (i.e., around McGinty Mountain) of high-quality late-successional coastal sage scrub, coastal sage scrub/chaparral ecotone, and/or southern mixed chaparral that include abundant spiny redberry and California buckwheat as potential habitat for Hermes copper butterfly. Continue to work with other San Diego conservation biologists to learn more about the species' habitat requirements, life history, and measures to conserve and protect Hermes copper and its habitat.

Rationale: In April 2011, the Service determined that the current status of Hermes copper butterfly warranted its listing as endangered or threatened (76 FR 20918). This butterfly is endemic to the coastal foothills of San Diego County and northern Baja California, Mexico. It is dependent on spiny redberry as its larval host and for completion of its lifecycle; however, this butterfly only occurs within a small portion of the range of spiny redberry for reasons which have not yet been determined. Hermes copper takes nectar almost exclusively from California buckwheat. The species' abundance, distribution, life history, habitat requirements, population genetic structure, and threats (other than wildfire) are not well understood. Wildfire, at least temporarily, eliminates the butterfly and its habitat, and the species is slow to recolonize burned areas, even after habitat has apparently regrown. The extensive wildfires in coastal San Diego County in the last decade, in conjunction with extensive development within the species' range, have greatly reduced its abundance and distribution, and the fires may have impaired dispersal behavior necessary to recolonize formerly occupied but recently burned habitat.

Objective 2.5 – Hermes Copper Butterfly				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Include spiny redberry and California buckwheat in post-fire emergency stabilization and rehabilitation measures.
	✓	✓	✓	Identify focal habitat patches of occupied Hermes copper habitat that may be more easily protected from wildfire due to low fuel load, topography, or natural barriers, and, if necessary, implement measures (e.g., creation of firebreaks, mechanical thinning of shrubs, chemical control of annual weeds) to reduce the likelihood for and/or intensity of wildfire in these areas.
	✓	✓	✓	Ensure adequate protection of occupied Hermes copper habitat when developing a designated trail plan for the Otay-Sweetwater Unit.
	✓	✓	✓	Continue to work with other San Diego conservation biologists to learn more about the species' habitat requirements, life history, and measures to conserve and protect Hermes copper and its habitat.

Objective 2.6: MSCP-Covered Bird Species

Throughout the life of the CCP, implement management actions including providing adequate buffers between sensitive habitat and areas of public use, managing vegetation where necessary to reduce the adverse effects of wildfire on highly susceptible habitat features, and coordinating with utility companies to minimize threats to raptors from utility lines present on the Refuge, and, as needed, restore or enhance native habitat to support healthy populations of the 11 San Diego MSCP-covered bird species supported on the Refuge.

Rationale: The San Diego NWR was established for a variety of purposes, including participating in the implementation of the San Diego MSCP, a comprehensive habitat conservation planning program for southwestern San Diego County (City of San Diego 1995). The Refuge's participation in the MSCP includes acquisition of lands supporting biologically important habitats that are needed to ensure that the preserve will adequately protect the species it was intended to cover. In addition, this participation includes commitments to provide for the long-term management and monitoring of acquired lands to protect biodiversity and ensure that the MSCP-covered species are, in fact, being conserved. The lands acquired for inclusion in the Refuge to date include habitat to support 11 MSCP-covered bird species.

Objective 2.6 - MSCP-Covered Bird Species Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to acquire lands within the Refuge acquisition boundary from willing sellers to conserve large blocks of undisturbed native habitats (e.g., coastal sage scrub, chaparral, oak woodland, riparian, and grassland habitats).
	✓	✓	✓	During step-down trail planning, ensure that large blocks of undisturbed habitat needed to conserve MSCP-covered bird species are protected from human disturbance.
	✓			To minimize disturbance in proposed trail corridors, prohibit dogs within the Otay-Sweetwater Unit.
		✓	✓	To minimize impacts to burrowing owls from disturbance by the public and/or dogs, align trails in manner that will maintain at least a 330-foot-wide (100 meters) buffer between the trail and burrowing owl nest boxes or other occupied burrowing owl nest locations. Wherever possible, trails should be aligned to avoid traversing burrowing owl nesting areas, and requirements to maintain dogs on a leash shall be activity enforced.
	✓	✓	✓	Maintain approximately 30 acres of existing burrowing owl habitat at and near the Shinohara vernal pool complex, and create suitable open grassland or coastal sage scrub/grassland ecotone habitat for an additional 15 pairs of owls in a suitable location.
	✓	✓	✓	Identify and implement measures to protect cactus wren habitat from destruction by wildfire (e.g., fuel reduction, fuel breaks).
	✓	✓	✓	By 2020, maintain, restore, and/or create cactus wren habitat on the Otay-Sweetwater Unit to provide 124 acres (50 hectares) of coastal sage scrub with about 200 mature (≥ 3 feet [one meter] high) coastal cholla, coastal prickly pear, and/or chaparral prickly pear per 2.5 acres (one hectare).
	✓	✓	✓	Expand monitoring conducted in accordance with adopted protocols to include Tecate cypress.
	✓	✓	✓	Work with the Carlsbad Fish and Wildlife Office and others to identify opportunities to salvage cactus from future construction sites for planting in existing cactus scrub habitat or in new cactus scrub patches.
	✓	✓	✓	Work with various land managers to create cactus wren habitat in an amount and configuration that will facilitate movement of cactus wrens around the perimeter of Sweetwater Reservoir and between the Otay-Sweetwater Unit and the Salt Creek Preserve in Chula Vista.
	✓	✓	✓	Step-down trail planning must address the need to maintain a 4,000-foot (1,219-meter) radius disturbance-avoidance zone around all golden eagle nest sites throughout the golden eagle breeding season (late October to mid-July).
	✓	✓	✓	Monitor golden eagle activity on and near the Otay-Sweetwater Unit and implement additional disturbance-avoidance measures if necessary to protect eagles outside of the San Miguel Mountain area.
	✓	✓	✓	Work with SDG&E to retrofit utility poles on the Refuge and in the surrounding areas to reduce the risk of electrocution to perched raptors and to retrofit wires to reduce collision risk (e.g., arrange multiple wires in a horizontal rather than a vertical plane).

Objective 2.6 - MSCP-Covered Bird Species Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
	✓	✓	✓	Provide adequate acreage of undisturbed habitat to accommodate two breeding pairs of harriers on the Otay-Sweetwater Unit; and between late December and mid-July of each year, maintain a 900-foot (300-meters) radius disturbance-avoidance zone around nesting sites, including the historic nest site in the vicinity of the Mother Miguel grassland.

Objective 2.7: Monitoring and Baseline Surveys

By 2022, using Refuge staff or in partnership with others, conduct all required monitoring for listed and MSCP-covered species; implement a baseline survey of the vegetation types present on the Del Mar Mesa Vernal Pool Unit, a baseline survey of vernal pool species within the Shinohara vernal pools and Del Mar Mesa vernal pools, and a directed survey for listed and sensitive plant species throughout the Otay-Sweetwater Unit and Del Mar Mesa Vernal Pool Unit; and support other monitoring efforts that will benefit Refuge management.

Rationale: Knowledge of the distribution and abundance of species, species' needs, and status is critical for the management of the Refuge. Obtaining this knowledge begins with baseline surveys, which establish a starting point for comparing the results of future surveys. Once we have baseline data, we can begin a monitoring process (i.e., comparing baseline data to the result of similar future surveys to identify any changes that may have occurred, including changes related to climate change, increased fire frequency, expansion of invasive non-native plants and animals).

As part of the San Diego MSCP, monitoring protocols have been or are in the process of being developed for various covered species and habitats. In addition, monitoring protocols have been developed by the Service for some of the listed species present on the Refuge, and for other species, presence/absence surveys are conducted. Biological monitoring is necessary to assess the status of listed and sensitive plant and wildlife species, as well as to assess their response to management actions. Analysis of monitoring and survey data also allows us to detect changes over time (e.g., changes in vegetative structure and/or composition, changes in bird species composition and/or abundance) due to factors such as disturbance, climate change, air or water pollution, and/or invasion by exotic species. Management effectiveness is evaluated and revised, if needed, based on monitoring and survey results. Implementing monitoring on the Refuge is consistent with the requirements of the San Diego MSCP, the recommendations of various bird conservation plans, and Statewide Conservation Action N in the California Wildlife Action Plan (CDFG 2005).

Baseline information collected by these monitoring efforts should not be construed to necessarily constrain conservation efforts or to define desired abundance, distribution, or habitat conditions of species of interest. Wildlife and habitats in coastal southern California in general (and worldwide) have already been greatly influenced by human activity and, where appropriate, should be restored to conditions that may have occurred historically or prehistorically.

Objective 2.7 – Monitoring and Baseline Surveys				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	In coordination with public and private partners, continue to conduct monitoring and presence/absence surveys for listed and MSPC-covered species on the Refuge.
✓	✓	✓	✓	Continue to conduct one annual survey for Harbison’s dun skipper larvae in winter and another for adults in June along Steele Canyon Creek.
	✓	✓	✓	Seek funding to survey and map vegetation and sensitive species on the Del Mar Mesa Vernal Pool Unit.
		✓	✓	Support creating two MAPS (Monitoring Avian Productivity and Survivorship) stations (chaparral/ coastal sage scrub and oak woodland) on the Refuge.
	✓	✓	✓	Per available funding, inventory and sample terrestrial invertebrates present in chaparral vegetation on the Otay-Sweetwater Unit.
	✓	✓	✓	Support and facilitate management-oriented research on wildlife and habitat, including monitoring the impacts of climate change.
	✓	✓	✓	Seek funding to conduct periodic monitoring of surface water and groundwater quality on the Otay-Sweetwater Unit and annual monitoring of groundwater levels within riparian and oak woodland areas of the unit.
		✓		Conduct annual surveys for brush rabbit, desert cottontail, mourning dove, and California quail on the McGinty Mountain and south Las Montañas areas (as well as southern mule deer on the McGinty Mountain area) to monitor populations and population trends.

Objective 2.8: Control Invasive Non-native Species

Over the life of the CCP, implement an integrated approach to pest management to reduce the percent coverage of non-native, invasive forbs, grasses, woody shrubs, and trees by at least 20 percent in areas of relatively intact shrubland; remove at least 90 percent of all large non-native woody shrubs and trees from cottonwood-willow riparian forest and oak riparian forest; and implement actions when necessary to remove all feral pigs and at least 80 percent of the wild turkeys from the Otay-Sweetwater Unit.

Rationale: Nationwide, invasive species cause environmental damage and losses that total almost \$120 billion annually. In addition, approximately 42 percent of all threatened and endangered species are at risk primarily because of non-native species (Pimentel et al. 2005). Economic effects are easier to calculate than ecological consequences, which are sometimes difficult to perceive, let alone quantify (Hanson and Sytsma 2001). According to the Service, invasive species have become the single greatest threat to the Refuge System. Rare species with limited ranges, small numbers, and restricted habitat requirements, such as the endemic plant and animal species of coastal southern California found on the San Diego NWR, are often particularly vulnerable. Invasive species can alter ecosystem structure and function, disrupt food chains and other ecosystem characteristics vital to wildlife (including rare and endangered species), and alter key ecosystem processes such as hydrology, productivity, nutrient cycling, and fire regime (Randall 1996, Brooks and Pyke 2001).

A National Strategy for Management of Invasive Species (National Invasive Species Strategy Team 2003) has been developed for the NWRS within the context of the National Invasive Species Management Plan, as called for by Presidential Executive Order 13112; it functions as the internal guidance document for invasive species management throughout the Refuge System. This plan has four goals: 1) increase the awareness of invasive species issues, both internally and externally; 2) reduce the impacts of invasive species to allow the Refuge System to more effectively meet its fish and wildlife conservation mission and purpose; 3) reduce invasive species impacts on the Refuge System's neighbors and communities; and 4) promote and support the development and use of safe and effective integrated management techniques to deal with invasive species. Refuge management strategies will support these objectives, as well as assist in achieving Statewide Conservation Action F in the California Wildlife Action Plan (CDFG 2005).

Objective 2.8 – Control Invasive Non-native Species				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓		Per available funding, continue to remove invasive plants from sensitive habitat areas using a combination of mechanical and chemical controls.
	✓	✓	✓	Upon approval of the Integrated Pest Management Plan, begin implementation to control invasive plants and address the prevalence of invasive aquatic species in Refuge wetland areas.
	✓	✓	✓	By 2018, develop and implement an Invasive Species Rapid Response Program (refer to Chapter 4) to assist in addressing potential new invasive species threats before they become a significant problem.
	✓	✓	✓	Seek funding to systematically reestablish areas of native grassland or annual forbland in appropriate locations throughout the Otay-Sweetwater Unit by controlling invasive plants and, where necessary, seeding these sites with appropriate native plants.
	✓	✓	✓	As funding permits, enhance the quality and quantity of Quino checkerspot habitat through control of non-native invasive forbs and grasses.
	✓	✓	✓	As funding permits, remove non-native woody shrubs and trees from cottonwood-willow riparian forest and oak riparian forest.
	✓	✓	✓	As necessary, control tree tobacco and other shrubs to reduce “predator ladders” in cactus wren nesting habitat.
	✓	✓	✓	Prepare a step-down plan for the control of feral pigs on the Refuge that would be implemented when monitoring indicates the presence of feral pigs on the Refuge; actions (e.g., trapping, shooting) to eradicate the pigs from the Refuge would be consistent with the eradication program developed by the U.S. Forest Service for the San Diego region.
		✓	✓	When wild turkeys are documented on the Refuge, implement actions to control them, either through expansion of the hunting program on the Refuge or through an approved lethal control program.
	✓	✓	✓	By 2017, incorporate into the Refuge's public outreach program information (e.g., kiosk poster, brochure) to educate the public about the hazards (e.g., illness, starvation, death by predation) to unwanted pets and the impacts to native wildlife of releasing a pet “back into the wild.”

Objective 2.8 – Control Invasive Non-native Species				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
	✓	✓	✓	Work with the San Diego Turtle and Tortoise Society (or other established adoption program) to place non-native turtles encountered on the Refuge and deemed to be in good health with people who have demonstrated a commitment to their long-term care.
	✓	✓	✓	Control non-native fish, crayfish, and herpetofauna from the Sweetwater River and other wetland areas on the Refuge to the degree that reestablishment of native aquatic species (i.e., southwestern pond turtle, California red-legged frog, and arroyo toad) is feasible.
	✓	✓	✓	To effectively manage invasive plant species, complete an inventory of invasive plant infestations on the Otay-Sweetwater Unit by 2016 that prioritizes those areas in need of treatment based on the extent of the infestation and the potential effects of the infestation on adjacent native habitat areas.

Goal 3: Engage in partnerships and provide leadership in coordinating land management and acquisition efforts throughout southwestern San Diego County in support of the Multiple Species Conservation Program (MSCP) and other resource protection objectives developed for the Region.

Objective 3.1: MSCP Partnerships

Over the next 15 years, continue to support existing partnerships and form new partnerships with Federal, State, local, tribal, non-profit, and other land managers to ensure ongoing communication and coordination of land management practices and habitat and species monitoring to achieve the goals of the San Diego NWR, as well as the conservation goals of the San Diego MSCP.

Rationale: The San Diego MSCP was developed for the conservation of plants and animals in southwestern San Diego County under the Federal Endangered Species Act of 1973, as amended, and the California Natural Community Conservation Planning Act of 1991. The program is intended to guide future development within the MSCP planning area and conserve at-risk species with the oversight of both Federal and State agencies. The primary goal of the MSCP is the preservation of important habitats to conserve some 85 “covered” species. Achieving this goal requires the acquisition of lands that support these species and the adaptive management of these lands and the habitats and species they support in perpetuity.

A series of recent studies have been prepared to assess and make recommendations for how to improve the San Diego MSCP Biological Monitoring Plan and achieve the biological conservation goals of the MSCP. A common recommendation of these studies has been the need for coordination and consistency among MSCP partners involving such issues as monitoring methods and priorities, data analysis and accessibility, and feedback between decision-makers and land managers (Hierl et al. 2005). Coordination is a critical factor in the success of the MSCP’s biological monitoring program, and recent actions by SANDAG to fund the San Diego Management and Monitoring Program have already resulted in better communication among land

managers. Continuing to improve communication and expanding the conservation to other land managers in the region will ensure a better understanding of not only how the MSCP reserve is currently meeting its biological conservation goals, but also how these goals can continue to be met well into the future through adaptive management.

Objective 3.1 – MSCP Partnerships				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue active involvement in the efforts of the San Diego Management and Monitoring Program to stay connected to other land managers, be aware of the latest best management practices, and participate in prioritizing regional management and monitoring needs.
✓	✓	✓	✓	Actively participate in efforts to refine existing or create additional monitoring protocols for MSCP-covered species.

Objective 3.2: Coordinated Land Management

Over the next 15 years, continue current coordination efforts with other managers of conserved lands in the San Diego south county region, meeting at least twice annually to share experiences and information, identify common information gaps, explore joint funding opportunities, develop coordinated monitoring and management strategies, and generally foster cooperation across jurisdictional boundaries.

Rationale: Coordination among land managers can improve monitoring and management efficiencies for all participants. Through regular coordination and communication, land managers can identify gaps in knowledge and funding resources, leverage funds to realize greater benefits, and develop cost-effective cross-agency management strategies. Management efforts on the San Diego NWR have benefited in a variety of ways from Refuge staff leadership and participation in the South County Land Managers Group. Through the sharing of information, issues common to various land managers have been addressed via joint projects, sharing of personnel, equipment, and/or volunteers, and partnering to secure grant funding need to address area-wide management problems. Continued participation in this group will strengthen relationships, facilitate ongoing communication, and ensure long-term coordination of regional management efforts.

Objective 3.2 – Coordinated Land Management				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue active involvement in the South County Land Managers Group to coordinate management activities, increase management efficiencies through sharing of resources, and ensure continued communication.
✓	✓	✓	✓	Maintain contact with adjacent landowners to discuss and address mutual concerns and opportunities.
✓	✓	✓	✓	Actively look for partnering opportunities with other land managers, local and regional conservation groups, academic institutions, organizations, tribal governments, and other local, State, and Federal agencies that will result in improvements to management, monitoring, or opportunities for compatible public use.

Objective 3.3: Cultural Resources Program

Over the next 15 years, implement proactive management of cultural resources that focuses on meeting the requirements of the National Historic Preservation Act and other cultural resource legislation to address the protection, identification, inventory, evaluation, consultation, and, when appropriate, interpretation of the Refuge's historical and archaeological resources to increase the public's appreciation for cultural resource preservation.

Rationale: It is the policy of the Service to identify, protect, and manage cultural resources located on Service lands and affected by Service undertakings. A number of historical and archaeological sites are known to exist on the lands within the San Diego NWR, and many other sites are likely present that have not yet been discovered or recorded. Cultural resources possess scientific and educational value to tribes, archaeologists, historians, and many members of the public. Many cultural resources also have a spiritual connection to one or more tribes, providing important elements of individual and group identity. Cultural resources can also connect us to our past, providing the means to study and reflect upon the events and processes that have shaped our nation, our communities, and ourselves. The true value of these resources rests in what they offer us in terms of cultural identity, scientific information, and interpretive opportunities. Cultural resources are not renewable, making protection an essential component of cultural resource management. To realize the full scientific and education value or better understand the spiritual value of a cultural resource, it is also important to preserve and/or record the context of the setting in which a cultural resource is discovered. This requires proactive management in which public access is restricted in areas identified as having a high potential for undiscovered cultural resources.

Objective 3.3 - Cultural Resources Program				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Comply with all applicable cultural resource regulations and policies prior to implementing projects that would disturb any surface or subsurface cultural resources.
	✓	✓	✓	Work with local tribe representatives to develop a Memorandum of Understanding for implementing the inadvertent discovery clause of the Native American Graves Protection and Repatriation Act (NAGPRA).
	✓	✓	✓	Seek funding to identify, evaluate, and protect important cultural resources on the Refuge, and to implement activities such as special thematic studies, surveys, National Register of Historic Places evaluations, site enhancements, and site interpretation.
	✓	✓	✓	Maintain the current condition of the historic Barn at the Oaks, protect the structure and its immediate surroundings from vandalism, and interpret the history and relationship of the structure to historical farming activity in the area.
	✓	✓	✓	Ensure that Refuge staff receives training in historic preservation requirements and of NHPA, the Archaeological Resources Protection Act, and the NAGPRA.
	✓	✓	✓	Develop and present verbally or through signage interpretive themes that include the cultural and/or historical significance of various areas within the Refuge.

Goal 4: Provide safe and high-quality opportunities for compatible wildlife-dependent recreational uses that foster public appreciation of the unique natural heritage of the San Diego region.

Objective 4.1: Hunt Plan

Within 18 months of the approval of the San Diego NWR CCP, complete a hunt plan for the Otay-Sweetwater Unit that will ensure high-quality upland hunting opportunities on about 160 acres within the Otay Mesa and Lakes area. Within a year of completing the hunt plan, publish the final refuge-specific regulations in the Federal Register.

Rationale: Enactment of the National Wildlife Refuge System Improvement Act established compatible wildlife-dependent recreational uses, including hunting, as the priority general public uses of the NWRS. The Improvement Act, which specifies that priority general public uses receive enhanced consideration over other general public uses in planning and management, states that increased opportunities for families to experience compatible wildlife-dependent recreation shall be provided, particularly opportunities for parents and their children to “safely engage in traditional outdoor activities, such as fishing and hunting.” Hunting is recognized by the Service as a healthy, traditional outdoor pastime, deeply rooted in the American heritage. Hunting can instill a unique understanding and appreciation of wildlife, their behavior, and their habitat needs.

Public input during the scoping process for the CCP included requests to consider hunting opportunities within the San Diego NWR. As a result, the Refuge proposes to develop and implement a hunting program within the Otay-Sweetwater Unit. This hunting program would be developed in partnership with CDFW and interested members of the public; comply with the Code of Federal Regulations (CFR) Title 50, 32.1; and be managed in accordance with Service Manual 605 FW 2, Hunting.

Objective 4.1 - Hunting Plan				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓			Do not open the Refuge to hunting; instead maintain the current recreational uses on the Refuge (e.g., wildlife observation, photography, environmental education, interpretation, research, and trail use).
		✓		Upon approval of the Final CCP, initiate the development of a step-down hunt plan for the Otay-Sweetwater Unit to facilitate a small game and upland bird hunting program for portion of the McGinty Mountain area (about 400 acres) and the southern portion of the Las Montañas area (about 300 acres), with small game (i.e., rabbit) and upland bird (i.e., dove, quail) hunting permitted in both areas, and an additional archery-only southern mule deer hunting program for the McGinty Mountain area. Hunting in accordance with State regulations for CDFW Ecological Reserves would also be permitted on approximately 160 acres in the Otay Mesa and Lakes area.
			✓	Upon approval of the Final CCP, initiate the development of a step-down hunt plan for the Otay-Sweetwater Unit to facilitate a hunting program on about 160 acres in a portion of the Otay Mesa and Lakes area that abuts other public lands open to hunting.
		✓	✓	Work with CDFW and BLM to establish an annual special hunt for youth and disabled hunters.

Objective 4.1 - Hunting Plan Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
		✓	✓	Working closely with CDFW and the public, develop Refuge specific hunting regulations as part of the step-down planning process. The hunt plan may include issues such as wildlife species to be hunted, seasons, bag limits, methods of hunting, description of areas open to hunting, needs and funding for facilities (e.g., parking, restrooms), and other issues applicable to providing a quality hunting program that is compatible with Refuge purposes and minimizes conflicts with other compatible wildlife-dependent recreational activities.
		✓	✓	Within the hunt plan, assess the need for hunting retrieval and safety zones in those areas designated for hunting.
		✓	✓	Once drafted, distribute the draft hunt plan for review by agencies, tribes, various recreational user groups, adjacent property owners, and interested individuals and other organizations.
		✓	✓	Following completion of the hunt plan, prepare an opening package for Regional Director approval and publication in the <i>Federal Register</i> .
		✓	✓	Develop partnerships with hunting interests to assist with design, development, and maintenance of any hunting-related facilities.
		✓	✓	Work cooperatively with CDFW to enforce State hunting laws and Refuge-specific regulations.

Objective 4.2: Wildlife and Plant Observation

By 2018, develop a designated trail system through the Refuge consisting of approximately 20 miles trails that extend through a range of habitats to provide quality opportunities for up to 16,000 annual visits to the Refuge for the purpose of wildlife and native plant observation.

Rationale: The overarching goal of the Refuge System’s wildlife-dependent recreation policy (605 FW 1) is to enhance wildlife-dependent recreation opportunities and access to quality visitor experiences on refuges while managing refuges to conserve fish, wildlife, plants, and their habitats. New and ongoing recreational uses provide us with opportunities to introduce visitors to wildlife and other natural resources and to make visitors aware of resource issues, management plans, and the Refuge’s contribution to the Refuge System and Service mission. Wildlife-dependent recreational uses are the priority public uses that should be allowed on refuges when they are determined to be compatible with refuge purposes. The San Diego NWR was established, in part, to contribute to the conservation of the high diversity of native plants and animals present in southwestern San Diego County. Conservation of these resources requires that the public understand and appreciate the need for protection of these resources. Achieving the objective of providing quality opportunities for resource observation will enable us to not only foster a connection between our visitors and the natural resources protected on the Refuge, but also to increase the public’s appreciation for these resources.

Objective 4.2 - Wildlife and Plant Observation				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to support opportunities for wildlife and plant observation from a system of public trails designed to ensure capability with Refuge purposes.
✓	✓	✓	✓	Continue to provide opportunities for wildlife and plant observation by conducting periodic guided hikes on the Refuge.
	✓	✓	✓	Develop a designated system of sustainable trails and associated parking areas on the Refuge to provide access for wildlife and plant observation.
			✓	Develop a birding trail within the Las Montañas area of the Otay Sweetwater Unit.
		✓	✓	Expand opportunities for observing the plants and wildlife specific to vernal pool habitat by identifying funding for and constructing a boardwalk through a portion of the Shinohara vernal pool parcel.

Objective 4.3: Nature Photography

By 2018, provide quality opportunities for up to 250 nature photography-related visits to the Refuge annually, relying on approximately 20 miles of trail for access through a range of habitat types.

Rationale: The Improvement Act identifies wildlife photography as a priority public use that that should be allowed on refuges when it is determined to be compatible with the purposes for which a refuge has been established. Encouraging photography of wildlife, plants, landscapes, and other natural features provides Refuge visitors with the opportunity to focus on the smallest of creatures or to take in the full breadth and depth of the landscape before them. Achieving that special picture often requires stillness, silence, and patience but also provides the opportunity to become completely engrossed in the part of the natural world visible through the camera lens. By providing safe, enjoyable, and accessible nature photography opportunities and facilities, Refuge visitors will have the chance to capture and take home their memories and observations of the Refuge and the resources it was established to protect.

Objective 4.3 – Nature Photography				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to support opportunities for nature photography from a system of public trails designed to ensure capability with Refuge purposes.
	✓	✓	✓	By 2018, construct a photo blind within the Otay-Sweetwater Unit to provide opportunities for photographing birds and other wildlife.
	✓	✓	✓	On the Refuge website, provide information about nature photography opportunities on the Refuge; the best times and locations for photographing birds, wildflowers, and landscapes; and photographer etiquette that emphasizes respect for Refuge resources through the minimization of visitor impacts.

Objective 4.4: Environmental Education

Within 10 years of the CCP being adopted, develop and implement a multi-disciplinary environmental education program to reach up to 400 K-12 and college students annually. The program curricula would be aligned with national and State educational standards and would incorporate the use of the Refuge as an outdoor classroom.

Rationale: Environmental education is a priority general public use of the Refuge System and should be provided when compatible with Refuge purposes. Environmental education programs teach awareness, understanding, and appreciation of our natural and cultural resources and conservation history and allow program participants to demonstrate learning through refuge-specific stewardship tasks and projects that they can carry over into their everyday lives. Refuge environmental education programs are encouraged to offer educational assistance and work closely with local school districts and community partners. An interdisciplinary approach is encouraged that relies on existing curricula or a course of study involving natural and social sciences, history, and the arts. Environmental education can be conducted on the Refuge and/or in the classroom. Often the Refuge is used as an outdoor classroom, a site of structured environmental education activities that focus on the natural environment and cultural resources. These education activities are part of an approved course of study with identified learner outcomes. In developing environmental education programs for a specific refuge, refuge resources and ecosystem characteristics are assessed; then, working with educators, target audiences are identified and creative ways to tie resource priorities to local environmental education needs and curricula are developed. The Refuge's proximity to schools serving K-12 students and to a community college provides several opportunities for developing environmental education partnerships.

Objective 4.4 - Environmental Education				
Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Working with partners, contact local teachers regarding their needs and interests in the opportunities available on the Refuge for supporting environmental education programs.
	✓	✓	✓	Work with local educators to identify an interdisciplinary approach to environmental education that relies on existing curricula, or develop a course of study involving natural and social sciences, history, and the arts that, when implemented, can incorporate and benefit from the resources present on the Refuge.
	✓	✓	✓	Designate a portion of the Sweetwater River area as an outdoor classroom for hands-on activities.
	✓	✓	✓	Provide opportunities for partners (e.g., San Diego Audubon, YMCA, Water Conservation Garden at Cuyamaca College) to implement all or a portion of their after-school or other educational programs on the Refuge.
		✓		Working in partnership with others, develop an environmental education program that can incorporate the Lot 707 and the proposed interpretive trail into the program.
	✓	✓	✓	Post environmental education program offerings on Refuge website.

Objective 4.5: Refuge Resource Interpretation

Within five years of the CCP being adopted, develop and begin to implement an expanded Refuge resource interpretative program that will address multiple topics to appeal to a broad spectrum of interests, age groups, and learning styles and abilities and by 2020 will result in 5,000 additional annual visits to the Refuge that are focused on interpretation.

Rationale: The Improvement Act identifies interpretation as one of the six wildlife-dependent recreational uses of the Refuge System that should be allowed on refuges when it is determined to be compatible with the purposes for which a refuge has been established. Interpretation provides opportunities for visitors to make their own connections to Refuge resources and, in so doing, can provoke participation in resource stewardship. Interpretation can help Refuge visitors understand why and how to minimize their impact on Refuge resources.

The San Diego NWR, which is situated immediately adjacent to the highly urbanized San Diego metropolitan area, provides an excellent opportunity for visitors to escape the urban environment and connect with the natural environment, vegetation, and wildlife conserved within the Refuge. Through the interpretation of these resources, visitors can begin to imagine how this natural setting once dominated all of southwestern San Diego County and develop an understanding of why it is important to protect what remains of this historical landscape within the Refuge and on other conserved lands throughout the MSCP planning area. A long-range, multi-disciplinary interpretive plan that reflects consistency in design, function, and placement on the Refuge should incorporate themes unique to the habitats, wildlife, and heritage of the Refuge and contain content that is easily understood by the visiting public. Interpretive themes and content should also incorporate innovative activities intended to reach new and non-traditional audiences.

Objective 4.5 – Refuge Resource Interpretation				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to provide interpretive signage along the Sweetwater Loop Trail.
	✓	✓	✓	Develop an interpretive program that includes a combination of stationary interpretive elements distributed throughout the Refuge and interactive programs that can be adjusted to meet the demands of the audience in terms of theme, age appropriateness, interest, and other factors.
	✓	✓	✓	Incorporate interpretive signage into the kiosks proposed for installation at major trailheads.
	✓	✓	✓	In partnership with other agencies, participate in creating a vernal pool interpretive site at an appropriate location on the Del Mar Mesa Preserve.
		✓		Develop an interpretive trail on Lot 707.
		✓	✓	Design interpretive signage for installation along the boardwalk trail proposed on the Shinohara vernal pool parcel.
		✓	✓	Develop a geocaching program, which could include a Refuge-maintained traditional geocache, an EarthCache, or other form of geocaching, as part of the Refuge's interpretive program.

Objective 4.6: Connecting People with Nature

By 2016, develop and implement a minimum of two events per year, targeting nontraditional users, that are focused on connecting families with nature.

Rationale: Research shows that children and partners are suffering from too much time inside, with children spending an average of 6.5 hours a day with electronics (e.g., television, computers, video games) (Louv 2005). If children are raised with little or no connection to nature, they may miss out on the many health benefits of playing outdoors. Studies show that health is declining in children. Childhood obesity rates are increasing, as are the number of children taking prescription medications to treat Attention Deficit Hyperactivity Disorder (ADHD) and depression (Louv 2005, Migliarese 2008). Fortunately, research also shows that connecting children and families with nature can provide positive benefits, leading to improved physical and mental health (Faber and Kuo 2009, Pretty et al. 2009). Being out in nature can improve student learning and can build strong family bonds.

A connection with nature also helps children develop positive attitudes and behaviors towards the environment. Positive interactions with the environment can lead to a life-long interest in enjoying and preserving nature. People’s interest in nature is so crucial to the Service mission of conserving, protecting, and enhancing fish, wildlife, plants, and their habitats, that in 2007, the Service declared that “connecting people with nature” is among the agency’s highest national priorities.

Objective 4.6 – Connecting People with Nature				
Comparison by Alternative				
Alternative				Strategy
A	B	C	D	
	✓	✓	✓	In partnership with the Friends of the San Diego Refuges and others, incorporate a “connecting people with nature” theme into at least three events per year held on the Refuge.
	✓	✓	✓	Each year, host two activities involving people who might not normally come to the Refuge so they can experience their activity in a nature setting. Activities may include a nature-related scavenger hunt for after-school groups, painting sessions for seniors, or a “hike with the grandkids” event.

Objective 4.7: Recreational Trails

Within six months of final CCP approval, begin working with various partners on a step-down trail plan that will result in the designation and design of approximately 20 miles of sustainable trails throughout the Otay-Sweetwater Unit. Complete and begin implementation of the trail plan within 18 months of CCP approval.

Rationale: Many of the existing trails on the Refuge have been created without consideration for impacts to wildlife and habitat, trail sustainability, user impact, quality of visitor experience, or management efficiency. This has resulted in situations where recreation activities are damaging sensitive resources, excessive levels of disturbance are occurring in proximity to listed species, and trails are subject to serious erosion. While the use of trails simply for recreation is not considered a priority public use of the NWRS, trails can support and provide appropriate access for uses that are considered priority public uses, including wildlife observation, photography, environmental education, and interpretation. To ensure that trail use on the Refuge can be found both appropriate and compatible, modifications to the existing trail system (e.g., trail closures, trail realignments, new use regulations) are required. Identifying parameters for trail use, such as resource protection needs, seasonal restrictions, prohibiting off-trail activities, providing appropriate signage, facilities, and visitor information needs, are important to creating a trail system that is compatible with Refuge purposes.

Objective 4.7 – Recreational Trails				
<i>Comparison by Alternative</i>				
Alternative				
A	B	C	D	
✓	✓	✓	✓	As needed to protect Refuge resources, modify existing public access and use patterns on the Refuge by closing or realigning trails and/or installing fences and signs, while continuing to provide opportunities for compatible trail use.
✓	✓	✓	✓	Continue to work with the Sweetwater Authority and County of San Diego to identify a trail design or realignment for the County’s Sweetwater Loop and River Trail that protects vernal pool habitat both on and off the Refuge.
	✓	✓	✓	Prepare a step-down trail plan for the Otay-Sweetwater Unit, with a robust public participation process that includes a diversity of perspectives, with the goal of establishing sustainable trail alignments per the designated trail system in the CCP that will avoid or minimize adverse effects to sensitive resources.
	✓	✓	✓	Work with the City of San Diego and other partners to establish and enforce appropriate use of a compatible trail system on the Del Mar Mesa Preserve.
	✓	✓	✓	Continue to maintain the Otay Mesa and Lakes area of the Otay-Sweetwater Unit as an area of the Refuge that is closed to trail use.
	✓	✓	✓	As part of the step-down trail plan for the Otay-Sweetwater Unit, develop, distribute, and post educational materials on proper recreational use practices for the protection of the natural and cultural resources on the Refuge.
	✓	✓	✓	As part of the step-down trail plan, include a monitoring and adaptive management component to ensure routine assessment of the conditions on and adjacent to existing trails and, where necessary, to take appropriate actions needed to protect Refuge resources being affected by trail use.
		✓	✓	Routinely monitor the effects to Refuge resources of permitting leashed dog walking on the Refuge, and where necessary, take appropriate actions to eliminate any adverse effects.
✓		✓	✓	Post regulations related to dogs on the Refuge at all trailheads, and clearly indicate that use of the trails for dog walking is conditional and non-compliance with posted regulations may lead to the prohibition of dogs on the Refuge without prior notice.

Objective 4.8: Volunteers

By 2020, increase to approximately 4,000 volunteer hours per year the number of volunteer hours provided on the Refuge to assist in various aspects of Refuge management such as habitat restoration and enhancement, resource surveys, Refuge cleanups, trail maintenance, trail patrol, environmental education, interpretation, and visitor contact.

Rationale: The National Wildlife Refuge System Volunteer and Partnership Enhancement Act of 1998 (P.L. 105-242) strengthens the Refuge System’s role in developing relationships with volunteers. Volunteers possess knowledge, skills, and abilities that can enhance the scope of Refuge operations. Volunteers enrich Refuge staff with their gift of time, skills, and energy. Refuge staff will initiate, support, and nurture relationships with volunteers so that they may continue to be an integral part of Refuge programs and management. The volunteer program will be managed in accordance with the U.S. Fish and Wildlife Service Manual, Part 150, Chapters 1-3, “Volunteer Services Program,” and Part 240, Chapter 9 “Occupational Safety and Health, Volunteer and Youth Program.”

Objective 4.8 – Volunteers Comparison by Alternative				
<i>Alternative</i>				<i>Strategy</i>
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	
✓	✓	✓	✓	Continue to seek funding in partnership with other land managers to support a Community Outreach Coordinator to recruit volunteers and coordinate volunteer projects on preserved lands in south San Diego County.
	✓	✓	✓	Add a Community Outreach FTE staff position to the San Diego NWR Complex, allocating 50 percent of this position's time to volunteer recruitment and volunteer project coordination for the San Diego NWR.
	✓	✓	✓	By 2015, conduct at least two major volunteer workday events annually in an effort to recruit volunteers for small events and/or projects.
	✓	✓	✓	By 2017, conduct at least four opportunities annually for community organizations (e.g., youth groups, conservation organizations, nontraditional user groups) to assist in a volunteer project that would support Refuge management.
	✓	✓	✓	By 2016, establish a volunteer trail patrol and volunteer trail maintenance team by recruiting individuals from various trail user groups in the region.
		✓		By 2015, establish a volunteer group to assist with training for and implementation of the Refuge's hunting program.
	✓	✓	✓	Facilitate a range of volunteer training opportunities (e.g., docent training, trail maintenance, trail patrol, habitat restoration) as funding and staff time permits.

Objective 4.9: Environmentally Conscientious Refuge Operations

Reduce the Refuge's energy consumption by 3.5 percent annually to achieve a total reduction of 28 percent by 2020; incorporate water conservation measures into our facilities and practices; strive to reduce the total amount of manufactured goods and materials used on the Refuge; and develop an outreach program that will inform the public of these efforts and encourage them to implement similar practices.

Rationale: Human activity and resource consumption are root causes of declines in abundance and diversity of wildlife and habitat. Consumption and the output of that consumption (e.g., garbage, air and water pollution, noise, night lighting) are detrimental to the abundance, diversity, and distribution of native wildlife. We can reduce our impacts on wildlife resources that we are trying to protect by reducing the Refuge's own consumption of resources and by choosing materials and practices that lessen impacts to wildlife and habitats worldwide.

Depending on the model and assumptions, scientists project the average annual temperature in California to rise from 4°F to 10.5°F above the current average temperature by the end of the century (Hayhoe et al. 2004). Effects of climate change on vegetation and wildlife throughout California have already been documented (Kelly and Goulden 2008, Macmynowski et al. 2007, Barbour and Kueppers 2012), and these effects are expected to increase. The emission of GHGs through the combustion of fossil fuels (i.e., fuels containing carbon), in conjunction with other human activities, appears to be closely associated with changes in climate worldwide (State of California Office of Planning and Research 2008). By reducing our carbon footprint, we can assist in the efforts to address climate change. There are many ways in which GHG emissions can be reduced, including reducing the amount of electricity and fuel consumed directly by Refuge

operations, reducing the total consumption of goods and materials, and purchasing locally produced products whenever possible.

The overconsumption of potable water in southern California has far-reaching effects on wildlife and wildlife habitat, such as impacts to listed species in northern California and the loss of wetland habitat at the Salton Sea (USFWS 1995c, Salton Sea Authority 2006). By implementing practices that will reduce our consumption of potable water, as well as providing interpretation and environmental education regarding the need to conserve water, we can assist in reducing water consumption in the region.

Objective 4.9 – Environmentally Conscientious Refuge Operations				
<i>Comparison by Alternative</i>				
<i>Alternative</i>				<i>Strategy</i>
A	B	C	D	
✓	✓	✓	✓	Continue to meet or exceed requirements for recycling and using goods.
	✓	✓	✓	Replace Refuge vehicles with more fuel-efficient vehicles (hybrid, electric, etc.) as funding and management need permits.
	✓	✓	✓	Retrofit existing facilities to increase energy efficiency (e.g., use compact fluorescent bulbs, increase insulation, add photovoltaic panels, and replace single paned windows).
	✓	✓	✓	Seek funding to incorporate effective energy and water conservation measures into current and future Refuge operations and facilities.
	✓	✓	✓	Minimize the need for night lighting and, where necessary, install fixtures that are fully shielded.
	✓	✓	✓	Reduce vehicle trips by using telephone or computer video conferencing whenever possible to reduce carbon emissions.
	✓	✓	✓	Combine trips for Refuge-related activities to reduce gas consumption.
	✓	✓	✓	Whenever possible, purchase locally manufactured equipment and materials.
	✓	✓	✓	Prepare a fact sheet or poster for inclusion on a kiosk and/or posting on the Refuge website that describes the efforts being made by the Refuge to reduce consumption and emission and that explains why such efforts are important locally and globally.

6.3 Monitoring

Monitoring the effects of management actions on the Refuge's trust resources is an important component of the CCP, as is the documentation of the Refuge's baseline conditions. By completing baseline inventories and monitoring specific management actions, Refuge staff can better understand the species, habitats, and physical processes that occur on the Refuge and the ecological interactions that occur between species, as well as identify changes in populations or population trends that may be occurring on the Refuge as a result of factors including but certainly not limited to disturbance, competition from invasive species, wildland fire, and climate change. Monitoring of federally listed species, MSCP-covered species, and other special status species is an ongoing management activity on the Refuge that will continue per available funding.

As described in Chapter 4 and within Objective 2.7 in this chapter, a variety of new or expanded surveys and monitoring activities are proposed. These actions will be implemented by Refuge staff, other public, private, academic, and nonprofit partners, and researchers. They will be funded through a variety of funding sources from both within and outside the Service. These monitoring

programs will provide valuable information needed to assess the quality of the habitats protected within the region-wide San Diego MSCP Preserve. Monitoring will also provide Refuge-specific data needed to evaluate the effectiveness of the various management strategies proposed in this CCP and determine if changes in management are necessary to achieve Refuge purposes and goals.

Monitoring of public use programs will involve the continued collection of visitor use statistics and an assessment of how public use activities are affecting wildlife and habitat quality. The data obtained will then be used to evaluate the overall effects of public use on Refuge resources, as well as to determine if the public use opportunities provided by the Refuge are achieving proposed objectives for improving visitor understanding of Refuge resources, connecting people with nature, and providing a positive visitor experience.

6.4 Adaptive Management

The Service acknowledges that much remains to be learned about the species, habitats, and physical processes that occur on the Refuge and about the ecological interactions between them. Developing a better understanding of these processes and interactions is further complicated by ongoing changes associated with climate change, increased fire frequency, and presence of non-native species within native habitats. Uncertainty is an unavoidable component of managing natural systems because of their complexity, inherent variability, and gaps in our knowledge of their functions. Adaptive management involves sequential decision making, integrating project design, management, and monitoring to systematically test assumptions. It strives to reduce some of that uncertainty and improve management over time by allowing us to evaluate and refine management based on the results of management activities and the status of the managed resource. The Service has been practicing adaptive management on the Refuge since its establishment and the CCP proposes to continue this practice.

In designing and implementing the adaptive management strategy for this Refuge, it may be necessary at some point to amend the CCP in response to changing conditions. Adequate baseline data, clearly defined and measurable project objectives, a monitoring plan focused on measurable results, and a process for refining and improving current and future management actions are all essential components of a successful adaptive management approach.

The adaptive management process will also be used to evaluate our success in achieving our public use goals and objectives. These periodic evaluations would be used over time to adapt both our public use objectives and strategies to better achieve our goals. Such a system embraces uncertainty, reduces option foreclosure, and provides new information for future decision-making.

6.5 Partnership Opportunities

Partnerships will continue to play an important role in implementing the various strategies presented in the CCP. Achieving many of the objectives presented in this chapter, will require various degrees of interaction and support from outside partners. Through ongoing partnerships with other land managers in the region, staff and funding can continue to be leveraged to implement management and monitoring strategies that benefit multiple ownerships. Habitat protection and some restoration efforts will involve partnerships with other Federal, State, and/or local agencies, researchers, and adjacent landowners. Partnering in the management of the resources on the Del Mar Mesa Preserve, which includes the Del Mar Mesa Vernal Pool Unit, is an essential component of the draft Del Mar Mesa Preserve Management Plan. Protection of cultural

resources will also require partnerships with the region's Native American community on issues such as resource protection, interpretation, and repatriation.

The needs and opportunities for research on the Refuge are vast, and it is only through partnerships that these needs can be met. For example, expanded partnerships with academic institutions, USGS, and others could provide valuable data related to the life history of little-known species protected on the Refuge, such as Quino checkerspot butterfly, Hermes copper butterfly, and Harbison's dun skipper, while other research could answer questions related to which herbicides can be safely used in areas supporting rare plants or insects.

Implementing the Refuge's public use program will require the establishment of new partnerships. Assistance from the hunting community would likely be required to implement mandatory training programs, and funding sources will need to be identified to provide any facilities (e.g., parking, restrooms, temporary check-in sites) needed to support the proposed hunting program. To ensure a quality experience for visitors using the Refuge's designated trail system, as well as to avoid damage to Refuge resources, a partnership with the mountain biking, equestrian, and hiking communities is needed in order to form a volunteer trail patrol and volunteer trail maintenance crew. Other partnerships will be needed to support environmental education and resource interpretation objectives.

6.6 Fire Management Plan

Per the Department of the Interior fire management policy, all refuges with vegetation that can sustain fire must have a Fire Management Plan (FMP) that details fire management guidelines for operational procedures and values to be protected and enhanced. Fire management plans outline the fire management objectives for a refuge such as appropriate suppression and/or prescribed fire strategies. The Fire Management Plan (FMP) for the San Diego National Wildlife Refuge Complex addresses fire management strategies for the San Diego Bay, San Diego, Seal Beach, and Tijuana Slough National Wildlife Refuges. With respect to San Diego NWR, the currently approved plan focuses on preparedness, wildland fire operations, prevention, detection, and full suppression of wildfire. Within the currently approved plan, prescribed and wildland fire use are not proposed as a strategy for achieving land management objectives on the San Diego NWR; however, revisions to the Fire Management Plan for the Complex will likely reevaluate this position on prescribed fire use.

Values considered in the Fire Management Plan include protection of Refuge resources and neighboring private properties, effects of burning on refuge habitats/biota, and firefighter safety. Refuge resources include properties, structures, cultural resources, trust species including endangered, threatened, and species of special concern and their associated habitats. Fire management plans are reviewed periodically to ensure that the fire program is conducted consistent with approved plans and that the program is evolving with the Service mission and the goals and objectives of the Refuges covered by the plans. Revisions to the Fire Management Plan for the San Diego NWR were under way as of August 2013.

6.7 Cultural Resource Management

To avoid adverse effects to cultural resources, the following procedures will be implemented for all proposals that require subsurface disturbance in previously undisturbed areas or require ground

disturbance at depths that extend beyond the depths of previous ground disturbing activities within the proposed project area:

- a. Prepare and submit a Request for Cultural Resource Compliance (Appendix J) to the Regional Cultural Resources Program as early in the planning process as possible, and include a map, indicating the full extent of the area of potential effect along with a detailed project description;
- b. Implement any measures deemed necessary by the Cultural Resource staff to protect cultural resources (in an area of sensitivity for an archaeological resource, measures may include having an archaeological monitor present during activities affecting subsurface materials), or if the action falls under the terms of the Service's Programmatic Agreements with SHPO and the Advisory Council for Historic Preservation, retain this documentation in the project file;
- c. If during the course of ground disturbing activities, any cultural resources are discovered, all earthwork on the site would be stopped and the Service's Regional Historic Preservation Officer would be contacted to review the materials and recommend a treatment that is consistent with applicable laws and policies, the site would be recorded and evaluated for eligibility to the NRHP, and all measures required to protect or otherwise mitigate impacts to the site would be implemented (if the site is determined to be eligible to the NRHP, the Service, through the Regional Historic Preservation Officer, would consult with SHPO, federally recognized tribes, and interested parties); and
- d. Proper care for any federally owned and administered archaeological collections would be provided in accordance with all applicable Federal regulations, including ensuring that significant prehistoric and historic artifacts and associated records are deposited in an institution with adequate long-term curatorial capabilities (i.e., providing professional, systematic, and accountable curatorial services on a long-term basis).

To identify and preserve traditional cultural properties and sacred sites on the Refuge and to determine the level of confidentiality necessary to protect them, the Refuge will work with interested tribal groups to establish government-to-government relationships that will ensure meaningful consultation with tribal governments during the planning phase of projects. The Refuge Complex will continue discussions with interested tribal groups to create a Memorandum of Understanding (MOU) to implement the inadvertent discovery clause of NAGPRA. Development of this MOU involves identifying the Native American tribes, groups, and direct lineal descendants that may be affiliated with these 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.

6.8 Step-down Plans

Achieving some of the habitat management objectives and the public use goal for the Refuge will require more in-depth planning than the CCP process is designed to provide. For these projects, the Service prepares step-down plans. Step-down plans provide additional planning and design details necessary to implement the strategies (projects or programs) identified in the CCP. One step-down plan, an Integrated Pest Management Plan (Appendix D), has been prepared for review as part of this CCP. Several additional step-down plans are proposed for completion following the approval of the CCP. Table 6-1 lists these step-down plans along with target dates for completion.

Table 6-1 Future Step-down Plans Proposed for the Otay-Sweetwater Unit of the San Diego NWR	
<i>Plan</i>	<i>Target for Completion</i>
Hunt Plan	FY 2015
Trail Plan	FY 2015
Feral Pig Control Plan	FY 2016
Habitat Management Plan	FY 2018
Inventory and Monitoring Plan	FY 2019

6.8.1 Draft Step-down Plan

Draft Integrated Pest Management Plan

A draft Integrated Pest Management (IPM) Plan has been developed for the San Diego NWR in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (7 U.S.C. 136r-1) and Part 517 DM 1 of the Department of the Interior's Departmental Manual. The complete document is provided for review in Appendix D.

The purpose of preparing an IPM Plan is to provide a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools in a way that minimizes economic, health, and environmental risks. The Service is mandated to manage pests and use IPM principles in a manner that reduces risks from both the pests and associated pest management activities. IPM is a science-based, decision making process that incorporates management goals, consensus building, research, pest biology, environmental factors, pest detection, monitoring, and the selection of the best available technology to prevent unacceptable levels of pest damage. In developing the IPM Plan, full consideration has been given to the safety and protection of humans and other non-target organisms and resources.

Along with a detailed discussion of IPM techniques, the IPM Plan describes the selective use of pesticides for pest management on the San Diego NWR. It also describes the review and approval process to be followed when pesticides are proposed for use on the Refuge. For any proposed use of a pesticide, a Pesticide Use Proposal (PUP) is submitted for review and approval. The PUP is then reviewed at the Project Leader, Regional Office per guidance in the current year's Western Regions Pesticide Uses Granted Field Station Level Approval, or Washington Office level per the USFWS Headquarters Guidance for Pesticide Use Proposals. Unless an IPM Plan is in place, all PUPs must be submitted for review and approval at the appropriate level on an annual basis. For some pesticides with an approved IPM Plan or IPM strategies in place for the San Diego NWR, a PUP would initially be reviewed and approved at the appropriate level; then, for the next four years, PUPs may only need review and approval at the field level. If, however, the Refuge proposes a substantial change in the use pattern of an approved pesticide, review by the regional or Washington Office would be required before this change could be implemented on the Refuge.

The primary focus of the IPM Plan for the San Diego NWR is on controlling invasive plants. The IPM Plan also addresses the future need to control, to the extent feasible, exotic aquatic wildlife. The IPM Plan, which will be evaluated for approval as part of the CCP process, will continue to be reviewed and updated as needed to address new information and policy changes.

Draft Feral Pig Monitoring and Eradication Plan

A draft Feral Pig Monitoring and Eradication Plan has been developed for the San Diego NWR to address the potential future need to control feral pigs on the Refuge, as their presence would pose a substantial threat to the Refuge's sensitive physical, biological, and cultural resources. The complete document is provided for review in Appendix E.

No feral pigs are currently present on the Refuge, but feral pigs and the damage to resources associated with feral pig activity have been identified in the San Diego region. The initial implementation of this plan by the Refuge would therefore involve monitoring for the presence of pigs, with further action on the Refuge becoming necessary only if pigs are identified on Refuge lands. The actions taken to control pigs on the Refuge would be coordinated with the larger regional effort to control feral pigs throughout San Diego County.

This plan, which is consistent with the plan developed by USDA Forest Service, BLM, California Department of Parks and Recreation, and other Federal, State, and local participants on the Inter-Governmental Group on Feral Pig Impacts, draws upon a large body of experience from many successful feral pig elimination and control efforts across the United States (USDA Forest Service 2013). This group has developed Principles of Understanding to work together to address feral pig impacts in San Diego County and to develop an "all-lands" approach to dealing with the feral pig population. The Service proposes to join this group to share knowledge and develop strategies for dealing with the feral pig population in the County across jurisdictional boundaries.

6.8.2 Future Step-down Plans

Hunt Plan

Preparation of a hunt plan for the Otay-Sweetwater Unit will begin upon approval of the Final CCP. The plan, which will be prepared in coordination with CDFW and other adjoining property owners (e.g., BLM, City of San Diego Water Utilities Department), is intended to ensure the conservation of wildlife and their habitats, safety of hunters and other potential visitors, compliance with applicable State and Federal laws and regulations, and respect for the resource. The process will also involve coordination with partners who have an interest in helping promote a quality hunting program on the Refuge.

The plan and subsequent opening package will be prepared in accordance with 605 FW2 (Hunting) of the Service Manual and Title 50, Part 32 of the Code of Federal Regulations. Topics addressed in the hunt plan will include but are not limited to hunting program goals and objectives, a description of the hunting program (e.g., target species, hunting boundaries, access to the hunting area, harvest limits, permitted equipment, methods of control and enforcement, staffing requirements, seasons and/or hours that may differ from CDFW, any other Refuge-specific regulations).

Trail Plan

A trail plan for the Otay-Sweetwater Unit, to be initiated following completion of the Final CCP, would be prepared in coordination with interested trail groups and other members of the public. A major task in the development of the trail plan would be the identification of specific trail alignments for the general trail corridors described in the preferred alternative. Trail alignments would be determined based on accepted trail standards to ensure long-term sustainability and promote accessibility, as well as the need to protect sensitive Refuge resources. Factors such as proximity to listed or sensitive species or sensitive habitat; maximum and minimum trail grades; appropriate outsloping; soil type; presence of year-round or seasonal moisture; rock fall hazards;

and presence of rocks, limbs, or other obstacles in the trail tread would all be taken into consideration. All or a portion of an existing trail within an approved trail corridor may meet these standards, while other trails or portions of trails may require enhancement, realignment, or closure and complete relocation. The trail plan would also address the facilities and activities (e.g., parking, restrooms, signs, maps, volunteer trail patrol, volunteer trail maintenance) needed to support the trail system and ensure long-term compatibility with Refuge purposes. Potential funding sources would be explored and guidance for closing and rehabilitating trails not included within the designated trail system would be developed.

Habitat Management Plan

The development of a Habitat Management Plan (HMP) for the Otay-Sweetwater Unit is expected to begin in FY 2016. To the extent possible, this plan would be developed in partnership with other land managers, particularly those along the Sweetwater River corridor between the Loveland Reservoir to the northeast and the Sweetwater Reservoir to the south, in an effort to ensure a coordinated management effort that addresses issues such as listed and sensitive species, sensitive habitats, invasive species, and water quality and quantity. Plan preparation will also require coordination with other agencies, tribes, and non-governmental land managers to develop management strategies for the habitats and suite of listed and sensitive species that are currently or were historically supported within the Otay-Sweetwater Unit.

Inventory and Monitoring Plan

Following the completion of the HMP, an Inventory and Monitoring Plan (IMP) will be prepared. The IMP will prioritize surveys based on input provided in the HMP and MSCP monitoring strategies and provide guidance for improving the quality, consistency, utility, and long-term storage of monitoring data.

6.9 Compliance Requirements

6.9.1 Federal Regulations, Executive Orders, and Legislative Acts

All projects and step-down plans described in the CCP will be required to comply with NEPA and the Improvement Act, as well as a variety of other Federal regulations, Executive orders, and legislative acts. Such requirements address issues such as human rights, cultural resources, biological resources, land and water use, tribal coordination, and wilderness. Federal regulations, Executive orders, or legislative acts applicable to projects proposed for implementation on this Refuge are presented in Appendix J, along with a summary of how the CCP will comply with these requirements. With respect to wilderness, the lands within the San Diego NWR have been inventoried, and no areas were found that meet the eligibility criteria for a Wilderness Study Area as defined by the Wilderness Act. Therefore, potential wilderness designation of lands within the San Diego NWR is not analyzed further in the CCP. The results of the wilderness inventory are documented in Appendix K.

6.9.2 Potential Future Permit, Approval, and/or Review Requirements

The implementation of some actions described in this CCP may require additional analysis and review under NEPA, particularly those actions associated with future step-down plans or individual projects that are to be described in greater detail in the future. Additionally, prior to implementation of the various management actions, the Service may be required to obtain local, State, or Federal permits or approvals. Permits, approvals, or reviews that may be required for projects on the San Diego NWR include:

- **U.S. Fish and Wildlife Service, Refuges** - Project level internal Section 7 consultation, as appropriate under the authorities of the Endangered Species Act, prior to implementing any actions that may affect federally listed endangered or threatened species.
- **U.S. Fish and Wildlife Service, Regional Cultural Resources Team** - Project level internal review of actions that could have an adverse effect on cultural resources pursuant to the National Historic Preservation Act and/or other regulations related to the protection of cultural resources. Compliance involves submitting a Request for Cultural Resource Compliance Form (Appendix I) to the Regional Cultural Resources Team, which will assist in notification to the tribes and determine if consultation with the California State Historic Preservation Officer is required.
- **U.S. Army Corps of Engineers** - Clean Water Act Section 404 for projects, including restoration projects, that could discharge dredged or fill material into waters of the U.S.
- **California State Water Resources Control Board, San Diego Region** - Clean Water Act Section 401 certification for discharges into waters of the U.S. and/or a General Permit for Discharges of Storm Water Associated with Construction Activity.
- **California State Historic Preservation Office** - Section 106 consultations under the authorities of the National Historic Preservation Act for any actions that may affect historic properties or cultural resources associated with listed properties (or those eligible for listing) on the National Register of Historic Places.
- **Caltrans** - Coordination and approval of encroachment permits and any associated traffic improvements (e.g., traffic signals, acceleration/deceleration lanes) from Caltrans for proposals that will encroach into the right-of-way of a State highway such as Highway 94.

6.9.3 Conservation Measures to be Incorporated into Future Projects

To ensure that the future projects and other actions described in this CCP do not result in significant adverse effects to the environment, conservation measures shall be implemented, as appropriate, in association with the development and/or carrying out of future proposed projects and/or actions. Various conservation measures to be considered are outlined here.

General Conservation Measure for all Project Categories

- Follow all terms and conditions provided in regulatory permits and other official project authorizations or approvals.

Habitat and Species Protection Conservation Measures

- Avoid any disturbance within and provide adequate no-disturbance buffers around habitat that supports sensitive nesting bird species during the breeding season;
- Minimize disturbance (e.g., noise, lighting, human presence) in sensitive habitat areas year round;
- To the extent feasible, use existing roadways or travel paths for construction and maintenance access related to both project implementation and ongoing refuge activities;
- Adhere to the specific BMPs included on pesticide product Chemical Profiles to avoid impacts to Refuge trust species (refer to Appendix D for more details);

- Routinely evaluate the results of ongoing species and habitat monitoring to determine if modifications in Refuge operations and/or management practices are necessary to address changes in population trends or habitat quality; and
- Survey proposed construction sites to identify and map the locations of all listed or sensitive species and/or sensitive habitats that could be affected by a project and then design the proposed facility to avoid, to the extent practicable, any impacts to these resources; where impacts cannot be avoided, implement measures to mitigate these impacts to below a level of significance (e.g., habitat restoration).

Erosion Prevention Measures

- To minimize the potential for soil and water erosion, sustainable trail practices, such as those developed by the California Department of Parks and Recreation, will be implemented as part of all trail rehabilitation, trail realignment, or new trail construction projects. Such practices would include but are not limited to:
 - Maintaining, to the maximum extent feasible, a linear trail gradient of less than 10 percent (site-specific circumstances may warrant a greater or lesser gradient), while also designing the trail to traverse the natural slope (e.g., aligning the trail along the existing contours to minimize the potential for water to travel down the trail);
 - Creating and maintaining an outsloped (3 to 4 percent cross-slope) trail tread;
 - Using techniques such as grade reversals and rolling contours to prevent water from flowing down the trail;
 - Avoiding the construction of switchbacks, which lead to erosion issues from trail-cutting; and
 - Implementing special treatments (e.g., rock retaining walls, turnpikes, puncheons, boardwalks, soil stabilizer) in areas where soils are prone to excessive erosion or soils are known to retain moisture.

Water Quality Conservation Measures

- Obtain a Construction General Permit (2009-0009-DWQ) from the California State Water Resources Control Board and prepare a Storm Water Pollution Prevention Plan for construction activities involving grading and/or major brush removal;
- Implement appropriate erosion control measures (e.g., fiber rolls, filter fabric, silt fencing) during and after land disturbance to minimize short and long-term erosion into wetlands;
- Fence or otherwise delineate the boundaries of the project prior to construction to avoid disturbance to surrounding vegetation;
- Carry out the appropriate BMPs, including those outlined in the IPM Plan, when applying pesticides on the Refuge; and
- Implement the following BMPs when construction vehicles or equipment are being used on the Refuge:
 - Specify and follow vehicle and equipment fueling procedures and practices that are designed to minimize or eliminate the discharge of fuel spills and leaks into adjacent wetlands or the storm drain system;
 - To the extent practicable, do not allow vehicle/equipment fueling within 50 feet of a wetland or downstream drainage facility, and use berms and/or dikes around fueling areas to prevent run-on or runoff, and to contain spills;

- Inspect construction vehicles and equipment for leaks prior to each day of use and immediately implement repairs if a leak is discovered; and
- Maintain a spill kit on the construction site at all times when construction equipment is present.

Air Quality Conservation Measures

- Effectively stabilize graded or disturbed areas during construction to minimize dust generation by:
 - watering prior to and during any earth movement;
 - installing wind fencing, if deemed necessary; and
 - stopping work during high wind conditions;
- Cover temporary stockpiles of excavated material with a suitable cover such as a tarp when dry, windy conditions are predicted in the area;
- Revegetate disturbed construction sites with appropriate native plant species within one week of project completion;
- Cover the load of all haul vehicles during the transport of dirt or other dust generating materials;
- Wash or sweep all construction vehicles and equipment prior to leaving the project site to avoid tracking dirt and dust onto public roads;
- Ensure that all construction equipment meets San Diego APCD air quality standards; and
- Carry out the appropriate BMPs, as outlined in the IPM Plan (Appendix D), when applying herbicides.

6.10 Refuge Operations

The CCP will serve as the primary management reference document for Refuge operations, management, and step-down planning for the next 15 years or until the CCP is formally revised or amended. The Service will implement the final CCP with assistance from existing and new partner agencies and organizations and from the public. The timing and achievement of the management strategies proposed in this document is contingent upon a variety of factors, including funding and staffing, completion of step-down plans, accomplishing the compliance requirements, and monitoring outcomes.

Each of these factors is discussed as it applies to the CCP. The CCP provides long-term guidance for management decisions and identifies the Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. Accordingly, the plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.

6.10.1 Project Funding

For fiscal year (FY) 2011, the general operating costs (excluding staff costs, which are discussed later in this section) for the San Diego NWR were approximately \$58,240. Base funding available to refuges varies annually; budgets were reduced in FY 2013 over prior years. Specific funding may be provided in a given year to address deferred maintenance needs, to fund a specific refuge construction project, or to address specific management actions. For instance, in FY 2010, \$37,900 in additional funding was provided to the San Diego NWR for control of invasive plants. Special funding may also be available from time to time through a competitive process initiated to fund

special projects, such as visitor services projects that implement the Service's initiative for connecting people with nature.

The annual budget for the Refuge System is not always adequate to address the replacement and maintenance needs on individual refuges; therefore, a database of deferred maintenance projects is retained as part of the DOI Financial and Business Management System (FBMS). (FBMS maintains, among other records, the database of record for documented real property.)

The deferred maintenance projects for the San Diego NWR are presented in Table 6-2. The projects are divided between those that have been included in the Region's current "5-Year Plan" and are therefore likely to be funded by 2017, and those projects for which funding has not yet been identified. The deferred maintenance projects included prior to CCP approval total about \$454,075, of which \$244,000 is needed for projects covered under the "5-Year Plan."

Table 6-2 Current Deferred Maintenance Projects for the San Diego NWR	
Deferred Maintenance Projects (presented in order of priority)	Estimated Project Cost
Projects Currently Included in the Deferred Maintenance "5 Year Plan"	
Remove Old Dairy Water Tanks - This asset, acquired with the property, does not support the mission of the Refuge. Removal of the tanks would allow the site to be returned to native habitat.	\$16,000
Remove Abandoned Well/Pumphouse (South of Jamacha Road) - This asset, located on donated land, is non-operational and does not support the Refuge mission. Demolition of the pumphouse and closure of the well will eliminate a safety issue and allow the site to be restored to native habitat.	\$28,000
Other Refuge Deferred Maintenance Projects	
Repair Saddle Road Dam - Repair dam to eliminate erosion and seepage on the outside of the dam face to maintain wetland habitat in and around the existing pond, and reduce erosion and sedimentation below the dam.	\$170,272
Rehabilitate the San Miguel Ranch Access Road - Rehabilitate the deteriorated asphalt pavement that provides access to the San Miguel Mountain area from San Miguel Avenue to a sustainable surface that is compatible with Refuge management and access needs.	\$198,827
Rehabilitate Maintenance Access Road Behind the Otay Pumphouse in the south Las Montañas Area - Repair the existing gate and road that provides maintenance and law enforcement access into the southern portion of the Las Montañas area.	\$35,000
Rehabilitate Existing Metal Storage Building - Install ridge cap and replace damaged corrugated siding.	\$5,976
Total Estimated Cost	\$454,075

The database also includes new constructions projects. Prior to the approval of the CCP, the new construction projects included in the database for the San Diego NWR totaled approximately \$2,892,200, with \$162,000 allocated for facilities associated with wildlife and habitat management, \$435,200 for visitor facilities, and \$2,295,000 for Refuge operations. With the completion of the CCP, the database will be updated to reflect the proposals included in the preferred management alternative for the Refuge.

Table 6-3 outlines the new construction projects that would be included in the database if the proposed action, Alternative D, were selected as the preferred alternative. The projects are listed in order of priority for completion. The projects related to visitor services have been further prioritized and are identified at the end of the construction project description in Table 6-3 with a Visitor Services (VS) Priority number.

Table 6-3 Proposed Update to the FBMS Database Based on the Construction Proposals Described in Alternative D		
Construction Project (presented in order of priority)	Corresponding CCP Objective(s)	Estimated Project Cost
Construct a Visitor Staging Area/Temporary Contact Station – Design and construct a facility to accommodate visitor parking, a temporary visitor contact station, and restroom on a 3.5-acre site near Millar Ranch Road and Highway 94. This project (Phase 1 of a larger project) would provide for trail and volunteer staging and make Refuge staff more accessible to the public. In addition to a temporary contact station, the site would include a parking area (with some pull-through sites for equestrian trailers), trailhead, information kiosk, and restrooms. Traffic improvements (e.g., traffic study, traffic control, road widening for ingress and egress) totaling about \$1 million would be required to facilitate access to the site. (VS Priority #1)	4.1-4.8	\$2,000,000
Construct a Refuge Office/Permanent Visitor Contact Station – Design and construct a Refuge office and visitor contact facility on a portion of the 2.4-acre site near Millar Ranch Road and Highway 94, (Phase 2). Facilities proposed under this phase include a Refuge office, parking area for staff and Refuge vehicles, and a permanent visitor contact station.	4.1-4.8	\$4,000,000
Mine Closures on Mother Miguel and McGinty Mountains – Secure two horizontal openings (one on Mother Miguel Mountain and one at the Peg Leg Mine) using bat-compatible gates, and close existing vertical shafts and other openings with polyurethane to eliminate any public safety hazards and to protect wildlife.	2.1-2.6; 4.1-4.8	\$25,000
Construct Seasonal Staff and Volunteer Barracks – Purchase and set up a modular, four-bedroom, two-bath, "green" residence powered by photovoltaic panels to provide temporary housing for seasonal firefighters and transient staff/volunteers at Rancho Jamul.	4.2 - 4.8	\$700,000
Relocate Storage Building (Rice Barn) - Due to frequent vandalism at its present location on San Miguel Mountain, relocate the existing metal storage building to Rancho Jamul; install photovoltaic panels on relocated facility.	2.1-2.6	\$115,000
Construct Security Fence and Gates Along Refuge Boundary at Jamacha Road and Willow Glen Drive - Construct approximately 1,000 linear feet of 8-foot-high black chain link fencing with gates along the refuge boundary behind existing commercial development to minimize impacts related to trespass and illegal encampments.	2.3	\$75,000
Mark Refuge Boundaries– Identify and post Refuge boundaries as parcels are acquired, and install new markers elsewhere as needed.	2.1-2.6	\$100,000

Table 6-3
Proposed Update to the FBMS Database
Based on the Construction Proposals Described in Alternative D

Construction Project (presented in order of priority)	Corresponding CCP Objective(s)	Estimated Project Cost
Construct Native Plant Nursery - To propagate native plants for use in Refuge restoration and enhancement projects, develop a nursery at Rancho Jamul to include a greenhouse, potting shed, outdoor growing areas, and seed cleaning and storage facilities. To the maximum extent practicable, "green" technology (e.g., solar panels to run lights and equipment) will be utilized at the site.	2.1-2.6	\$75,000
Realigned Trails To Improve Sustainability (Otay-Sweetwater Unit) – Implement the CCP trail recommendations, including closure and rehabilitation of some 20 miles of user-created trails and the realignment of other trails to reduce impacts to Refuge trust species, recontour eroded areas, improve trail sustainability, and/or address visitor safety. (VS Priority #2)	2.1-2.6; 3.3; 4.1-4.8	\$1,500,000
Enhance Existing Interpretive Elements Along the Sweetwater River – Design, fabricate, and install five new interpretive elements along an existing interpretive trail in the Sweetwater River area of the Otay-Sweetwater Unit to interpret the listed species and native habitats in the immediate area. (VS Priority #3)	2.1-2.6; 3.3; 4.5	\$50,000
Construct Kiosk and Parking Area at Northern McGinty Mountain Trailhead – Design and construct a 4- to 6-car parking area off Sloane Canyon Road on the Refuge to provide public access on McGinty Mountain; and design, fabricate, and install a two-paneled kiosk with interpretive materials and general refuge information at the site. (VS Priority #4)	2.1-2.6; 3.3; 4.1-4.8	\$250,000
Construct Interpretive Kiosk at the Barn at the Oaks – Design, fabricate, and install a two-panel visitor contact kiosk with that introduces and interprets the historic Barn at the Oaks and conveys the history of the barn and surrounding lands. (VS Priority #5)	3.3; 4.1-4.8	\$30,000
Install Two Trail Bridges – Design, construct, and install two trail bridges (at the confluence of Sweetwater River and Steele Canyon Creek and over the drainage to the east of the Sweetwater River Trail Bridge) to reduce impacts to riparian habitat and ephemeral streams. (VS Priority #6)	2.1-2.6; 3.3; 4.1-4.8	\$230,000
Construct a Kiosk near the Convergence of Steele Canyon Creek and Sweetwater River – Design, fabricate, and install a shaded visitor contact kiosk with six interpretative and information panels (e.g., trail map, regulations) near the confluence of Steele Canyon Creek and the Sweetwater River. (VS Priority #7)	2.1-2.6; 3.3; 4.1-4.8	\$60,000
Construct Kiosk at Southern McGinty Mountain Trailhead – Design, fabricate, and construct a two-paneled kiosk and associated displays for the McGinty Mountain trailhead parking area at Jamul Drive. In addition to a trail map and facts about hazards and prohibitions, the panels will interpret the unusual biological resources (e.g., plants, butterflies, birds, gabbro soils) on McGinty Mountain. (VS Priority #8)	2.1-2.6; 3.3; 4.1-4.8	\$25,000

**Table 6-3
Proposed Update to the FBMS Database
Based on the Construction Proposals Described in Alternative D**

Construction Project (presented in order of priority)	Corresponding CCP Objective(s)	Estimated Project Cost
Construct Kiosk on the Sweetwater River Trail – Design, fabricate, and install a two-panel visitor contact kiosk (including interpretive panels) on the Sweetwater River Trail near the Shinohara parcel to inform users that they are entering the Refuge and to introduce and interpret coastal sage and chaparral scrub, grassland, and vernal pool ecology. (VS Priority #9)	2.1-2.6; 3.3; 4.1-4.8	\$20,800
Construct Kiosk at the End of Par Four Drive – Design, fabricate, and install a two-panel visitor contact kiosk (including interpretive panels) at this trailhead to inform users that they are entering the Refuge and to introduce and interpret San Diego ambrosia, Hermes copper butterfly, and California gnatcatcher. (VS Priority #10)	4.2-4.8	\$20,800
Parking Area for the South Las Montañas Area – Design and construct a parking area, restroom, and required street improvements from Highway 94 for the south Las Montañas area to accommodate wildlife-dependent recreational uses at this location. Access from Highway 94 will require a traffic study and Caltrans encroachment permit, improvements to Highway 94 for ingress/egress, and a short vehicular bridge to cross Steele Canyon Creek. (VS Priority #11)	4.1-4.8	\$1,500,000
Interpret Rare Vernal Pool Habitat – Design, fabricate, and install a 500-foot-long boardwalk, two interpretive panels, and eight species identification signs along the trail to support guided walks that will interpret the unique species and habitat requirements of this specialized wetland habitat. (VS Priority #12)	1.4; 4.2-4.8	\$60,000
Expand Opportunities for Wildlife Observation – Design, fabricate, and install bird identification signs for the birding trail to be established in the south Las Montañas area to support organized and individual outings to observed the birds supported by the oak woodland, riparian, and scrublands present in this area. (VS Priority #13)	4.2-4.8	\$20,000
Improve Accessibility on the Sweetwater River Trail Bridge – Design, construct, and install two new access ramps for the Sweetwater River Trail Bridge to better accommodate individuals in wheelchairs, as well as equestrians. (VS Priority #14)	4.2-4.8	\$100,000
Total Estimated Cost		\$10,956,600

Another database relevant to Refuge operations is the Refuge Operating Needs System (RONS), a database that houses a refuge's desired habitat improvement projects, studies, and new equipment needs, as well as the place where staffing needs (predicated on the nationally agreed upon staffing model) are expressed. Data within RONS are used regularly in budget justifications presented to the Department of the Interior, the Office of Management and Budget, and Congress. All of the RONS projects within the San Diego NWR Complex, of which the San Diego NWR is a part, are prioritized to identify the most important projects within the Complex. Each year RONS projects are submitted for consideration and compete with similar projects for Refuge funds.

Following the completion of the CCP for the San Diego NWR, the RONS database will be updated to reflect the proposals included in the preferred management alternative for the Refuge. To illustrate the changes to the RONS database that would occur following approval of the CCP, Table 6-4 presents the proposals included in Alternative D. If this alternative were selected for implementation, these projects would be included in the updated RONS database. For each project, the corresponding CCP objective, as described earlier in this chapter, is also provided.

The costs presented in Table 6-4 are rough estimates and will be refined as more details are available. The projects listed in Table 6-4 are presented in order of priority (from highest to lowest) within the Refuge. To fully implement the proposed actions and achieve the goals and objectives of the CCP, additional staff position will be required as reflected in Table 6-4.

The estimated cost for implementing the proposals in the FBMS and RONS database (excluding deferred maintenance projects), as outlined in Tables 6-3 and 6-4 is \$13,186,833 and the anticipated reoccurring annual cost for these new proposals is estimated at \$658,375.

Table 6-4 Proposed Update to the RONS Database Based on the Proposals Described in Alternative D			
Proposed Action	Corresponding CCP Objective	Operating Costs (in thousands)	
		First Year Cost	Recurring Annual Cost
Projects (presented in order of priority)			
Restore Habitat for the Endangered Quino Checkerspot Butterfly - Restore and enhance, through invasive plant control and planting and seeding of native species, about 300 acres habitat for the endangered Quino checkerspot butterfly in several locations on the Otay-Sweetwater Unit with the goal of increasing suitable breeding sites.	1.3	\$200,000	\$44,470
Restore and Enhance Restore Vernal Pool Habitat – Restore the natural hydrology in vernal pool habitat within the Del Mar Mesa Vernal Pool Unit; remove exotic plants and, where appropriate, reintroduce native vernal pool species to vernal pools on the Refuge.	1.4	\$50,000	\$25,000
Remove Former Dumpsite and Restore Riparian and Upland Habitat - Excavate and remove dumped materials within a small canyon that drains into the Sweetwater River. Dispose of the materials in an approved waste or recycling site, reconstruct and recontour the canyon to mimic the watershed's natural drainage pattern, and revegetate the site with appropriate native species.	1.2; 2.3	\$600,000	\$0

**Table 6-4
Proposed Update to the RONS Database
Based on the Proposals Described in Alternative D**

Proposed Action	Corresponding CCP Objective	Operating Costs (in thousands)	
		First Year Cost	Recurring Annual Cost
Restore Upland Habitats for the Coastal California Gnatcatcher and the Cactus Wren - Restore coastal sage scrub and cactus habitats on up to 500 acres in several disjunct areas within the Otay-Sweetwater Unit to recover populations of coastal California gnatcatcher and cactus wren.	1.1; 2.1	\$360,000	\$75,000
Restore Native Grasslands and Forblands to Benefit Threatened Otay Tarplant and San Diego Thornmint, and Migratory Birds – Implement restoration of native grass/forblands on the Otay-Sweetwater Unit by removing invasive plants and planting and seeding native species of grasses and forbs on up to 200 acres of uplands underlain with Diablo clay soils.	1.6; 2.6	\$133,333	\$35,000
Control Invasive Exotic Plants in Wetlands, Riparian, and Uplands - Control non-native invasive arundo, tamarisk, castor bean, Mediterranean grasses, and other species in wetland, riparian, and upland habitats following the recommendation included in the Integrated Pest Management.	2.1-2.4; 2.8	\$100,000	\$50,000
Monitor Presence of Feral Pigs and Wild Turkeys on the Otay-Sweetwater Unit - Initiate the monitoring of upland areas within the Otay-Sweetwater Unit to detect the presence of feral pigs and wild turkeys on the Refuge.	2.8	\$10,000	\$10,000
Conduct Baseline Rare Plant Survey – Conduct a Refuge-wide survey to identify, map, and assess existing populations of listed and sensitive plant species throughout the Refuge to establish baseline data necessary to ensure long-term protection and identify changes in populations or population trends over time.	1.5-1.6	\$200,000	\$0
Inventory of Terrestrial Invertebrates in Chaparral Habitat – Inventory and sample terrestrial invertebrates present in chaparral vegetation on the Otay-Sweetwater Unit.	2.7	\$100,000	\$0

**Table 6-4
Proposed Update to the RONS Database
Based on the Proposals Described in Alternative D**

Proposed Action	Corresponding CCP Objective	Operating Costs (in thousands)	
		First Year Cost	Recurring Annual Cost
Establish and Staff MAPS Stations - To provide monitoring data for listed and sensitive species, and other bird species present within oak woodland and chaparral or coastal sage scrub habitat within the Otay-Sweetwater Unit, develop two MAPS stations (designated bird banding stations operated by Federal and State agencies, private organizations, and individual bird banders), following standardized protocol for constant-effort mist netting per the Institute for Bird Populations.	2.7	\$24,000	\$20,000
Support the Restoration of Cryptobiotic Crust – Provide initial funding to support research related to the restoration of cryptobiotic crust, including the preparation and maintenance of test plots on the Refuge to facilitate this research.	1.3	\$50,000	\$0
Enhance Riparian Habitat Quality to Support Listed Species – Implement riparian restoration/enhancement proposals described in the Habitat Management Step-down Plan to be prepared within five years of CCP approval.	1.2; 2.3	TBD following completion of the Step-down Plan	TBD
Monitoring of Ground/Surface Water – Monitor surface water and groundwater quality and the quantity of groundwater available for riparian and oak woodland areas within the Otay-Sweetwater Unit.	2.7	\$5,000	\$1,000
Subtotal		\$1,832,333	\$260,470
Additional Staffing Needs (presented in order of priority)			
Implement Biological Activities – Hire a Fish and Wildlife Biological Technician (GS 5/7/9) to assist in the implementation of MSCP-required survey and monitoring efforts, annual surveys of upland game bird and wildlife species, monitoring of invasive species, and monitoring and maintenance of habitat restoration sites.	2.7	\$37,500	\$37,500

**Table 6-4
Proposed Update to the RONS Database
Based on the Proposals Described in Alternative D**

Proposed Action	Corresponding CCP Objective	Operating Costs (in thousands)	
		First Year Cost	Recurring Annual Cost
Implement Strategic Habitat Conservation and Science-Based Adaptive Management – Hire a Fish and Wildlife Biologist (GS 11) to implement MSCP requirements that cannot currently be implemented on a routine basis, and to implement strategic habitat conservation for endangered and threatened species, design adaptive management, and assess the effectiveness of control methods on invasive species.	2.7- 2.8	\$95,000	\$95,000
Enhance Public Interpretation Programs – Hire a Park Ranger (GS 5/7/9) to assist in the development of interpretive trails, visitor kiosks, brochures, and public outreach.	3.3; 4.5	\$37,500	\$37,500
Maintain Refuge Facilities, Equipment, and other Real Property – Hire a Maintenance Worker (WG 8) to maintain facilities, equipment, and other real property and assist with various aspects of habitat restoration/enhancement, kiosk installation and upkeep, trail and access road maintenance, and other related activities.	2.1-2.8; 4.1-4.8	\$61,655	\$61,655
Improve Public Outreach and Expand Current Volunteer Program – Hire a Community Outreach Specialist (GS 11), with half of this position’s time devoted to the San Diego NWR and half to the Refuge Complex. Responsibilities would include public outreach about Refuge actions, activities, and special events; implementing an Invasive Species Rapid Response Program; and implementing volunteer programs.	4.8	\$47,500 (0.5 FTE)	\$47,500
Enhance Environmental Education Programs – Hire an Environmental Education Specialist (GS 11) to implement an expanded environmental education program on the Refuge to reach additional K–12 students, as well as incorporate a program to reach students at nearby community and four-year colleges.	4.4	\$95,000	\$95,000

**Table 6-4
Proposed Update to the RONS Database
Based on the Proposals Described in Alternative D**

Proposed Action	Corresponding CCP Objective	Operating Costs (in thousands)	
		First Year Cost	Recurring Annual Cost
Provide Geospatial Information and Analysis – Hire a GIS Technician (GS 7/9/11) who would be responsible for maintaining and analyzing data to assist Refuge staff in various matters, including wildlife and habitat management, land acquisition, fire protection, law enforcement, and visitor services.	2.1-2.8; 4.1-4.8	\$23,750 (0.25 FTE)	\$23,750
Subtotal		\$397,905	\$397,905
Total Estimated Cost		\$2,230,233	\$658,375

6.10.2 Current and Future Staffing Needs

The San Diego NWR is part of the San Diego NWR Complex, which provides supervisory, administrative, and logistical support for the San Diego NWR. The amount of time that staff within the Complex devote to the operations at San Diego NWR are reflected in Table 6-5, as are the current and future (proposed) on-site staff needs for the Refuge. Based on the actions proposed in the CCP, the need for five additional Refuge staff positions and two Refuge Complex staff positions, which would dedicate a portion of time to the San Diego NWR, were identified. If these positions were to be filled and funding was available for project implementation, the Refuge would be able to carry out all aspects of CCP to a reasonable standard. If one or more of the positions are not filled, some aspects of the CCP may not be completed within the timeframe presented in this chapter. The estimated cost of providing the staffing needs for maintaining and operating the San Diego NWR is approximately \$860,080.

6.10.3 Continued Acquisition of Land per the Approved Acquisition Boundary

As described in Chapter 4, there are lands within the approved Refuge boundary that have not been acquired for inclusion in the San Diego NWR or by other entities for the purpose of habitat and species conservation. The remaining properties may at some point, based on available funding, be considered for acquisition if the following conditions apply: 1) there is a willing seller; 2) the land being considered for acquisition supports “very high” to “moderate” habitat values, high biological diversity/species richness, priority target species, vernal pool habitat, and/or would provide appropriate habitat connections (wildlife corridors) between larger areas of preserved land; and 3) the property meets the general requirements of acquisition by the Service (e.g., no encumbrances on the land, no contaminants issues, no access restrictions). An important factor in the selection of potential future acquisitions is the extent to which the acquisition would improve the contiguity (i.e., eliminating inholdings, reducing edge/area ratio) of the lands already preserved within the Refuge.

**Table 6-5
Estimated Staffing Needs for the San Diego NWR CCP**

Position (grade)	Quantity	Unit¹	Cost² (salary + benefits)
San Diego NWR Complex			
Project Leader (GS-14)	.20	FTE	\$34,802
Deputy Project Leader (GS-13)	.25	FTE	\$32,426
Administrative Officer (GS-7)	.25	FTE	\$18,575
Community Outreach (GS-11)	.50 ³	FTE	\$47,500
GIS Technician (GS 7/9/11)	.25 ³	FTE	\$23,750
Federal Wildlife Officer (GL1801, FPL 9)	1.0	FTE	\$72,024
San Diego NWR			
Refuge Manager (GS-12)	1.0	FTE	\$126,680
Refuge Operations Specialist (GS-11)	1.0	FTE	\$95,000
Wildlife Biologist (GS-11)	2.0 ⁴	FTE	\$190,000
Fish and Wildlife Biological Technician (GS-5/7/9)	1.0 ³	FTE	\$37,500
Park Ranger (GS 5/7/9)	1.0 ³	FTE	\$37,500
Maintenance Worker (WG 8)	1.0 ³	FTE	\$49,323
Environmental Education Specialist (GS-11)	1.0 ³	FTE	\$95,000
Total Staffing Costs			\$860,080

¹FTE = Full-Time Equivalency Position

²Based on FY 2013 costs

³New position proposed in the CCP

⁴One FTE is a new position proposed in the CCP

This Land Protection Plan for the Vernal Pools Stewardship Project acknowledges that not all of the lands included within the proposed acquisition boundary would become part of the Vernal Pools Unit of the San Diego NWR, and, to date, there are no plans to acquire additional properties within the acquisition boundary of the Stewardship Project. If a new acquisition was to be proposed, the conditions for acquisition described previously would be considered prior to approval.

6.10.4 Potential Funding Sources for Implementing CCP Projects

Many projects included in the CCP may be implemented in full or in part by sources other than the Refuge annual budget. These projects could be funded through partnerships with other local, State, or Federal agencies; special legislative appropriations; or grants (e.g., National Fish and Wildlife Foundation, Service Cost Share Grants, Federal Highway Administration Refuge Roads Program, *TransNet* Environmental Mitigation Program). Other potential sources of funding for habitat restoration, listed species conservation and recovery, and research include the Cooperative Endangered Species Conservation Fund, California Landscape Conservation Cooperative funding, and grants that support community-based restoration through partnerships with land management agencies.

6.11 Compatibility and Appropriate Use Determinations

The Improvement Act requires that all uses permitted on a national wildlife refuge must be compatible with Refuge purposes and the mission of the NWRS and shall not be inconsistent with public safety. Before activities or uses are allowed on a refuge, uses must be found to be both appropriate and compatible. A compatible use is defined as a proposed or existing wildlife-dependent recreational use or any other use of a refuge that, based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the Refuge System mission or the purposes for which a refuge was established. A determination of whether or not a use is appropriate is required for all but wildlife-dependent recreational uses, which are identified in the Improvement Act as hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

Compatibility determinations have been prepared for hunting, fishing, wildlife observation, interpretation, and environmental education, public trail use, and research. Both an appropriate use evaluation and compatibility determination have been prepared for public trail use and for research. These documents are provided for public review and comment in Appendix A.

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