

4.0 BIOLOGICAL RESOURCES

4.1 Overview

The following descriptions of vegetation and landcover types are based on those of O'Leary *et al.* (1994), as updated by O'Leary *et al.* (2002). Acreage data presented in this INRMP represent results from O'Leary *et al.* (2002) prior to the 26 October 2003 Cedar Fire that burned about 17,600 acres of the Station. Informal evaluations in 2009 concluded that post-fire regrowth had not been sufficient to allow accurate updates to vegetation classification. Most changes in vegetation acreages within this INRMP are due to development removing some acreage from various vegetation classes.

Vegetation types, such as coastal sage scrub, are not discussed as a habitat type. Discussions of habitat are organism (*i.e.*, species) specific. Vernal pool habitat at MCAS Miramar is discussed separately because it occurs in more than one vegetation type. Nomenclature used throughout the document follows Jones *et al.* (1992) for mammals; American Ornithologists' Union (1983, 1996) for birds; Jennings (1983) for reptiles and amphibians; Hickman (1993) for plants; and Holland (1986) for vegetation types (plant communities).

Also included in this chapter is a discussion of wildlife and wildlife habitat, habitat linkages and wildlife corridors, Special Status Species, other Species of Regional Special Concern, and a review of the Habitat Evaluation Model developed in the 2000 INRMP. As a result of ongoing biological studies at MCAS Miramar, this information is periodically updated.

4.2 Vegetation and Landcover Types

O'Leary *et al.* (1994 and 2002) described and mapped 18 native and non-native vegetation types, and four landcover types on MCAS Miramar (Figure 4.2). Figure 4.2 is a consolidation of similar types for graphical purposes (*i.e.*, Grasslands includes 3 types - native, native/non-native, and non-native; there are four types of Chaparral and three types of Riparian Forest). Fifteen of these vegetation types are recognized in the classification system proposed by Holland (1986). Ceanothus chaparral and mixed grassland were added to the Holland system by O'Leary *et al.* (1994 and 2002) because they were deemed ecologically important. Additional vegetation types, consistent with those outlined in the Multiple Species Conservation Program (MSCP), include recognition of eucalyptus woodland and areas mapped as disturbed land. Unless cited otherwise, the following descriptions are based on O'Leary *et al.* (1994 and 2002).

Most vegetation types have disturbed versions that are different than the disturbed land designation added from the MSCP. Disturbed MSCP lands, for all vegetation types, pertain to areas that are substantially altered and provide little wildlife value (*e.g.*, vacant lots). Areas On MCAS Miramar were classified as disturbed land if physical disturbance had resulted in greater than half the area being bare ground and/or covered by plant species indicative of disturbed areas, especially forbs. These areas have the potential to support native plant communities. Approximately 2,310 acres of the Station were classified as disturbed. Refer to Appendix B for a list of plant species known to occur at the Station.

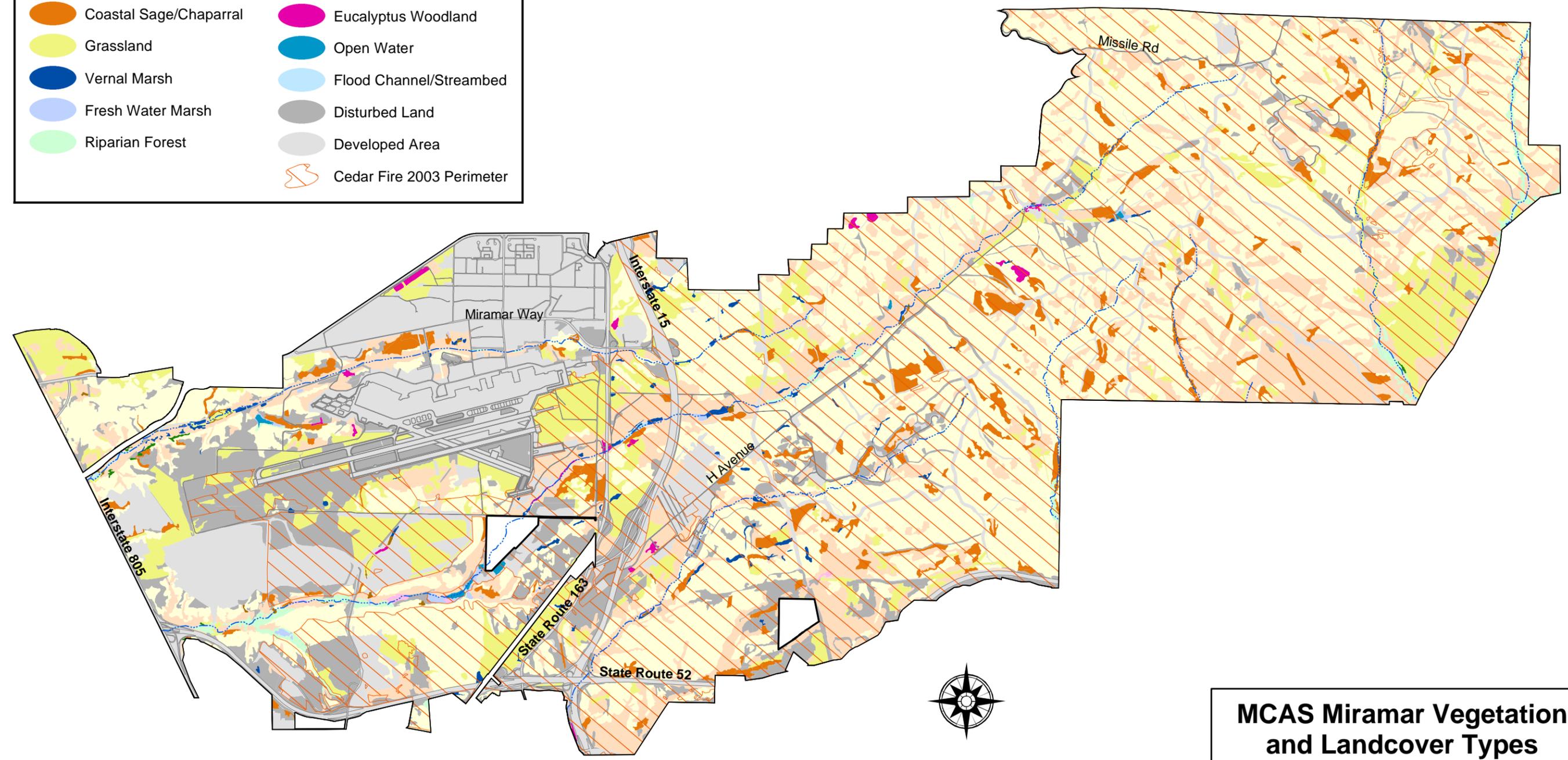
4.2.1 Coastal Sage Scrub

Coastal sage scrub vegetation on MCAS Miramar is categorized as Diegan coastal sage scrub (Holland 1986). The Station supports approximately 3,770 acres of coastal sage scrub, 2,006 acres of which are classified as disturbed. This land type consists of sparsely to densely spaced, low-growing, drought deciduous shrubs. It frequently occurs on south-facing slopes and ridges where the rainfall, drainage, soil type, and exposure to the sun provide conditions necessary for the plant community. Coastal sage scrub is one of the most endangered land types in California (Atwood 1993). Species characteristic of coastal sage scrub include California



Vegetation/Landcover 2010

Chaparral	Willow Scrub
Coastal Sage Scrub	Mulefat Scrub
Coastal Sage/Chaparral	Oak Woodland
Grassland	Eucalyptus Woodland
Vernal Marsh	Open Water
Fresh Water Marsh	Flood Channel/Streambed
Riparian Forest	Disturbed Land
	Developed Area
	Cedar Fire 2003 Perimeter



MCAS Miramar Vegetation and Landcover Types
Figure 4.2
Source: O'Leary et. al. 2002
GeomorphIS 2011

This map is for planning purposes only. Some data may be incomplete, inaccurately positioned, and/or generalized.

sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), bush monkey-flower (*Mimulus aurantiacus*), saw-toothed goldenbush (*Hazardia squarrosa*), laurel sumac (*Malosma laurina*), and lemonade berry (*Rhus integrifolia*).

4.2.2 Chaparral



Coastal Sage Scrub (foreground)/Chaparral (background) Natural Resources Division

Chaparral is made up of shrubs with small, hard, evergreen leaves (*i.e.*, sclerophyllous) that are adapted to prevent wilting during dry periods. Chaparral vegetation composes approximately 9,258 acres on MCAS Miramar, of which 1,534 are disturbed. This includes three disturbed chaparral groups: Chamise Chaparral, Disturbed Southern Mix Chaparral, and Disturbed Scrub Oak Chaparral. Chamise (*Adenostoma fasciculatum*) is an indicator species that defines chaparral vegetation types and is present to some degree in all chaparral vegetation at MCAS Miramar.

Chaparral types are chamise, southern mixed chaparral, Nuttall's scrub oak (*Quercus dumosa*), and ceanothus (*Ceanothus tomentosus* and *C. verrucosus*) with mixed and disturbed versions of each.

4.2.3 Coastal Sage Scrub/Chaparral

Coastal sage/chaparral vegetation combines attributes, in nearly equal measures, of coastal sage scrub and chaparral vegetation types. This vegetation type covers approximately 729 acres on the Station, of which 148 acres are disturbed.

4.2.4 Grasslands



Native Grasslands Natural Resources Division

Grasslands are a characteristic feature of the California landscape; however, most grasslands present today are dominated by non-native annual grasses. Native grasslands are dominated by perennial needlegrasses (*Nassella* spp.) and are thought to have been more widely distributed throughout the state. This vegetation type now has the highest ranking of rarity possible in terms of native habitat for wildlife species according to the California Department of Fish and Game (1994).

Native grassland is characterized by 40 percent ground cover of grasses and forbs, with greater than two-thirds of cover attributable to

needlegrasses; native and non-native grasses and forbs may be intermixed. Disturbed and undisturbed versions of native grassland cover approximately 24 acres (not including burned acreage) on MCAS Miramar. Non-native grass species include wild oats (*Avena* spp.) and bromes (*Bromus* spp.). Disturbed and undisturbed versions of non-native grassland cover approximately 1,468 acres on MCAS Miramar. Intergradation zones in which both native and non-native grasslands occur (and could not be definitively placed into either category)

are also recognized on MCAS Miramar; these areas are categorized as mixed grassland. Mixed grassland covers approximately 415 acres of MCAS Miramar. The total vegetative cover of the three grassland types described here is approximately 1,907 acres, of which 1,358 acres are classified as disturbed.

4.2.5 Vernal Marsh

Vernal marsh seasonal wetlands are dominated by small rushes (*Juncus dubious* and *bufonius*), although other forbs and grasslike species occur to a much lesser extent. Approximately 89 acres of these wetlands occur on the Station. These vernal marshes typically occur in ephemeral and intermittent streambeds as opposed to depressions that would typically be considered vernal pool habitat. The latter is often dominated by pale spikerush (*Eleocharis macrostachya*). Toad rush can be an indication of previous disturbance.

4.2.6 Fresh Water Marsh

Fresh water marshes are permanently flooded sites without significant water currents. These marshes are dominated by perennial plants that are adapted to flooded conditions. Dominant species include cattails (*Typha* spp.), bullrushes (*Scirpus* spp.), smartweed (*Polygonum* spp.), and dock (*Rumex* spp.). Approximately 31 acres of this vegetation type occur on the Station, of which 10 acres are disturbed.

4.2.7 Riparian Forests



Southern Arroyo-Willow Riparian Forest
Natural Resources Division

Non-scrub riparian vegetation types (forests) on MCAS Miramar include southern coast live oak (*Quercus agrifolia*) riparian forest, southern arroyo-willow (*Salix* spp.) riparian forest, and sycamore (*Platanus racemosa*) woodland and cover approximately 160 acres, of which 6 acres are disturbed. Riparian vegetation types are generally associated with bodies of water, such as streams, lakes, or wetlands, or are dependent upon perennial, intermittent, or ephemeral surface or subsurface water drainage. On MCAS Miramar, riparian vegetation is associated with intermittent streams or floodplains.

4.2.8 Willow Scrub

Willow (*Salix* spp.) scrub is a riparian vegetation type that is dominated by several species of willow. Willows form relatively dense stands of vegetation averaging less than 20 feet high. Disturbed areas can include non-native species, such as giant reed (*Arundo donax*), tamarisk (*Tamarix* spp.), gum tree (*Eucalyptus* spp.), and pampas grass (*Cortaderia* spp.). Approximately 14 acres of willow scrub occur on the Station, of which 7 acres are disturbed.



Coast Live Oak Woodland
Natural Resources Division

4.2.9 Mulefat Scrub

Mulefat (*Baccharis salicifolia*) scrub is generally considered a depauperate riparian scrub vegetation type. It is established in areas of frequent flooding that prevents other riparian vegetation from becoming established. Mulefat scrub occupies approximately 15 acres on the Station typically on intermittent stream channels with

coarse substrates. Approximately 7 acres are classified as disturbed.

4.2.10 Coast Live Oak Woodland

More than 25 percent of overstory cover of coast live oak woodland consists of coast live oak (*Quercus agrifolia*). These woodlands typically occur on or near the base of north-facing slopes and in moist ravines. The understory may contain a variety of chaparral-related shrubs, such as toyon (*Heteromeles arbutifolia*), white flowering currant (*Ribes indecorum*), blue elderberry (*Sambucus mexicana*), and poison oak (*Toxicodendron diversilobum*). Only 7 acres of this vegetation type occur on the Station.

4.2.11 Eucalyptus Woodland

In eucalyptus woodland vegetation, greater than 25 percent of the overstory cover consists of *Eucalyptus* species. Approximately 50 acres of Eucalyptus woodland occur on the Station.

4.2.12 Disturbed Land

Areas classified as disturbed are those where past or present physical disturbance (*e.g.*, brushing, tilling, or vehicle disturbance) is prevalent. In these areas more than half of the area is covered by species adapted to disturbance, especially forbs, or by bare ground. Disturbed areas have potential to support native vegetation if left undisturbed or are subjected to active restoration actions. Approximately 2,254 acres of MCAS Miramar have been characterized as disturbed land.

4.2.13 Open Water

At MCAS Miramar, bodies of open water, because of size, are defined as ponds and account for approximately 13 acres.

4.2.14 Natural Flood Channel/Streambed

Approximately 18 acres of the Station are categorized as natural flood channel/streambeds. These areas are unvegetated or sparsely vegetated (less than 30 percent cover of shrubs and trees) natural flood channels or scoured streambeds. The lack of well-developed vegetation in these areas is a result of periodic flooding.

4.2.15 Developed

Developed areas are those with little or no potential for conversion to native plant communities in the near future. These include landscaped areas, buildings, pavement, and recently graded areas. Approximately 4,088 acres of MCAS Miramar are developed. About 402 additional acres are planned for development.



Natural Flood Channel/Streambed
Natural Resources Division

4.3 Vernal Pool Habitat

4.3.1 General

Vernal pools are ephemeral wetlands that develop on a variety of soils (*e.g.*, Redding) that on MCAS Miramar are usually underlain by an iron-silica hardpan, in a variety of habitats. The hardpan retards natural rainwater percolation, and ponding occurs in depressions on the soil surface.

Vernal pools develop during the seasonal rainy period that begins in late fall or early winter and extends into the spring. Water rarely ponds before December 1 or remains after May 1. Year-to-year variation in the length and pattern of precipitation affects the depth and duration of standing water. After a heavy rainfall, pools may become interconnected either because of the high water level or shallow surface water flow. In dry years many pools do not fill.



Vernal Pool – Wet Season Natural Resources Division

Vernal pools are non-tidal waters that are isolated seasonal wetlands and may be subject to provisions of Section 404 of the Clean Water Act (CWA) administered by the Army Corps of Engineers (*Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, September 2008*). These pools have all three wetland indicators (hydric soils, hydrophytic vegetation, and hydrology) during the wet season and normally lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season.

4.3.2 Regional Vernal Pool Habitat Issues

Extensive residential, commercial, agricultural, and infrastructure development has led to the loss of most of San Diego's vernal pool habitat and the endemic plants that grow in this specialized habitat. Bauder (1986) estimated that 93 percent of the original watershed acres of vernal pools had been lost; this estimate was based on Beauchamp and Cass' (1979) estimate of the historical distribution of pools. Oberbauer (1990), using a higher estimate for the original amount of vernal pool habitat, concluded that 97 percent of the pool habitat had been lost. In a report for the California Senate Committee on Natural Resources and Wildlife, Jones and Stokes (1987) stated, "*The severity of habitat loss and species endangerment makes the San Diego vernal pools one of the natural communities most urgently in need of site protection in California.*"



Vernal Pool – Dry Season Natural Resources Division

Efforts to preserve vernal pool habitat in the private sector have been largely unsuccessful. Between 1979 and 1986, about 68 percent of vernal pools on privately-owned land within the City of San Diego were lost (Bauder and Wier 1991).

On the other hand, more intense regional field surveys have revealed pools that were previously unmapped.

Along with destruction of vernal pool habitat, overall habitat quality has declined -- partly from continuing disturbances, but also from fragmentation (Bauder 1986). Fragmentation has led to additional edge effects and altered hydrology. Its impact on animals associated with vernal pools is unknown (Bauder and Wier 1991).

4.3.3 Vernal Pool Ecosystem

Vernal pools allow for a unique assemblage of plants and animals to occur on a temporal basis, some of which occur nowhere else. As the water evaporates, animal life declines, depositing cysts and other reproductive structures that will persist through the dry season and hatch with ponding in subsequent years. Plants, likewise, produce seeds, and some take on terrestrial life forms. In some areas, rounded knolls known as mima mounds separate vernal pools. However, not all vernal pool habitat contains mima mounds.

Vernal pool plant and animal communities, which Thorne (1976) labeled “*vernal pool ephemeral*,” are unique. More than three-quarters of plant species characteristic of these pools are found only in the California Floristic Province (Thorne 1976), an area west of the Sierra Nevada and stretching from southern Oregon to northern Baja California, Mexico. Pools contain assemblages of up to 25 freshwater crustacean species, some of which are cosmopolitan and some (*e.g.*, San Diego and Riverside fairy shrimp) of which are endemic to Southern California. There are possibly several undescribed species of ostracods (Branchiopod Research Group 2003) whose conservation status is unknown.

Even within the California Floristic Province, some of the plant species’ distributions are exceedingly restricted. *Pogogyne abramsii* is found exclusively on the central mesas of San Diego County, and *Pogogyne nudiuscula* occurs only on the southern mesas, extending south into Baja California, Mexico. Likewise, *Brodiaea orcuttii* is found only in San Diego County and Baja California. *Eryngium aristulatum* var. *parishii* and a possible undescribed subspecies of *Downingia cuspidata* are restricted to southern California. On a local scale, distributions of many vernal pool species are patchy within pool clusters or “complexes” (Bauder and Wier 1991).

In addition to the endemic vernal pool habitat species of restricted distribution, there are a number of plant species, such as *Elatine californica*, *Pilularia americana*, and *Lythrum hyssopifolium*, belonging to the subcosmopolitan aquatic flora (Thorne 1984) that occurs worldwide as well as in these ephemeral pools. Likewise, Miramar vernal pool freshwater invertebrate fauna consist of both Southern California/Northern Baja endemics, such as San Diego and Riverside fairy shrimp, and more widely distributed species, such as Lindahl’s fairy shrimp, the cladoceran *Macrothrix hirsuticornis* found worldwide.

On MCAS Miramar, vernal pool habitat is essential to the survival of six species protected under the ESA. Five vernal pool associated species are listed as endangered: the San Diego button-celery (*Eryngium aristulatum* var. *parishii*), California Orcutt grass (*Orcuttia californica*), San Diego mesa mint (*Pogogyne abramsii*), Riverside fairy shrimp (*Streptocephalus woottoni*), and San Diego fairy shrimp (*Branchinecta sandiegonensis*). Spreading navarretia (*Navarretia fossalis*) is listed as threatened. Table 4.3.3 indicates the presence of these species within MCAS Miramar vernal pool groups. Map 4.3.4 indicates locations of these management units and pool groups.

4.3.4 Vernal Pool Habitat at MCAS Miramar

Vernal pool habitats at MCAS Miramar constitute Southern California’s largest, least disturbed, and most contiguous vernal pool landscapes supporting endangered and sensitive species (Bauder and Wier 1991).

Vernal pool habitat typically occurs on the coastal terraces of MCAS Miramar in the western half of the Station. Vernal pools are not uniformly distributed but occur in groups or clusters on mesas where soil and topographic conditions favor their development (*i.e.*, presence of a durapan layer). Historically, vernal pool clusters were separated from each other by a system of canyons trending in a northeast/southwest direction and draining toward the ocean. Three of these large canyons drain MCAS Miramar: Rose Canyon, San Clemente Canyon, and Murphy Canyon. Varying degrees of land use (*e.g.*, roads, buildings, landfill) have dissected

Table 4.3.3 Federal Listed Species Occurrence within MCAS Miramar Vernal Pool Groups^**

Pool Groups	California Orcutt Grass	San Diego Button-celery	San Diego Mesa Mint	Spreading Navarretia	San Diego Fairy Shrimp	Riverside Fairy Shrimp	Total Basins in Group#
A	0	0	8	0	43	0	103
AA	0	44	124	0	516	2	1,197
EE	0	334	139	1	752	0	1,364
Elliott	0	0	0	0	48	0	220
F	0	9	51	1	162	0	367
FF	0	15	0	0	26	0	59
FP (Flood Plain)	0	1	0	0	87	0	332
GA	0	5	0	0	36	0	252
GG	0	16	0	0	58	0	133
HH	1	114	42	1	182	0	421
I	0	31	3	0	42	0	68
Landfill	0	0	1	0	23	0	25
RR	0	0	18	0	56	0	137
U	1	910	654	3	1,455	0	1,702
V	0	10	3	0	21	0	77
W	0	13	0	0	65	0	105
X	0	232	28	0	374	0	663
Z	0	61	31	0	105	0	306
Total All Groups	2	1,795	1,112	6	4,051	2	7,531

* Numbers of basins, including vernal pools and other seasonally ponded features.

^ Some plant species presence/absence data from spring/summer 2010 not included.

Total basins in group cannot be calculated by adding rows because some basins have more than one federal listed species, which would result in double counting them. Additionally, basins with no listed species would not be counted at all.

remaining natural habitat into a number of separate parcels varying in size from large (>1,500 acres) to very small (< 1 acre).

The NAS Miramar Vernal Pool Management Plan (Bauder and Wier 1991) grouped pools into units (Figure 4.3.4). This plan established Management Units that were delineated as geographical areas with similar management needs grouped pools within geographical areas with similar management needs. For instance, all pools within the flightline security fence were placed in Management Unit 8. A number of pools east of I-15 were assigned to Unit 4, an area that was highly disturbed. Units 1, 2, and 5-7 have the potential for high quality conservation because they were large, contain varied topography and a number of vegetation types, and were distant from intense military activity. Unit 9 contains small groups suitable for public awareness and educational activities; however most groups requesting field trips have asked to visit the Unit 7 area within the Miramar Mounds National Natural Landmark due to the less disturbed and more extensive representation of a vernal pool landscape. Management Unit 10 contains pools which could not be placed logically into other units. This unit is divided into two sections: A) a number of isolated pools at risk for low to moderate disturbance, and B) isolated pools at risk for high disturbance (Bauder and Wier 1991). Current management unit designations continue to be based on Bauder and Wier (1991). Updated pool resource delineations have necessitated adjustment of management unit and group boundaries within units. New management groups have been created to acknowledge differences associated with less typical habitats occupied by San Diego fairy



- Vernal Pool
 - Other Vernal Pool Habitat
 - Estimated Watershed
 - Management Unit
 - Developed Area
- (Watersheds have not been mapped for recently surveyed basins)



**MCAS Miramar
Vernal Pool Resource
Distribution and Management Units**
Figure 4.3.4

GeomorphIS 2010

This map is for planning purposes only. Some data may be incomplete, inaccurately positioned, and/or generalized.

shrimp not recognized in the 1991 plan (*e.g.*, ponded areas of canyon floodplains and artificial drainage ditches in the Landfill area).

Vernal pool habitat on MCAS Miramar has been mapped using several different methods. Initial vernal pool habitat mapping on Station was conducted in 1993 using 1 inch:400 feet, aerial photographs coupled with extensive field surveys. Typically, this method overestimated the surface area of vernal pool habitat basins.

In 1995, the Station began re-mapping individual vernal pool habitat basins using a sub-meter accuracy global positioning system (GPS). Between 1999 and 2010, essentially all of the Station has been resurveyed to precisely map vernal pool habitat basins, estimate watersheds, and determine species presence (Black 2004a, 2004b, 2006, 2007, 2009a, 2009b, 2010; Cobb 2003). As these resurvey efforts have proceeded, discrepancies between previously mapped vernal pool habitat and those observed by newer surveys have been resolved by the Natural Resources Division to update the database that replaces previous information using a standardized format. Results from other projects, such as BRAC vernal pool habitat restoration projects, surveys supporting NEPA analyses, and the 2001 inventory of “G” (Teacup) parcel (Ecological Restoration Service 2001), also were used to update the vernal pool habitat database maintained by the Natural Resources Division.

Essentially all areas of the Station supporting both undisturbed natural vernal pools and other basins supporting fairy shrimp and typical vernal pool fauna and flora have now been carefully examined, and basins have been mapped with sub-meter accuracy and sampled for listed vernal pool fairy shrimp and listed pool plant species. More than 7,500 basins have been surveyed (Figure 4.3.4) Many basins surveyed have included puddles in dirt roads, ruts, and sites impounding water as a result of man-made conditions that may not have otherwise ponded sufficient water to warrant survey. Some basins did not support any vernal pool species. Recent mapping of pools previously mapped with old technology using sub-meter accurate GPS equipment has resulted in a more accurate, but lower, estimate of total acreage of vernal pool habitat on the Station (147.1 acres in 2010 vs 157.3 acres reported in 2006). The apparent loss of vernal pool habitat acreage is only the result of more accurate mapping. The total number of basins mapped has increased by a few hundred.

The Station developed descriptive terms for various “types” of basins to provide an indication of apparent origin (natural or as a result of human activity) for mapping and assessment purposes. Use of these “type definitions,” by themselves, is not intended to indicate whether a site supports threatened/endangered species or is subject to Clean Water Act regulatory jurisdiction. “Type” identifiers have been used since 1999 when conducting vernal pool resource surveys and mapping, as a required data entry field in associated GIS layer attributes. Individuals conducting surveys assign the vernal pool “type” description while conducting fieldwork. “Type” definitions contribute to understanding vernal pool habitats and other seasonally ponded features at MCAS Miramar.

Pool: An apparently naturally occurring or purposely created/restored basin that holds water following a series of winter rainfall events. Some evidence of human disturbance may be present (*e.g.*, ruts), but a basin must be present that suggests an origin due to natural processes or purposeful creation/restoration activities. These will usually be very well vegetated with plants indicative of vernal pool conditions unless restoration is ongoing.

Marsh: A wetland frequently or continually inundated with water, characterized by emergent soft-stemmed vegetation adapted to saturated soil conditions following a series of winter rainfall events or urban runoff. On MCAS Miramar, this type is dominated by plants of the families Juncaceae and Cyperaceae; with lesser amounts of assorted forbs and graminoids such as *Lythrum hyssopifolium*, *Ambrosia psilostachya*, *Eleocharis* spp., and *Rumex acetosa* admixed. Use a dominance of Juncaceae and Cyperaceae to distinguish marshes from pools.

Puddle: A depression in an improved (*e.g.*, paved, graded), altered, or unimproved surface that holds water following a series of winter rainfall events apparently as the result of human activities (use and/or

maintenance). No reasonable indication exists of a naturally occurring basin. It will usually be sparsely vegetated, if at all, due to frequent disturbance. Examples of this type would include depressions in dirt roads, dirt parking/storage lots, potholes, and sub-base failures in improved surfaces.

Impoundment: An area of ponding water resulting from human actions that have obstructed natural drainage patterns or flow following a series of winter rainfall events or urban runoff. No evidence of the pre-existence of natural wetlands or other waters remains. The site may often be well-vegetated. Examples of conditions creating impoundments include deposited material “damming” a natural drainage swale, bermed areas, borrow sites, dozer windrows, and similar.

Ditch: A linear depression, often paralleling or extending from developments, including roads, runways, paths, etc. It may retain and hold water following a series of winter rainfall events or urban runoff if the grade of the ditch does not allow water to flow off-site. A ditch may be sparsely vegetated due to periodic maintenance but may be well vegetated if routine maintenance has not been required. If a ditch is wider than normal (*e.g.*, when borrow material was obtained alongside a road under construction), but no clear indication of a naturally occurring basin is present, the entire depressional area should be identified as part of the ditch.

Rut: Vehicle track in soil where there is no indication of a natural vernal pool basin present. These may hold water following a series of winter rainfall events or urban runoff. Older ruts may be vegetated with plants often found in vernal pool conditions.

N/A: This is a depression that has no MCAS Miramar vernal pool database plants, ACOE vernal pool indicator plants, other aquatic weed species, or hatched fairy shrimp or fairy shrimp cysts present. This is used to describe a site that ponded water sufficiently to be surveyed, but results were negative.

Excavation: A deliberate depression that is generally evidenced by rectangular shape when dug with heavy equipment or by abrupt and often deep (> .5 meter) hole. There is usually a pile of extracted material in the immediate vicinity of the excavation. Because of their depth and possibly because of their proximity to hardpan areas, excavations often pond for extended periods compared with shallow ruts, puddles, or natural pools found near them.

Building Foundation: A special class of excavation that is usually characterized by rectangular or angular shapes, and often has outside foundation walls and/or pilings of concrete. Occasionally, there is a concrete slab rather than bare soil within the interior walls.

Watercourse: This is a portion of an ephemeral watercourse/drainage that has a propensity to pond following cessation of storm flows. Duration of water flow varies depending on the associated watershed sizes and degree of topographical change along their lengths. The ponded areas may have fairy shrimp and other freshwater invertebrates present, as well as a wide range of vernal pool plant species.

4.4 Wildlife and Wildlife Habitat

MCAS Miramar provides important habitat for a wide variety of wildlife species. At a minimum, MCAS



Western Rattlesnake *Natural Resources Division*

Miramar supports 7 species of amphibians, 30 species of reptiles, and 39 species of mammals. Well over 200 species of birds have been observed on the Station. A list of animal species observed or potentially occurring at MCAS Miramar is provided in Appendix C; the Station has a pamphlet, Checklist of Birds, which has been reproduced for general dissemination. Chaparral and coastal sage scrub are the most common vegetation types on the Station, and many species of wildlife are adapted to both types.

The loss of coastal sage scrub throughout Southern California has resulted in the listing of the coastal California gnatcatcher as threatened under the federal ESA.

Native grasslands, and the wildlife dependent on them, face a similar plight in coastal southern California. Some vegetation types, such as eucalyptus woodlands and disturbed non-native grasslands, provide relatively poor habitat for most taxa of native wildlife.

Riparian/wetland/open water areas at MCAS Miramar provide important resources to wildlife, especially amphibians. Even though these areas contribute only 1.3 percent of native vegetative cover on the Station, they are relatively diverse. Riparian vegetation is also important because it may be used as a preliminary indicator of potential wildlife corridors, in addition to being important habitat in its own right (Simberloff and Cox 1987).

Riparian corridors provide good structural diversity of vegetative cover (and sometimes topographic cover), a water source, an abundance of insects and plant food, and less intense temperature fluctuations than surrounding upland habitat (Doyle 1990). Ample cover allows wildlife using corridors to pass through undetected, and ephemeral streams that do not flow year-round may contain small ponds that provide enough water to reinforce the use of corridors in the future. Riparian vegetation generally maintains visual stimuli along the length of corridors, a characteristic that may keep animals moving through it (Ogden 1992). Since many areas within riparian corridors meet criteria of wetlands, they are subject to regulations of the CWA.

4.5 Habitat Linkages and Wildlife Corridors

The following definitions and designations of habitat linkages and wildlife corridors are consistent with those used in the development of the MSCP (City of San Diego 1996a; Ogden 1993). **Habitat linkages** are natural areas that not only provide connectivity among habitat patches, but also provide habitat for native plants as well as year-round foraging and reproduction habitat for resident wildlife. There is particular concern for habitat linkages because they are the key to maintaining contiguous occupied habitat for many species. Breaking the linkages would result in habitat fragmentation and isolated populations.

Wildlife corridors are narrower connections among habitat patches that are intended to allow for wildlife movement and dispersal. Wildlife corridors can be viewed as being local (*i.e.*, within MCAS Miramar) or regional. Local corridors are important because they allow resident wildlife access to resources within MCAS Miramar (Figures 4.5a and 4.5b), and they function as connections with habitat patches in the region (Figure 4.5c). Wildlife corridors generally follow major drainages and open ridgelines.

4.5.1 Habitat Linkages

The entire eastern portion of MCAS Miramar (*i.e.*, east of I-15) functions as an important habitat linkage with adjacent open spaces. Unfortunately, the construction of State Route 52 south of MCAS Miramar fragmented this once open habitat linkage with the Mission Trails Regional Park to the south. Two large bridges of SR 52, spanning Oak and Spring Canyons, now provide connectivity between MCAS Miramar and Mission Trails Regional Park. The conservation of habitat linkages is preferred over wildlife corridors, which are more constrained. As a result of the rapid urban development in the region, wildlife movement is frequently restricted to narrow corridors, as discussed below.

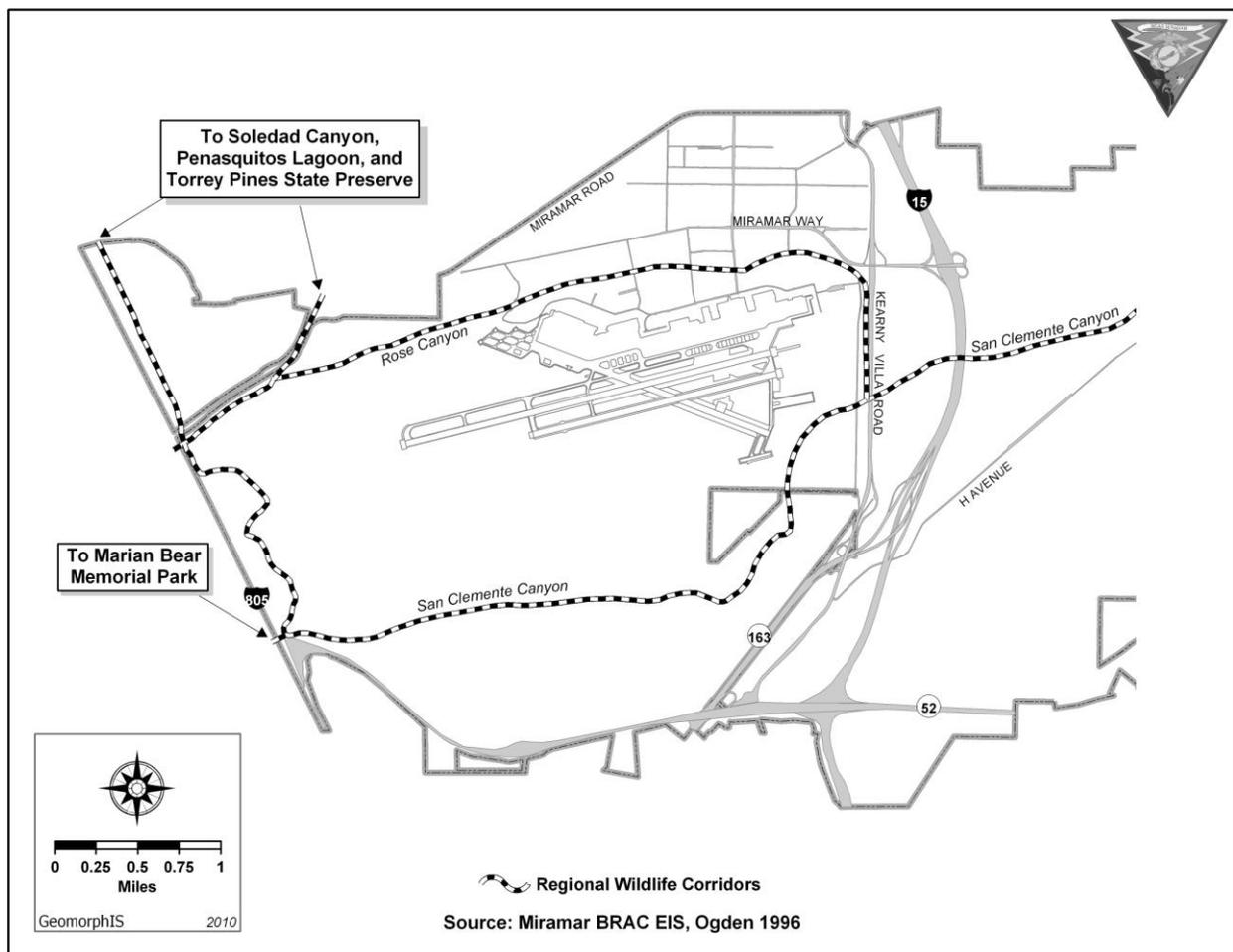
4.5.2 Wildlife Corridors

Methods Delineating Wildlife Corridors

The following descriptions of wildlife corridors are based largely on investigations conducted in 1992 by Ogden (1992) in an area encompassing MCAS Miramar, Torrey Pines State Reserve, and Los Penasquitos Canyon Preserve. Target species were the mountain lion (*Felis concolor*), bobcat (*F. rufus*), and mule deer (*Odocoileus hemionus fuliginita*).

Presumed corridors were surveyed for animal sign during April-June 1992. Animal sign (tracks and scat) was used as the primary indicator of wildlife use of corridors and was supplemented with other information gathered from more recent sightings. Data were also collected on road-kill locations that occurred between January 1990 and April 1992, and augmented by more recent road-kill data collected by the Station. All data were mapped and used to determine major regional corridors in the area and whether they were being used by target species. Also evaluated were 34 road underpasses located within the corridors. Underpasses included box culverts, pipe culverts, bridges, and a freeway interchange. Wildlife use of these underpasses was evaluated based on signs as well as the likelihood of use based on the level of topographic and vegetative cover (Ogden 1992). This information has been supplemented by evaluations reported in the Final Environmental Impact Statement for the Realignment of NAS Miramar (Ogden 1996) as well as information provided by Station personnel.

Figure 4.5a. Conceptual Wildlife Corridors on Western MCAS Miramar

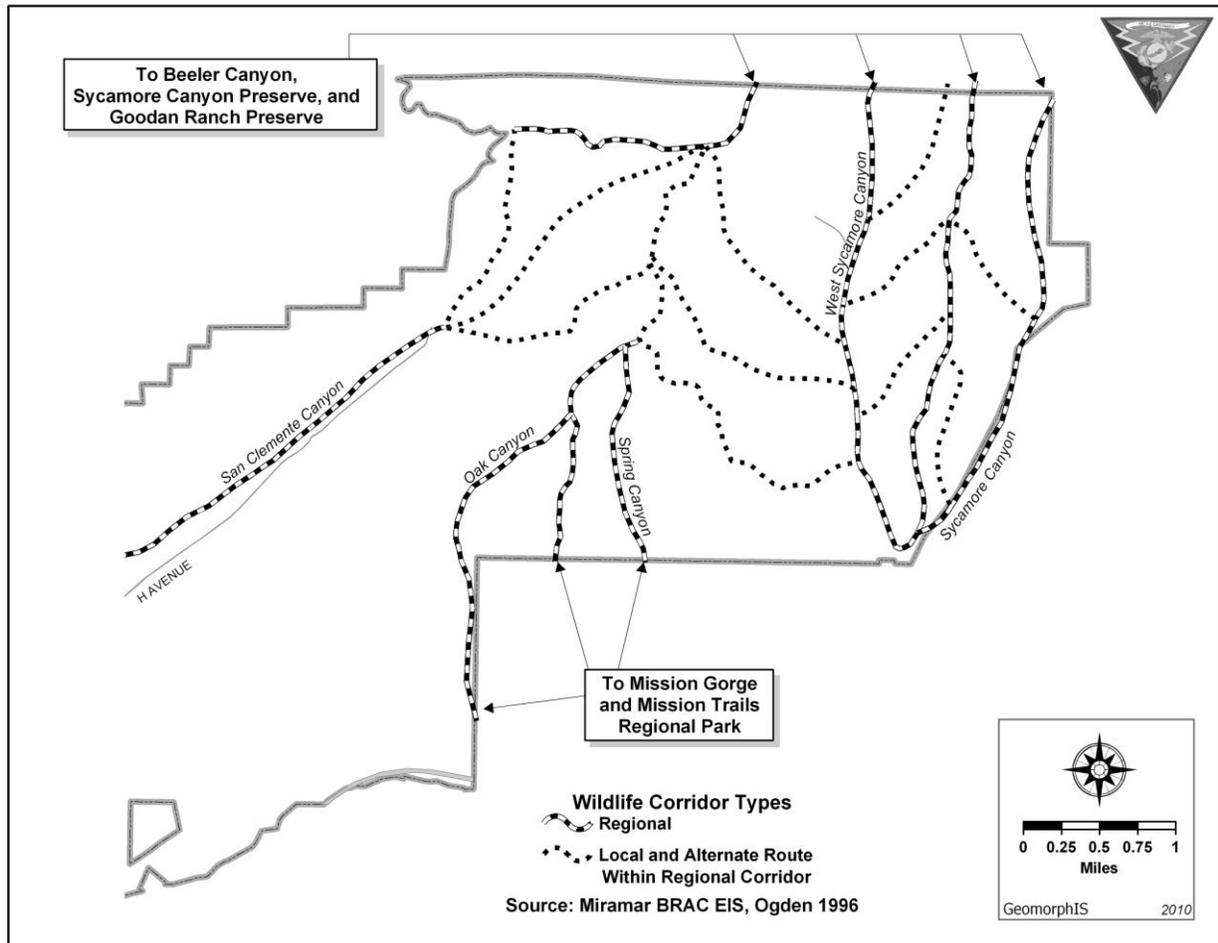


MCAS Miramar Corridors

Primary east-west corridors on MCAS Miramar are Rose and San Clemente canyons (Figures 4.5a and 4.5b). Rose Canyon originates east of the Main Station and drains west under I-805 on MCAS Miramar’s western boundary. This canyon provides connectivity to habitat patches west of the Station. Mule deer, bobcat, and mountain lion use has been documented in this portion of Rose Canyon. Water flows are intermittent in Rose Canyon, and coastal sage and chaparral vegetation provide cover for wildlife.

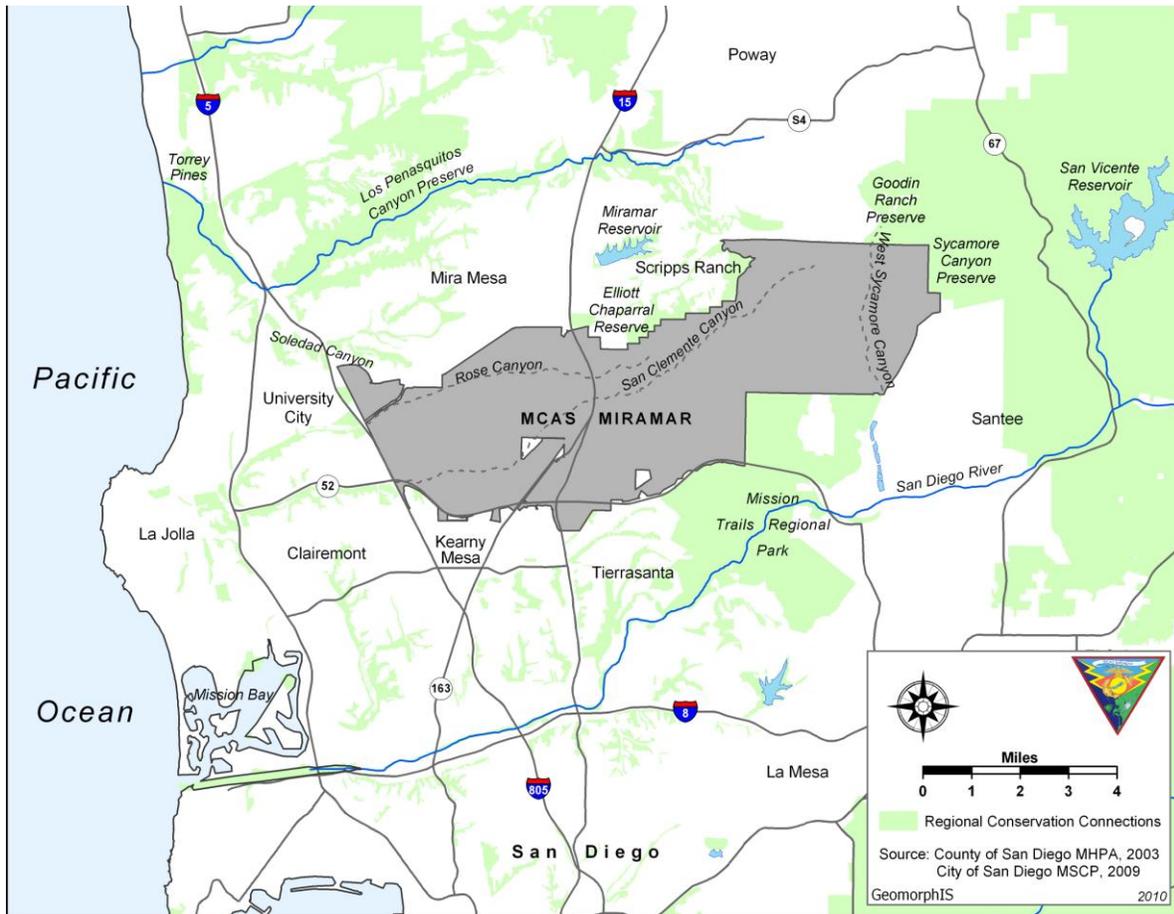
San Clemente Canyon originates in northcentral East Miramar and flows south and west through MCAS Miramar before draining under I-805 in the southwestern corner of the property. This canyon also provides connectivity to habitat west of the Station, including that in Marian Bear Memorial Park, as described below in *Regional Corridors through Western Miramar*. Water flows are intermittent in this canyon, which supports coastal sage, chaparral, wetland, and riparian vegetation. Wildlife traveling west through San Clemente Canyon must pass under I-15 and Kearny Villa Road. Passage under I-15 is through a narrow tunnel measuring 14 feet high, 18 feet wide, and 475 feet long. Passage under Kearny Villa Road is under a bridge. There is a fence along the entire western edge of the roadway at the under-crossing that may be passable by deer. While this portion of the corridor is quite constrained by the two roadways, there is evidence of mule deer use.

Figure 4.5b. Conceptual Wildlife Corridors on Eastern MCAS Miramar



North-south wildlife movement in East Miramar oriented with Oak, Spring, West Sycamore, and Sycamore canyons (Figure 4.5c) is relatively unconstrained where the area functions more like a large habitat linkage than narrower corridors. Along the western edge of MCAS Miramar, a north-south corridor exists along the eastern side of I-805 until the Station boundary is reached and developments substantially constrain the corridor. The following discussion of Regional Wildlife Corridors helps delineate the role of MCAS Miramar corridors within a larger context.

Figure 4.5c. Regional Conservation Connections



Regional Wildlife Corridors

Regional Corridors through Western Miramar

There are two corridors that link western MCAS Miramar to Los Penasquitos Canyon Preserve to the north (figures 4.5a and 4.5c). These corridors are already highly constrained and limited in function. However, both were monitored by Ogden (1992) and determined to be functional at that time.

One corridor is the power line easement along the eastern side of I-805 between Los Penasquitos Canyon Preserve and MCAS Miramar. From Los Penasquitos Canyon Preserve, the corridor rises to the south onto a mesa at Lusk Boulevard. Animals must pass between business park developments by staying in the easement, which is bordered by landscaping, undeveloped areas, and parking lots. A ravine leads down to Mira Mesa Boulevard and to Soledad Canyon beyond. The power line easement extends south to Eastgate Mall and Miramar Road before entering the open spaces of MCAS Miramar. This corridor is 400 feet wide at its narrowest section where it crosses over Mira Mesa Boulevard. Several road kills of large mammals have been documented at the crossing of Eastgate Mall and Miramar Road (Ogden 1992). Recent completion of the Nobel Drive connection to Miramar Road has likely eliminated the viability of this connection to MCAS Miramar for large mammals. As development continues along I-805, this corridor may lose its value as a viable wildlife corridor to most wildlife.

A second wildlife corridor follows a railroad under Miramar Road. This short and very narrow corridor connects Rose Canyon on MCAS Miramar to Soledad Canyon, two areas of high-quality habitat. The railroad is situated in a gorge bordered on both sides by steep, 40-foot-high walls carved into the mesa extending for about 1,500 feet; the ridges and terraces are covered with chaparral and sage scrub. This gorge is 175 feet wide at the rim of the mesa. Topography and vegetation combine to completely obscure this corridor from surrounding commercial development.

Two additional corridors connect western Miramar with open space west of I-805. San Clemente Canyon, which runs from the northeastern corner of MCAS Miramar to the southwestern corner, apparently dead ends into the I-805 and State Route 52 interchange. However, there is a system of open drainages with dirt trails along the borders that provide access through the interchange into Marian Bear Regional Park on the west side of I-805. In spite of the apparent restriction, large mammals continue to move regularly in and out of the park through this portal.

Rose Canyon, another east-west corridor within the open space of MCAS Miramar, funnels the movement of wildlife under the I-805 bridge over the railroad easement within Rose Canyon. This is the same railroad easement that connects Rose Canyon to Soledad Canyon north of MCAS Miramar. On the western side of I-805 this wildlife corridor continues along the railroad easement to the west until it connects with Marian Bear Regional Park at the end of San Clemente Canyon and continues south.

Regional Connectivity through Eastern Miramar

Core biological resource areas and linkages maps for the MSCP illustrate two regional connections through eastern MCAS Miramar linking undeveloped lands in eastern San Diego County and the Mission Trails Regional Park to coastal areas. One is to the north of MCAS Miramar and the other is to the south (Figure 4.5c).

The northern connection relies on the linkage of eastern MCAS Miramar to Beeler Canyon to the north. Beeler Canyon eventually leads west to Los Penasquitos Canyon and finally on to Torrey Pines State Reserve and the coast. The wildlife corridor through Beeler Canyon and upper Los Penasquitos Canyon is highly constrained by development but eventually becomes more open as Los Penasquitos Canyon Preserve is reached.

The regional connection extending south from eastern MCAS Miramar requires wildlife to travel under State Route 52. Two travel routes are under large bridges spanning Oak and Spring canyons, and a third is a culvert located west of Oak Canyon immediately east of the aqueduct. These routes allow the safe movement for wildlife in eastern MCAS Miramar to Mission Trails Regional Park compared to movement over State Route 52. In general, bridges are preferred over culverts for wildlife movement. Site visits to the large culvert under State Route 52 indicate that while there is minimal wildlife use, the site is experiencing substantial human visitation, and as such, the Station has fenced this large culvert under SR 52.

Mission Trails Regional Park, in turn, provides access to the San Diego River, which runs through Mission Gorge, Mission Valley, and finally out to Mission Bay. Nearly the entire length of this corridor outside of Mission Trails Regional Park to the southwest is restricted to the riparian vegetation associated with the San Diego River; the rest of the area has been developed.

4.6 Federal Special Status Species

Special Status Species are those listed by the federal government as threatened, endangered, proposed for listing as threatened or endangered, or are candidates for such listings. Also included in this category are species protected by the Bald Eagle Protection Act. The Marine Corps is obligated to conserve Special Status Species under provisions of the federal ESA and Bald Eagle Protection Act. Information on these species is

provided in Table 4.6, and information related to previous surveys conducted on Station is within Chapter 7.

Table 4.6. Special Status Species Known or Potentially Occurring on MCAS Miramar
(**Boldface type** indicates species that are known to occur on MCAS Miramar.)

No.	Species Name, Status (Federal), Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
Plants				
1	Del Mar manzanita (<i>Arctostaphylos glandulosa</i> var. <i>crassifolia</i>) Status: FE/S1.1/1B Family: Ericaceae	Del Mar manzanita occurs in chaparral vegetation that is relatively low-growing with an eroding sandstone substrate.	The local distribution extends from Torrey Pines State Park inland to Rancho Santa Fe and Del Mar Mesa. It is infrequent in coastal San Diego County from Del Mar to Carlsbad. It has been documented at many locales in East Miramar by a station-wide census (Licon Engineering Co., Inc. & Garcia and Associates 2006).	This taxon was listed as endangered by the USFWS (1996c). Urban sprawl and the associated clearing of land is the major threat to this species. In addition, over shading from surrounding taller chaparral species appears to affect the vigor of the plant (Tierra Data, Inc. 2004). No critical habitat has been designated for this species.
2	Orcutt's spineflower (<i>Chorizanthe orcuttiana</i>) Status: FE/S2.1/1B Family: Polygonaceae	Orcutt's spineflower may be found in coastal chamise chaparral, coastal sage scrub, and close-coned coniferous forest openings with a distinctive loose sandy substrate.	Openings in coastal chaparral with a distinctive loose sandy substrate (e.g., Corralitos loamy sand, Huerhuero complex loamy alluvial sand., Carlsbad gravelly loamy sand, Gaviota fine sandy loam) are the presumed microhabitat favored by Orcutt's spineflower (Reiser 1994). Focused surveys covering the entire station have not found this species.	This taxon was listed as endangered by the USFWS (1996c). Loss of suitable habitat to development is a major threat to the species. At completion of this INRMP, no critical habitat has been designated for this species.
3	San Diego Button-celery/Coyote thistle (<i>Eryngium aristulatum</i> var. <i>parishii</i>) Status: FE/S2.1/1B Family: Apiaceae	San Diego button celery occurs in Redding gravelly loams in and around vernal pool habitat and its watersheds.	This taxon is distributed from Riverside and San Diego counties to Baja California, Mexico. Vernal pool habitat monitoring within Station boundaries has documented populations, west of Fuelbreak NS-4 (San Diego County Water Authority aqueduct easement).	Development, agriculture, and off-highway vehicle use are main threats (Skinner and Pavlik 1994) causing this species to be listed as a federally endangered plant (USFWS 1993b). No critical habitat has been designated for this species.
4	Spreading navarretia (<i>Navarretia fossalis</i>) Status: T/S2.1/1B Family: Polemoniaceae	Vernal pool habitat and vernal swales provide habitat for spreading navarretia. Rarely found in shallow pools, population increases are correlated with heavier rainfalls and greatly reduced during drought (Reiser 1994).	This species' range extends from Riverside and San Diego counties to Baja California, Mexico. Populations exist at Camp Pendleton and Ramona with the largest concentration located on private parcels in the Otay Mesa area. Small populations, in a small number of pools on western Miramar, are documented from recent monitoring efforts	This plant was listed in 1998 (USFWS 1998). It is threatened by urbanization, grazing, road construction, and off-highway vehicle use (Skinner and Pavlik 1994). The USFWS published final critical habitat for this species on October 7, 2010 that identified essential habitat ⁶ on MCAS Miramar, but did not propose designation of critical habitat on the Station, based on protections

⁶ While the term "Essential Habitat" has been used in some proposed and final rules for designation of critical habitat, no definition of this term is provided in Endangered Species Act implementing regulations or critical habitat designations where the term is use. Based on usage of the term, essential habitat are areas that have physical and biological features and habitat characteristics that are deemed essential to the conservation of the species involved. Essential habitat is not equivalent to formally designated critical habitat.

No.	Species Name, Status (Federal), Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
				provided by the INRMP (USFWS 20010a).
5	San Diego thornmint (<i>Acanthomintha ilicifolia</i>) Status: FT/S1.1/1B Family: Lamiaceae	San Diego thornmint is normally found in grassy openings in chaparral or coastal sage scrub with loose clay loam soils, particularly the Las Posas or San Miguel-Exchequer series.	This species range extends from San Diego County south to northern Baja California, Mexico. It is known from approximately 30 populations that are typically small. Focused rare plant surveys have not identified San Diego thornmint on Station, possibly due to the limited amount of preferred soil type.	Approximately one-third of its historical occurrences have been extirpated, and it is threatened by continued urbanization, road construction, and off-road vehicle use (Skinner and Pavlik 1994). Reintroduction attempts have been largely unsuccessful. At completion of this INRMP, no critical habitat has been designated for this species.
6	Willowy monardella (<i>Monardella viminea</i> , Elvin and Sanders 2003; <i>Monardella linoidea</i> ssp. <i>viminea</i> , (Abrams 1951) Status: FE/S2.1/1B Family: Lamiaceae	This perennial herb occurs in riverwash cobbly loams of ephemeral drainages and floodplains. It typically is found on sandbars or low benches in drainage beds intermingled with coastal sage scrub, chaparral, or riparian scrub woodland vegetation.	The species is a San Diego County endemic. Populations reported on MCAS Miramar are primarily located in East Miramar canyons with a small population segment located in West San Clemente Canyon. In addition, willowy monardella populations occur off-Station in Lopez, Cemetery and Carroll canyons to the north, San Clemente canyon to the west, Sycamore canyon to the east, and Spring and Little Sycamore canyons to the south. (San Diego Natural History Museum 2004a)	It has been reported that about 95 percent of the domestic range of this taxon occurs within the MSCB region, with about 80 percent occurring on MCAS Miramar (USFWS 1998). The USFWS published final critical habitat for this species on November 8, 2006 that identified 1,863 acres of essential habitat ⁷ on MCAS Miramar, but did not propose designation of critical habitat on the Station, based on protections provided by the INRMP (USFWS 2006).
7	San Diego mesa mint (<i>Pogogyne abramsii</i>) Status: FE/S2.1/1B Family: Lamiaceae	San Diego mesa mint inhabits vernal pool habitat complexes in chaparral, coastal sage scrub, and grassland habitats. It may also be found on coastal terraces and mesas in San Diego County (Hickman 1993; Skinner and Pavlik 1994).	This species has been reported from all 10 of the vernal pool habitat management units on MCAS Miramar (Bauder and Wier 1991).	This wetland species continues to be threatened by urbanization, off-highway vehicle use, and road maintenance (Bauder and Wier 1991; Skinner and Pavlik 1994). At completion of this INRMP, no critical habitat has been designated for this species.
8	Encinitas baccharis (<i>Baccharis vanessae</i>) Status: FT/S1.1/1B Family: Asteraceae	Encinitas baccharis is a deciduous shrub that occurs in low-growing chaparral, primarily in Corralitos loamy sand, Cieneba rocky coarse sandy loam soils, or associated with large granitic boulders (Reiser 1994).	This San Diego County endemic had historic populations at 19 natural locations extending from Encinitas eastward to Del Dios highlands, Lake Hodges, and Mount Woodson and southward to Poway and Carmel Mountain. Fourteen extant populations have approximately 2,000 plants. Focused rare plant surveys have not identified Encinitas baccharis	This taxon was listed as threatened by the USFWS (1996c). Critical habitat has not been designated.

⁷ While the term “Essential Habitat” has been used in some proposed and final rules for designation of critical habitat, no definition of this term is provided in Endangered Species Act implementing regulations or critical habitat designations where the term is used. Based on usage of the term, essential habitat are areas that have physical and biological features and habitat characteristics that are deemed essential to the conservation of the species involved. Essential habitat is not equivalent to formally designated critical habitat.

No.	Species Name, Status (Federal), Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
			on Station, possibly due to limited amounts of preferred soil types.	
9	California Orcutt grass (<i>Orcuttia californica</i>) Status: FE/S2.1/1B Family: Poaceae	This annual grass is present exclusively in vernal pool habitat complexes, usually in wetter portions as pools are drying.	Orcutt's grass is distributed from Riverside and San Diego counties to Baja, California. On MCAS Miramar, it is reported from a few vernal pool habitats in Management Unit 7 and one vernal pool habitat in Management Unit 8 (Bauder and Wier 1991). Current vernal pool habitat survey efforts have not located any new Station distributions thus far.	California orcutt grass is known from fewer than 20 locations and is threatened by development, agriculture, non-native invasive plant species, and off-highway vehicle use (Skinner and Pavlik 1994). At completion of this INRMP, no critical habitat has been designated for this species.
10	San Diego ambrosia (<i>Ambrosia pumila</i>) Status: FE/S1.1/1B Family: Asteraceae	San Diego ambrosia occurs in a variety of habitats, including chaparral, coastal sage scrub, grassland, and vernal pool habitat, often in disturbed areas.	San Diego ambrosia ranges from Riverside & San Diego counties south to Baja California, Mexico. It is known from four scattered locations in San Diego County. Focused surveys covering the entire station have not found this species on MCAS Miramar.	San Diego ambrosia is threatened by development (Skinner and Pavlik, 1994).
Invertebrates				
11	San Diego fairy shrimp (<i>Branchinecta sandiegonensis</i>) Status: FE	San Diego fairy shrimp may be present in seasonally astatic vernal pools and many other seasonally ponded features in coastal areas within grassland, agriculture, coastal sage scrub, and chaparral habitats.	The San Diego fairy shrimp's range extends from Santa Barbara County south to northwestern Baja California, Mexico (USFWS 1997). It occurs throughout San Diego County and is known from all 10 vernal pool habitat management units on MCAS Miramar. A large proportion of the vernal pool habitats on MCAS Miramar contain San Diego fairy shrimp.	This species is threatened by habitat destruction and fragmentation from agricultural and urban development, alteration of wetland hydrology by draining, off-highway vehicle activity, and cattle and sheep grazing (USFWS 1997). The USFWS published a final rule to designate critical habitat for this species on December 12, 2007 that identified essential habitat not designated as critical habitat on MCAS Miramar (USFWS 2007b).
12	Quino checkerspot butterfly (<i>Euphydryas editha quino</i>) Status: FE	This butterfly is restricted to open grassland and openings in chaparral and coastal sage scrub.	The Quino checkerspot ranges from the interior foothills of southwestern California to northwestern Baja California, Mexico. This species was detected in the vicinity of East Miramar. Focused surveys conducted by the San Diego Natural History Museum in 1996, 1997, and 1998 (San Diego Natural History Museum 2004b) and several project-specific surveys in East Miramar have not found it on MCAS Miramar. A new survey for this species on	Planning processes should reference the negative survey results from 2011 surveys and, if applicable, "excluded areas," as defined in the survey protocol for Quino checkerspot butterfly (USFWS 2002) as the basis for not conducting project-specific surveys. "Excluded areas" include, but are not limited to, developed areas, closed canopy forests, riparian areas, dense chaparral, and open areas less than an acre in size that are surrounded by dense chaparral. The USFWS published a final rule

No.	Species Name, Status (Federal), Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
			<p>MCAS Miramar was conducted in 2011 for identification of suitable habitat and presence/ absence survey of the most promising 1,400 acres of suitable habitat in East Miramar. No individuals were found throughout the flight season by surveys completed using USFWS protocols.</p>	<p>to designate critical habitat for this species on June 17, 2009, and no critical habitat was designated on MCAS Miramar (USFWS 2009).</p>
13	<p>Hermes copper butterfly (<i>Hermelycaena</i> [<i>Lycaena</i>] <i>hermes</i>) Status: C, CSC Family: Hermelycaena</p>	<p>Hermes copper butterfly occurs in coastal sage scrub and southern mixed chaparral containing its host plant, spiny redberry (<i>Rhamnus crocea</i>).</p>	<p>This species ranges throughout southern California where appropriate habitat is found. Populations have been found near Bonsal, Fallbrook, Pala, Bernardo Mountain, Harmon Grove, Del Dios, Poway, and MCAS Miramar and Northern Baja California.</p> <p>This butterfly was found in San Clemente Canyon and West Sycamore Canyon areas of East Miramar in 1996-1998. All sites where this butterfly was found were severely burned by the Cedar Fire in 2003. The butterfly's host plant, spiny redberry (<i>Rhamnus crocea</i>), has resprouted well in some areas identified as previously supporting the species. All sites where the butterfly was previously reported remain undeveloped, and most of the host plant area is within areas already identified for special attention for conservation of other non-vernal pool threatened and endangered species.</p> <p>The nearest known location occupied by this species following the Cedar Fire is the southern part of Mission Trails Regional Park.</p>	<p>Focused surveys for the species by Miramar environmental staff during the 2010 flight season (mid-May-July) were conducted at sites reported as having the species present in 1996-1998 (prior to the 2003 Cedar Fire). Additional sites supporting spiny redberry in canyon bottoms that were not burned in 2003 or other fires in recent decades were also examined. These surveys did not find the butterfly.</p> <p>The USFWS (2011b) concluded that listing the Hermes copper butterfly under the Endangered Species Act was warranted but was precluded by higher priority listing actions. As part of this determination, the USFWS added the butterfly to its Candidate list. If the species becomes listed as threatened or endangered, focused surveys for the species must be done prior to actions that would remove stands of its host plant.</p>
14	<p>Riverside fairy shrimp (<i>Streptocephalus woottoni</i>) Status: FE</p>	<p>The Riverside fairy shrimp is found in deep vernal pool habitat and ephemeral wetlands that retain water through the warmer weather of late spring.</p>	<p>This species is known from vernal pools near Temecula, Riverside County; one population in Orange County; vernal pool habitat on Otay Mesa and MCAS Miramar; and two locations in Baja California (USFWS 1993b). On MCAS Miramar, Riverside fairy shrimp are known from two impoundments east of Interstate 15 (Vernal Pool Unit 4, group AA1 south).</p>	<p>Eggs of this species will not hatch in pools that are shallow or receive cool waters from early winter rains.</p> <p>The USFWS published a final rule to designate critical habitat for this species on April 12, 2005 and a proposed rule on June 1, 2011 to revise this designation, both identifying essential habitat not designated as critical habitat on MCAS Miramar (USFWS 2005, 2011a).</p>

No.	Species Name, Status (Federal), Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
Birds				
15	Golden eagle (<i>Aquila chrysaetos</i>) Status: FP Family: Accipitridae	Golden eagles require large, open spaces for foraging and nesting. Foraging takes place over a wide variety of open habitats, such as desert scrub, grassland, rolling foothills, mountains, and sage scrub. Nest sites typically require large buffers from development.	Golden eagles are known from mountainous regions of the western hemisphere. They are uncommon residents of San Diego County. While not known to breed on MCAS Miramar, golden eagles are known to forage within its boundaries (Cox <i>et al.</i> 1994), possibly coming from nest sites on Cleveland National Forest. They are known from East Miramar above West Sycamore and Sycamore Canyon. A golden eagle was sited in April 1998, along "H" Avenue and along the Aqueduct Road in East Miramar by Station personnel.	The golden eagle is a large predatory bird that requires extensive open areas to forage for its prey. The loss of foraging and nesting habitat throughout southern California has resulted in a decline in the species' population.
16	Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>) Status: FE Family: Tyrannidae	Preferred habitat of the Southwestern willow flycatcher includes riparian habitats along rivers, streams, ponds, lakes or other wetlands with dense growth of willows (<i>Salix</i> sp.) (USFWS 1995). The destruction of willow riparian woodland and brood parasitism by the brown-headed cowbird (<i>Molothrus ater</i>) are likely reasons for the decline of this species (Remsen 1978).	The breeding range of this species includes southern California, Arizona, New Mexico, southern parts of Utah and Nevada, southwestern Texas, and northwestern Mexico. Small breeding populations are present in major river valleys in San Diego County. Focused surveys for this species were conducted in 1999, 2002, and 2008. Migrating willow flycatchers were recorded early on MCAS Miramar, but none were confirmed to be the southwestern subspecies, and none bred on Station . These individuals were likely a different subspecies of willow flycatcher (AmDyne Corporation 2008, Varanus Biological Services, Inc. 2003).	Focused surveys are conducted for this species about every three years. Project-specific surveys need not be conducted for this species. There is no designated critical habitat for this species on MCAS Miramar.
17	Coastal California gnatcatcher (<i>Polioptila californica californica</i>) Status: FT Family: Muscicapidae	This subspecies is generally described as an obligate resident of coastal sage scrub communities; however, investigations suggest that California gnatcatchers also use chamise chaparral near coastal sage scrub as nesting habitat.	The coastal California gnatcatcher's range includes coastal southern California from Los Angeles, Orange, western Riverside, and San Diego counties south to northern Baja California, Mexico. This species is locally abundant on MCAS Miramar where suitable habitat exists; the pre-Cedar Fire (2003) population on Station was 24-62 pairs (1997-2001 surveys). Surveys in 2004, following the 2003 Cedar Fire, found 21 breeding pairs and 1	Focused surveys for this species are conducted about every three years to monitor the population and have presence/absence information to support activity planning. Urban and agricultural development, with associated habitat loss and fragmentation, threatens the coastal gnatcatcher's existence in California. The USFWS published a final rule to designate critical habitat for this

No.	Species Name, Status (Federal), Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
			lone male in unburned areas. Surveys in 2007 found 34 breeding pairs and 3 territorial males with some recolonization of 2003 burned areas (RECON Environmental, Inc. 2008). Surveys in 2009 by Haas (<i>in preparation</i>) found about 50 breeding pairs of gnatcatchers, similar to the highest densities recorded in earlier surveys; many were in areas burned by the Cedar Fire.	species on December 19, 2007, that identified essential habitat not designated as critical habitat on MCAS Miramar (USFWS 2007a).
18	Least Bell's vireo (<i>Vireo bellii pusillus</i>) Status: FE Family: Vireonidae	This species is found in remnant stands of riparian habitats, requiring willow-dominance with lush understory vegetation. The understory is particularly important since least Bell's vireos frequently nest within three feet of the ground (USFWS 1985).	The range of the least Bell's vireo extends from California to Baja California, Mexico. The bird winters only in Southern Baja. In 1998, 1999, 2002, 2008, and 2011 breeding least Bell's vireos were found in willow riparian habitat of Sycamore Canyon in far East Miramar. Some of these territories were just outside of the Station boundary. Identification of five breeding vireos in 2008 represent an increase from pre-Cedar Fire results, in spite of severe habitat damage from the 2003 Cedar Fire. This indicates recovery from the severe habitat damage of the 2003 Cedar Fire (AmDyne Corporation 2008). Ongoing 2011 surveys found breeding least Bell's vireos in San Clemente Canyon, east of Interstate -15.	Focused surveys are conducted for this species about every three years. Project-specific surveys need not be conducted for this species. Factors that have led to the decline in least Bell's vireo populations include flood control and water development projects, crop production, livestock grazing, human disturbances, and general habitat degradation. There is no designated critical habitat for this species on MCAS Miramar.

* FE = Federally endangered PT = Proposed threatened (federal) PE = Proposed endangered (federal)
 FT = Federally threatened FP = Fully protected C = Candidate

Species Status Codes

FSC = Federal Species of Special Concern (Animal or Plant)

California State Plant Ranking List (only rankings used are included)

S1 = Less than 6 viable element occurrences (Eos) or less than 1,000 individuals or less than 2,000 acres

S1.1 = very threatened

S1.2 = threatened

S1.3 = no current threats known

S2 = 6 – 20 Eos or 1,000 – 3,000 individuals or 2,000 – 10,000 acres

S2.1 = very threatened

S2.2 = threatened

S2.3 = no current threats known

California Native Plant Society Ranking List (only ranking used is included)

List 1B = Rare, threatened, or endangered and eligible for listing under the California Endangered Species Act

The federal classification system for Special Status Species is as follows:

Endangered (FE): any species that is in danger of extinction throughout all or a significant portion of its range;

Threatened (FT): any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range;

Proposed (PT, PE): any species that has been proposed for listing as a threatened or endangered species;

Candidate (C): plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a listing regulation is precluded by other higher priority listing activities; and

Fully Protected (FP): the Golden Eagle is also protected by the Bald Eagle Protection Act.

Distributions of the threatened coastal California gnatcatcher (*Poliopitila californica californica*), endangered least Bell's vireo (*Vireo bellii pusillus*), endangered Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), and endangered willowy monardella (*Monardella viminea*) are shown on Figure 4.6. Figure 4.3.4 shows locations of vernal pool habitat at MCAS Miramar. This habitat, collectively, supports five vernal pool



California Gnatcatcher

species that are listed as endangered (*i.e.*, San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, San Diego fairy shrimp) and spreading navarretia, listed as threatened.

The Hermes copper butterfly was considered for listing as a threatened or endangered species by the USFWS. In April 2011, the USFWS concluded that listing was warranted but precluded by higher priority listing actions. As part of this determination, the USFWS added the butterfly to its Candidate list. This species was found at multiple sites on MCAS Miramar during 1996-1998 surveys (San Diego Natural History Museum 2004b). However this butterfly has not been found on MCAS Miramar since

all sites where it had previously been found were severely burned by the 2003 Cedar Fire (see Section 7.4.1.1, *Federally Listed Species*).

4.7 Other Species of Regional Concern

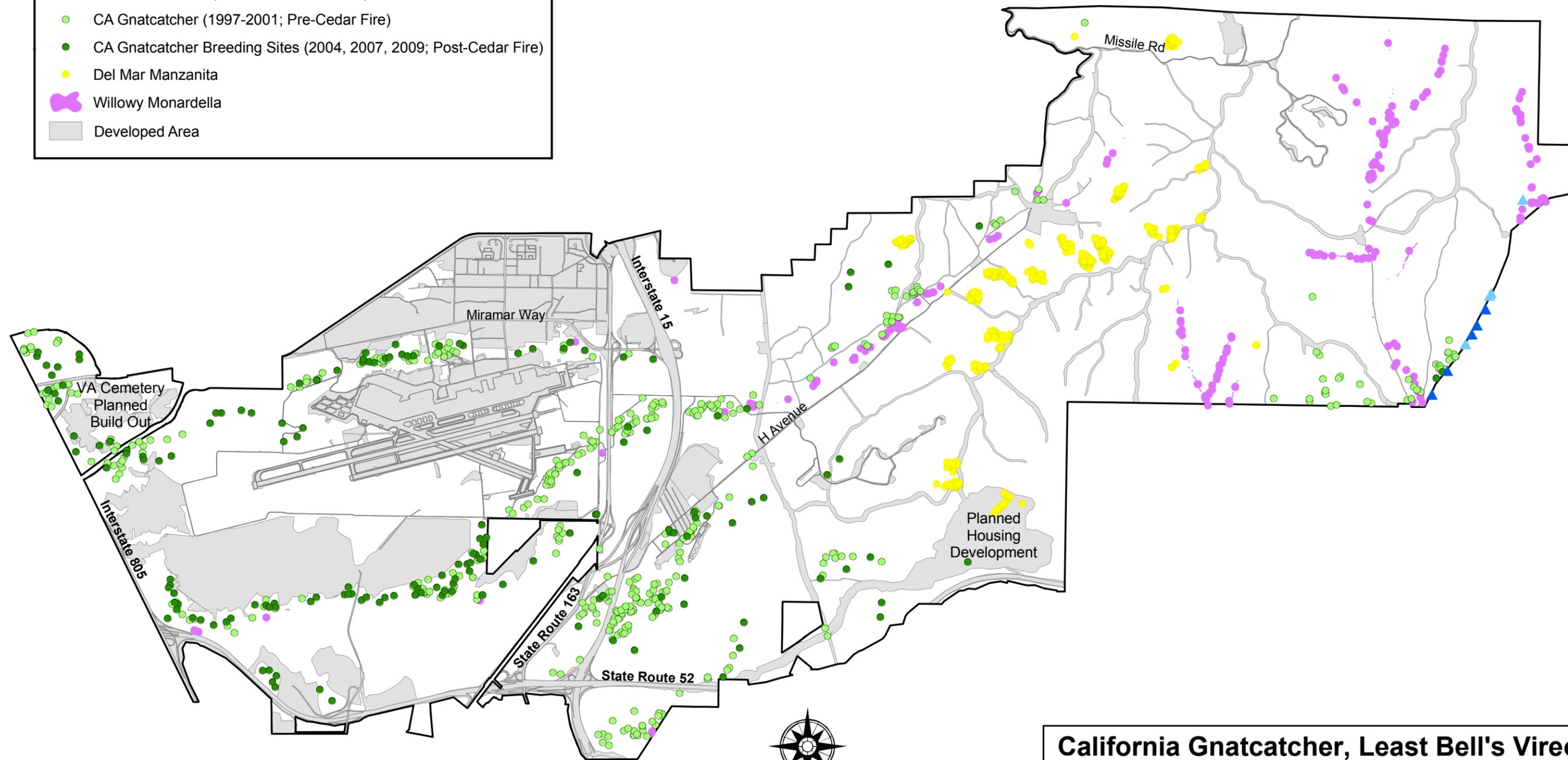
Species of regional Special Concern at MCAS Miramar include federal species of concern; State of California species of concern; state of California listed species; Bird Species of Concern, defined in Section 6.1.2.3, *Migratory Bird Legal Instrumentalities*; and species listed by the California Native Plant Society (2001). These species are included for consideration during environmental planning at MCAS Miramar (Chapters 5 and 6). Information on these species is in Table 4.7⁸ with exception of Bird Species of Concern for Bird Conservation Region 32. Bird Species of Concern for Bird Conservation Region 32 can be viewed at <http://www.dodpif.org/sitehtm?-checklist.htm> and have been identified in Appendix C. Applicable classifications for these species are as follows.

Species of Special Concern (SSC): species formerly under consideration by the USFWS for status changes (includes Category 1, 2, and 3 Candidates for federal listing) (In February 1996 the USFWS discontinued the

⁸ Table 4.7, due to its length, is located after Section 4.9, at the end of this Chapter.



- ▲ Least Bell's Vireo (1998, 2002; Pre-Cedar Fire)
- ▲ Least Bell's Vireo (2008; Post-Cedar Fire)
- CA Gnatcatcher (1997-2001; Pre-Cedar Fire)
- CA Gnatcatcher Breeding Sites (2004, 2007, 2009; Post-Cedar Fire)
- Del Mar Manzanita
- Willowy Monardella
- Developed Area



California Gnatcatcher, Least Bell's Vireo, Del Mar Manzanita, and Willowy Monardella on MCAS Miramar

Figure 4.6

This map is for planning purposes only. Some data may be incomplete, inaccurately positioned, and/or generalized.

use of the Category 1, 2, and 3 designations but remains concerned about these species and encourages further study into their conservation status (USFWS 1996b).);

Federal Candidate (C): plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act, but for which development of a listing regulation is precluded by other higher priority listing activities (Note: No species on MCAS Miramar are candidates for federal listing.);

State Endangered (CE): taxa in serious danger of becoming extinct throughout all, or a significant portion, of its range within the State of California due to threats to the taxa;

State Threatened (CT): taxa likely to become endangered within the foreseeable future throughout all or a significant portion of its range within the State of California;

California Species of Special Concern (CSC): potentially jeopardized taxa; the status of these taxa could possibly change to threatened or endangered, or be removed from the list when further data are available; and

State Rare (CR): a plant species, subspecies, or variety not presently threatened with extinction but found in such small numbers throughout its range that it may be endangered if its environment worsens.

Bird Species of Concern includes species that are of concern because of (a) documented or apparent population declines, (b) small or restricted populations, or (c) dependence on restricted or vulnerable habitat. These bird species are listed with the intent of avoiding future designations under the ESA. Due to the frequency at which these lists are updated, specific species data is not included in Table 4.7. The comprehensive Bird Species of Concern list is provided as referenced above. This list should be reviewed against species known to occur on MCAS Miramar (appendix C) and each of the appropriate lists.

Rare plants in California are also listed in the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California* (CNPS 2001) as follows:

List 1B (CNPS-1B) plants are recognized by the CNPS as plants that are rare, threatened, or endangered in California and elsewhere. They are judged to be vulnerable under present circumstances or to have a high potential for becoming so because of their limited or vulnerable habitat, their low numbers of individuals per population, or their limited number of populations. All List 1B plants meet definitions of Section 1901, Chapter 10 of the California Fish and Game Code and are eligible for state listing. **List 2** includes taxa that are considered to be rare and endangered in California but are more common elsewhere. **List 3** includes taxa that are probably rare or endangered, but there is insufficient data to make a determination. **List 4** indicates taxa that are rare but are found in sufficiently large numbers and distributed widely enough that the potential for extinction is low at this time.

These plants have been adopted by the CDFG as constituting the Special Plants List, which was formerly known as the "species of concern" list. The CNPS regularly updates its lists; these updated lists are accessible via the CNPS website, www.cnps.org.

4.8 Cedar Fire

4.8.1 October 26, 2003, Ecosystem Havoc

On October 26, 2003, a wildfire, named the Cedar Fire, swept through MCAS Miramar and much of the region in general. Blown by strong Santa Ana winds, the Cedar



2003 Cedar Fire Impacts – Austin Bridge
Natural Resources Division



2010 Cedar Fire Regrowth – Austin Bridge
Natural Resources

- gnatcatcher locations,
- 97.8% of total willowy monardella populations,
- 100% of total least Bell’s vireo locations, and
- 100% of total Del Mar manzanita locations.

Fire burned more than 280,000 acres extending from the Laguna Mountains and Julian in the east to MCAS Miramar at its westernmost point. The fire affected approximately 17,600 acres on the Station.

Most of the area was severely burned, and it left virtually no unburned areas within the general fire area. Figure 4.6 shows areas affected by this fire and the extent of the effects to special status species. Below percentages provide examples of the degree of impacts of this wildfire on MCAS Miramar:

- 2,479 acres (66.4% of total) of coastal sage scrub,
- 74.4% of total vernal pool habitat,
- 67.0% of total California

4.8.2 Ecosystem Recovery Status

After evaluation by land managers and with recommendations from the BAER team, MCAS Miramar did not seed burned slopes. Standard soil erosion control devices (*e.g.*, wattles, jute netting) were used to stabilize some steep slopes or areas of concern, but most of the landscape was allowed to recover naturally. During the 2004 growing season, non-native species were no more evident than native ones. However, during the 2005 growing season, non-native grasses were more dominant. These non-native grass populations have persisted in the opened canopy areas, particularly along or within ephemeral drainages and require more invasive plant species control. Despite the added exotic competition, all federally listed threatened and endangered species known to occur within the Cedar Fire boundary have been post-fire documented on Station and reported in finalized reports (*e.g.*, O’Leary (2009), AMEC Earth & Environmental, Inc. (2009), Ecological Restoration Service (2009), Tierra Data Inc. (2008), Dossey & Associates (2007), Licon Engineering Co., Inc. & Garcia and Associates (2006) and current contracted surveys (See Figure 4.6).

Sensitive species’ and vegetation monitoring efforts within station boundaries reveal recovery and recolonization of these populations both within previously identified habitats/territories and some expanded areas. Typical native plant and animal populations for this region re-established according to current rainfall regimes. Immediately post-Cedar Fire, record rainfall eroded barren slopes and minimally re-arranged some drainage areas. This affected the locations of some plant populations (seed and plant clumps were washed downstream; larger populations of annual plants occurred; etc.) and competition intensity between recovering plants and opportunistic plant species. These opportunistic species were a combination of native annuals, known as ‘fire followers’ (*e.g.*, lupines, ceanothus, poppies), and exotic plant species (*e.g.*, grasses, thistles, mustards) able to quickly colonize an open area. In addition, established perennial natives resprouted vigorously (*e.g.*, manzanita, laurel sumac, lemonadeberry). The fauna component of the Station’s ecosystems has fluctuated with the availability of the water and vegetation recovery. As areas have developed more layers and density of vegetation, animals have recolonized according to the resources utilized. Thus far, Station

observations have been similar to other post-fire recovery effects reported in other fire ecology literature (*e.g.*, Zouhar (2008), Cobb 2005, Brown and Smith (2000), Hunsaker and Awbrey 1999, Cox and Austin 1990).

However, since 2005, regional drought conditions have affected plant vitality. Lifecycles of annuals (both native and exotic) have been shortened while biennials and perennials show reduced growth. In retrospect, it appears drought conditions have had a more negative effect on the Station's plant population fire recovery than the fire itself. Monitoring efforts continue on a scheduled basis and hopefully will provide more documentation for vegetation and sensitive species recovery trends.

4.9 Habitat Evaluation Model

A Habitat Evaluation Model (HEM) was developed as a part of the 2000 INRMP (Section 4.8 within MCAS Miramar INRMP (2000))⁹. The primary purpose for initial development of the HEM was to identify and rank important biological resource areas within MCAS Miramar.

The HEM was a GIS model that used information collected on MCAS Miramar relative to the distribution of sensitive biological resources, habitats, and habitat linkages/corridors. Components of the HEM include: (1) vernal pool habitat and its associated watersheds, (2) non-vernal pool threatened and endangered species, and (3) a habitat evaluation index.

Vernal pool habitat watersheds were given a value of Very High in the development of the HEM.

Non-vernal pool species included locations of the coastal California gnatcatchers, willow monardella, Del Mar manzanita, and least Bell's vireo nests. These locations were given a value of Very High in the development of the HEM.

The *habitat evaluation index* combined an evaluation of wildlife corridors and rarity of local and regional vegetation types (and associated habitats).

- Wildlife corridors, including connections to regional wildlife corridors and to adjacent open space areas (Ogden 1992, 1996) (Figures 4.5a-c), were assigned high point values in the HEM development.
- Locally rare vegetation types, that compose less than 100 acres, received a high value.
- Regionally rare vegetation types, used rankings adapted from the MSCP, which categorized habitats (*i.e.*, vegetation types) within four tiers for San Diego County. Tier I represents habitats of the highest value, and Tier IV represents those of the lowest value (City of San Diego 1996b).

Each component was developed as a separate GIS layer and then combined to produce a final HEM map that ranked the entire surface area as Very High, High, Moderate, or Low in terms of biological value. The final evaluation was based on the highest value on any one GIS overlay. Figure 4.9 (taken from MCAS Miramar INRMP (2000)) shows the final map output of the HEM process.

Use of the HEM

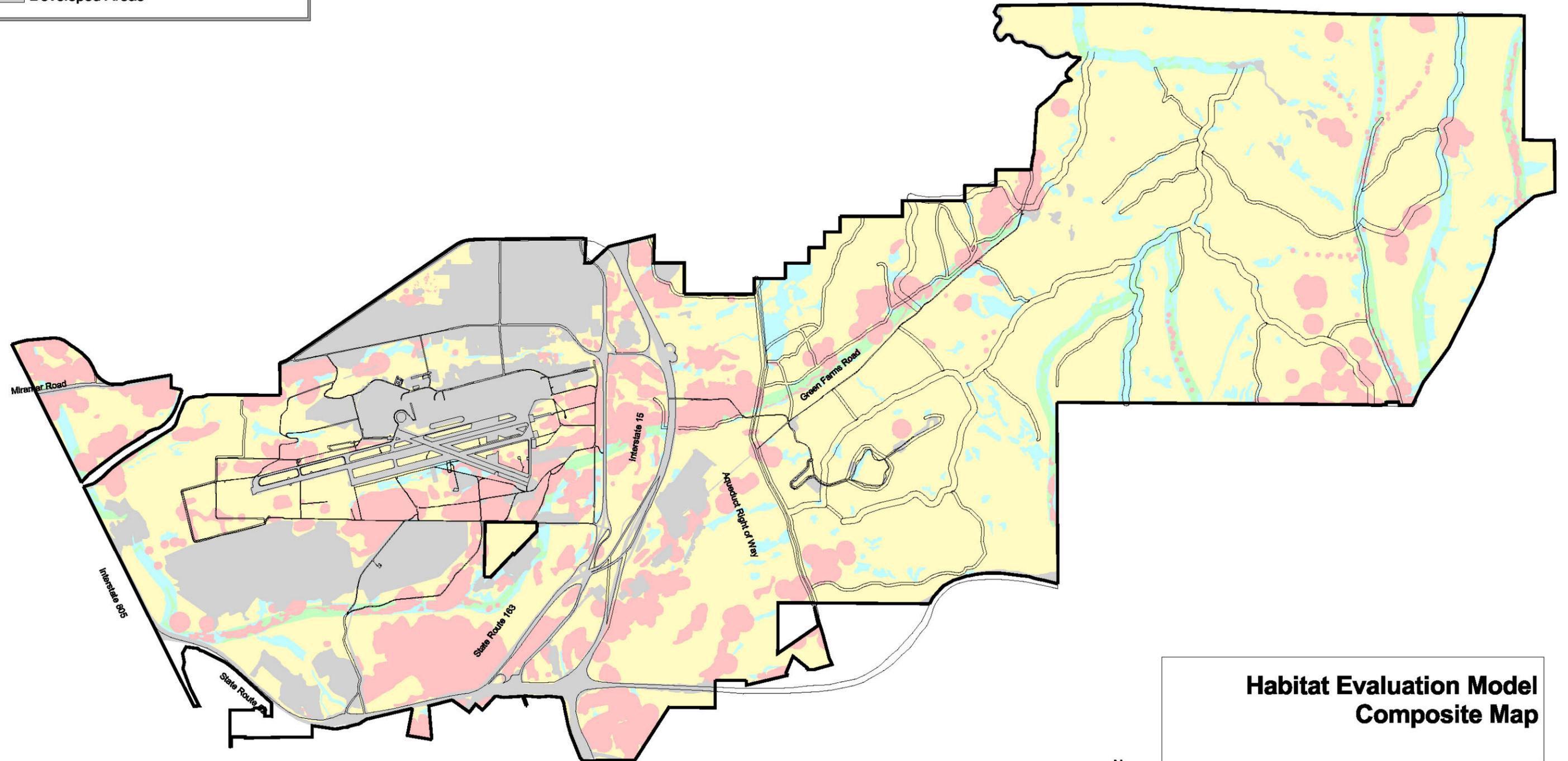
The HEM was used to identify high value areas relative to the known distribution of Special Status Species and associated habitats (*e.g.*, vegetation types, vernal pool habitat, wetlands) present at MCAS Miramar. The composite map assisted in delineating Management Areas on the Station (Chapter 5).

⁹ This model has not been 'rerun' since 2000. All changes to update management layers since then due to changes in natural resources mapping have been done manually.

Value ratings of the HEM do not directly equate to levels of management or conservation concern at MCAS Miramar. Areas rated similarly (*e.g.*, high value) may not receive similar attention. This is a reflection of the nature of the resource of interest. For example, vernal pool habitat watersheds and California gnatcatcher territories will require different conservation and management measures. Although not the specific subject of this model, Species of Regional Special Concern will be conserved as part of MCAS Miramar's general vegetation and wildlife management program.

Legend

- Very High Value Habitat
- High Value Habitat
- Moderate Value Habitat
- Low Value Habitat
- Developed Areas



**Habitat Evaluation Model
Composite Map**

Map Source: INRMP for MCAS Miramar
Dames & Moore, 2000



Figure 4.9

Table 4.7. Other Species of Regional Concern Known or Potentially Occurring on MCAS Miramar

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
Plants				
1	Little mousetail (<i>Myosurus minimus</i>) Status: FSC/S2.2/List 3 Family: Ranunculaceae	Little mousetail, an annual herb, occurs in vernal pool habitat and flowers from March to June (Munz 1974). It prefers Bosanko clay and Huerhuero loam soils.	Little mousetail is restricted to several vernal pool complexes on mesas north of San Diego and on Otay Mesa. It was observed in 3 of 10 vernal pool habitat management units on MCAS Miramar (Bauder and Wier 1991).	Populations have declined throughout the region due to urban expansion and its limited habitat range.
2	Nuttall's scrub oak (<i>Quercus dumosa</i>) Status: FSC/S1.1/List 1B Family: Fagaceae	Nuttall's (coastal) scrub oak is found in chaparral occurring along the coast of California.	This species is found in appropriate habitat along the coast of southern California and is documented on western portions of MCAS Miramar (Station Rare and Endangered Plant Surveys).	Nuttall's scrub oak was once considered to be widespread in chaparral throughout cismontane California, but, that species is now called <i>Q. berberidifolia</i> . Development threatens Nuttall's scrub oak (Skinner and Pavlik 1994).
3	Otay lilac (<i>Ceanothus otayensis</i>) Status: None/S1.2/List 1B Family: Rhamnaceae	Otay lilac grows in a xeric chamise chaparral; the known soil type is mapped as San Miguel-Exchequer rocky silt loam. This shrub may be restricted to metavolcanic and gabbroic peaks (Reiser 1994).	Previous documented populations of Otay lilac are primarily on the San Miguel and Otay Mountain areas of southern San Diego County and Baja, Mexico. The plants found on Miramar (2006) and confirmed (2008) are the northern-most known location for this plant.	H.E. McMinn (1942) recognized this entity as intermediate between <i>C. greggii</i> var. <i>perplexans</i> and <i>C. crassifolius</i> , naming it <i>C.X otayensis</i> . Since then, others (R.M. Beauchamp and R. Moran [Beauchamp 1986]) recognized its species status since the proposed parent species' are not nearby.
4	San Diego barrel cactus (<i>Ferocactus viridescens</i>) Status: FSC/S3.1/List 2) Family: Cactaceae	This species of cactus is found in San Diego County and Baja California, Mexico in coastal sage scrub, chaparral, maritime succulent scrub, and grasslands (including vernal pool grasslands).	The species range extends from San Diego County to Baja California, Mexico. Numerous fragmented localities exist in San Diego County. It has been reported on south-facing slopes on MCAS Miramar (Station Rare and Endangered Plant Surveys).	The San Diego barrel cactus is threatened by urbanization, off-highway vehicle use, and horticultural collecting (Skinner and Pavlik 1994).
5	Summer holly (<i>Comarostaphylis diversifolia</i> ssp. <i>diversifolia</i>) Status: FSC/S2.2/List 1B Family: Ericaceae	Summer holly occurs on dry slopes in chaparral habitat. It is found predominantly in low elevation situations, usually along the coast.	The species range extends from San Diego County southward to northern Baja California, Mexico. Summer holly has been documented on western portions of MCAS Miramar (Station Rare and Endangered Plant Surveys).	The species is threatened by development and gravel mining (Skinner and Pavlik 1994).

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
6	Variegated dudleya (<i>Dudleya variegata</i>) Status: FSC/S2.2/List 1B Family: Crassulaceae	Variegated dudleya, a perennial herb, is present in a variety of habitats including coastal sage scrub, cismontane woodlands, grasslands, and chaparral on dry hillsides and mesas in San Diego County.	Variegated dudleya is known from southern San Diego County into Baja California, Mexico. Populations of variegated dudleya have been documented in eastern Miramar and G Parcel south of SR 52 (Station Rare and Endangered Plant Surveys).	This species is considered threatened by urbanization and grazing (Skinner and Pavlik 1994).
7	Wart-stemmed ceanothus (<i>Ceanothus verrucosus</i>) Status: FSC/S2.2/List 2 Family: Rhamnaceae	The wart-stemmed ceanothus is an evergreen shrub that occurs in chaparral habitat on dry hills and mesas in San Diego County.	This species (along with <i>Ceanothus tomentosus</i> var. <i>olivaceus</i>) is a common component of the ceanothus chaparral distributed in coastal San Diego County and Baja California, Mexico. Wart-stemmed ceanothus has been observed on western portions of MCAS Miramar (Station Rare and Endangered Plant Surveys).	Wart-stemmed ceanothus flowers from January to April (Munz 1974) and is vulnerable to development, which is its primary threat (Skinner and Pavlik 1994).
8	Long-spined spineflower (<i>Chorizanthe polygonoides</i> var. <i>longispina</i>) Status: FSC/S2.2/List 1B Family: Polygonaceae	Long-spined spineflower is present in western Riverside and San Diego counties where it grows in dry places in chaparral habitat, close-coned coniferous forest, and coastal sage scrub, usually below 5,000 feet (Munz 1974).	Populations of long-spined spineflower have been documented in western Miramar and portions of eastern Miramar (Station Rare and Endangered Plant Surveys).	The species is threatened by development and by competition with non-native grasses (Skinner and Pavlik 1994).
9	Palmer's grappling hook (<i>Harpagonella palmeri</i>) Status: FSC/S3.2/List 4 Family: Boraginaceae	This plant species may be found on dry slopes and mesas below 1,500 feet in clay soil with chaparral, coastal sage scrub, and grassland habitats.	This species' distribution extends from Orange, Riverside, and San Diego counties southward and eastward to Baja California and Sonora in Mexico, and Arizona. This species has been documented in eastern Miramar (Station Rare and Endangered Plant Surveys).	Palmer's grappling hook flowers from March through April. It is susceptible to development activities and losses of habitat.
10	Mission Canyon bluecup (<i>Githopsis diffusa</i> ssp. <i>filicaulis</i>) Status: S1.1/List 3 Family: Campanulaceae	Mission Canyon bluecup occurs in Visalia sandy loam in open mesic chaparral habitat.	Documented from fewer than five locations in California, this species' known locations in the San Diego region are limited to the El Cajon Mount and La Mesa U.S.G. S. 7.5-minute quadrangles. Current Rare and Endangered Plant Surveys have not documented Mission Canyon bluecup on MCAS Miramar.	Prior USFWS Notices of Review in the Federal Register classified this taxon as a Category 2 candidate species. It has no current federal status.
11	Palmer sagewort (<i>Artemisia palmeri</i>) Status: S3.2/List 4 Family: Asteraceae	This plant species prefers sandy soils, along drainages or in mesic chaparral (Reiser, 1994).	Although it is known from no more than 20 locations in California, it reportedly ranges from southwestern San Diego County to Baja California, Mexico. It has been documented in western Miramar (Station Rare and Endangered Plant Surveys).	CNPS previously listed San Diego sagewort as a List 2 plant. This species is impacted by projects that disrupt drainages or involve flood control efforts. (Reiser 1994).

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
12	San Diego sunflower (<i>Viguiera laciniata</i>) Status: S3.2/List 4 Family: Asteraceae	This shrub species occurs in chaparral and coastal sage scrub on dry slopes.	Its range extends from Riverside and San Diego counties into Baja California and Sonora, Mexico. San Diego sunflower has been documented on MCAS Miramar (Station Rare and Endangered Plant Surveys).	San Diego sunflower is threatened by loss of habitat from development.
13	Orcutt's brodiaea (<i>Brodiaea orcuttii</i>) Status: FSC/S3.1/List 1B Family: Themidaceae	Orcutt's brodiaea is present in a variety of habitats, including clay soils, close-coned coniferous forest, chaparral, cismontane woodlands, meadows, valleys, grassland, and vernal pool habitat in southern California (Hickman 1993).	This species is known from all 10 vernal pool habitat management units on MCAS Miramar (Bauder and Wier 1991).	This species is threatened by development, road construction, and dumping (Skinner and Pavlik 1994).
14	San Diego goldenstar (<i>Bloomeria clevelandii</i> , formerly <i>Muilla clevelandii</i>) Status: FSC/S2.2/List 1B Family: Themidaceae	San Diego goldenstar is found in chaparral, coastal sage scrub, and vernal pool grasslands on mesas in San Diego County.	It is known from San Diego County to Baja California, Mexico. Approximately 112 localities in San Diego County have been documented. It has been documented on MCAS Miramar (Station Rare and Endangered Plant Surveys).	This species is considered sensitive due to loss and degradation of habitat from road construction, urbanization, and off-highway vehicle use (Skinner and Pavlik 1994).
Invertebrates				
Amphibians				
15	Western spadefoot toad (<i>Spea hammondi</i>) Status: FSC/CSC	The western spadefoot toad prefers grassland habitats in lowlands, foothills, and plains along the Coast Range from northern California to northern Baja California, Mexico.	Once widely distributed in California, this species has suffered significant extirpation from its previous range. This species is known from the Central Valley and adjacent foothills. This species has been documented on the Station in Diegan coastal sage scrub, disturbed areas, riparian forests, southern mixed chaparral, and vernal marsh habitat (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	The western spadefoot toad emerges from underground retreats following fall, winter, and spring rains and breeds in the temporary ponds that form.
Reptiles				
16	Southwestern pond turtle (<i>Clemmys marmorata pallida</i>) Status: FSC/CSC Family: Emydidae (box and water turtles)	This aquatic species occupies ponds, marshes, rivers, streams, and irrigation ditches. They prefer these habitats especially within woodland, grassland, and open forest (Stebbins 1985).	This species ranges from coastal California near the San Francisco Bay area to northern Baja California, Mexico. Indications are 6-8 viable populations of this species are located south of the Santa Clara River system in California. The southwestern pond turtle was reported on Station (Hunsaker and Cox 2000) but was not present/observed during recent surveys (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	Losses of habitat, use of insecticides, and development are major threats to this species.

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
17	San Diego horned lizard (<i>Phrynosoma coronatum blainvillei</i>) Status: CSC Family: Equanidae	This horned lizard may be present in coastal sage scrub, chaparral, oak, pine woodland and along washes.	The range of this horned lizard includes southern California west of the deserts, south into northern Baja California, Mexico. The San Diego horned lizard has been reported in chaparral, coastal sage scrub, and vernal pool habitat of the central and western portion of the Station (Hunsaker and Cox 1997).	Like other horned lizards, this species can be identified by the large horns that protrude from the back of its head. Steady declines in population numbers are attributed to habitat loss and fragmentation, as well as over-collecting.
18	Coronado Island skink (<i>Eumeces skiltonianus interparietalis</i>) Status: CSC Family: Scincidae	The Coronado skink, a subspecies of the western skink is most commonly associated with oak woodlands and coastal sage scrub habitats.	This skink is found from Los Angeles County into northwest Baja California, Mexico, including San Diego County (Stebbins 1985). This subspecies has been reported as common under pieces of wood and other objects in grasslands and open habitats throughout the Station (Hunsaker and Cox 1997).	This small, secretive lizard is thought to be declining as a result of habitat loss due to development.
19	Orange-throated whiptail (<i>Cnemidophorus hyperythrus beldingi</i>) Status: CSC Family: Teiidae	The orange-throated whiptail may be present in coastal sage scrub, chaparral, and along the borders of riparian zones and washes.	This whiptail is considered part of the endemic herpetofauna of Baja California that includes the entire length of the peninsular ranges from the Moreno Valley, California to the tip of Baja California, Mexico. This subspecies is common in spring and summer in sandy streambeds, open sycamore woodland, and coastal sage scrub areas of the canyons and mesas of the Station (Hunsaker and Cox 1997).	The orange-throated whiptail is still relatively common where suitable habitat occurs (Leatherman unpublished data); however, vast areas of its former habitat have been lost to agriculture and urbanization.
20	Silvery legless lizard (<i>Anniella pulcha pulcha</i>) Status: FSC/CSC Family: Anniellidae	This species inhabits loose sandy soils that often have habitat containing little cover. Optimal conditions consist of a dry sandy layer overlaying damp soil with free movement between both.	This species is known to occur in the vicinity of Antioch, Contra Costa County, California, south through the Coastal Ranges, Transverse Ranges, and Peninsular Ranges into northwestern Baja California. Observations on MCAS Miramar consists of one individual in Sycamore Canyon (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	The silvery legless lizard is a species of special concern due to habitat loss, possibly resulting from development, grazing practices and off-road vehicle use. Status evaluation has been difficult due to insufficient and incomparable species data.
21	Coastal rosy boa (<i>Lichanura trivirgata roseofusca</i>) Status: FSC Family: Boidae	The coastal rosy boa inhabits rocky mesas in coastal sage scrub, desert sage scrub, and chaparral-covered hillsides and canyons in coastal San Diego County.	The subspecies ranges from Los Angeles and San Bernadino counties south into northwest Baja California, Mexico. To date, two observations were reported in the north-central portion (Hunsaker and Cox 2000) and three observations were made in the northeastern portion of the Station (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	Activity is mostly nocturnal, but there is relatively little information available on its life history (Zeiner <i>et al.</i> 1988).

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
22	Coast patch-nosed snake (<i>Salvadora hexalepis virgultea</i>) Status: None/CSC Family: Colubridae	This diurnal species is found in grasslands, chaparral, and desertscrub (Stebbins 1985). It is commonly associated with open grasslands with friable or sandy soils and enough cover to escape predation.	This snake may be found in coastal southern California and northern Baja California, Mexico. Five observations have been reported on MCAS Miramar (Hunsaker and Cox 2000) and (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	The coast patch-nosed snake is a subspecies of the western patch-nosed snake present in coastal southern California and northern Baja California, Mexico.
23	Two-striped garter snake (<i>Thamnophis hammondi</i>) Status: CSC Family: Colubridae	The two-striped garter snake is found along permanent streams, creeks, and vernal pool habitat with protective cover. It may occasionally be present in chaparral or other habitats far from water.	This garter snake is known from coastal California near the Monterey Bay area south through northern Baja California, Mexico. This species has been reported in or near temporary ponds in throughout the Station (Hunsaker and Cox 1997).	Urban development has greatly reduced the range of this species in southern California (Stebbins 1985), although it is locally common in creeks throughout San Diego County (Ogden 1996).
24	Northern red diamond rattlesnake (<i>Crotalus ruber ruber</i>) Status: CSC Family: Viperidae	This rattlesnake prefers coastal sage scrub and chaparral, and may be found in oak woodland and canyon bottoms and along borders of riparian zones and washes.	Included in the range of this snake is the entire length of the peninsular ranges from the Moreno Valley, California area to the tip of Baja California, Mexico. This species has been commonly observed in brushy, rocky upland areas of central and eastern portions of the Station, and occasionally observed on stony slopes of lower San Clemente Canyon (Hunsaker and Cox 1997).	Loss of habitat due to development is a continual threat to this species existence.
Birds				
25	Osprey (<i>Pandion haliaetus</i>) Status: CSC Family: Accipitridae	Osprey habitat consists of areas near lakes, streams, and coastal areas, preferably with tall trees or snags for roosting and nesting.	The osprey is widespread through parts of the continental U.S., Canada, and Alaska. One osprey was observed on MCAS Miramar in 1999 (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	The Osprey observed in 1999 was presumed to be one of the pair nesting at Miramar Reservoir (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).
26	Cooper's hawk (<i>Accipiter cooperi</i>) Status: CSC Family: Accipitridae	Cooper's hawk habitat consists of mature forests, open woodlands, woodland edges, and river groves.	The species is widespread from Canada to Mexico. Cooper's hawks have been observed on Station throughout the year in habitats containing shrubs and trees, often with in close proximity to permanent water (Hunsaker and Cox 2000).	

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
27	Sharp-shinned hawk (<i>Accipiter striatus</i>) Status: CSC Family: Accipitridae	The sharp-shinned hawk inhabits woodland areas ranging from boreal coniferous, mixed deciduous, bushy and riparian areas, tropical cloud forests, mountainous pine forests, savanna woodlands, and urban areas.	The range encompasses area below the treeline in Alaska, Canada, and continental U.S. south to northern Argentina. This species is an occasional resident of MCAS Miramar during the fall, winter, and spring (Hunsaker and Cox 2000).	It is unknown if or to what extent the sharp-shinned hawk population has declined in California.
28	Northern harrier (<i>Circus cyaneus</i>) Status: CSC Family: Accipitridae	This species is fairly common in marshes and fields where it may be seen flying close to the ground in search of prey. The northern harrier breeds in marshes and grasslands and forages in grasslands, wetlands, fields, and open coastal sage scrub.	This species is widespread throughout temperate regions of North America and Eurasia. San Diego County is at the southwestern corner of the northern harrier's breeding range. T. Conkle (personal communication) has reported an observation of harriers nesting on the Station in East Miramar along the west side of West Sycamore Canyon.	This raptor is a species of concern because of the decline in nesting pairs in California. This decline is the result of continued loss and degradation of breeding and foraging habitat (Remsen 1978).
29	Ferruginous hawk (<i>Buteo regalis</i>) Status: FSC/CSC Family: Accipitridae	Because the ferruginous hawk utilizes diverse breeding areas, it can be found in a wide variety of habitats. Among These are grassland, sagebrush flats, desert scrub, valleys, and agricultural areas.	Its breeding range extends from eastern Washington and southeastern Canada south to eastern Oregon, Nevada, Arizona, northern New Mexico, north-central Texas, western Oklahoma, and western Texas. It is an uncommon San Diego County winter visitor. The species does not breed on the Station, but it has been observed on the Station (T. Conkle, personal communication).	The USFWS has ruled against a petition to list the Ferruginous Hawk as threatened or endangered (USFWS 1992a).
30	Merlin (<i>Falco columbaris</i>) Status: CSC Family: Falconidae	Habitat consists of open woodlands, tundra, cliffs adjacent to grasslands, and foothills, marshes, and open country coasts during migration.	Widespread throughout Alaska, Canada, and the U.S. south to the northern part of South America. One merlin was observed on MCAS Miramar in 1993, 1994, and 1995 (Hunsaker and Cox 2000).	
31	Prairie falcon (<i>Falco mexicanus</i>) Status: CSC Family: Falconidae	This species primarily inhabit dry open country prairies and alpine tundra.	The distribution comprises south-central British Columbia, southern Alberta and southern Saskatchewan, south to central Mexico with eastern distribution occurring in the Dakotas, Kansas, Arizona, and Texas. Infrequent observations of this species have been documented in numerous ornithological surveys for MCAS Miramar.	This species most likely does not nest on Station (Hunsaker and Cox 2000).
32	Peregrine falcon: (<i>Falco peregrinus anatum</i>) Status: FSC/Fully Protected Family: Falconidae	This species prefers open habitat, usually near water, which can be comprised of tundra, marsh, high mountain, more open forest, deserts, and urban settings.	The peregrine falcon breeds south of the tree line in Alaska and Canada, throughout most of the U.S., and from central to southern Mexico. Northern birds winter from Mexico south to southern South America.	

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
33	Long-billed curlew (<i>Numenius phaeopus</i>) Status: FSC/CSC Family: Scolopacidae	The long-billed curlew's habitat consists of prairies, grassy meadow, and sagebrush, generally near water or moist areas during the breeding season and tidal mudflats, marshes, and wet fields/grasslands during migration.	Breeding occurs from southern Canada to northern California, Utah, northern New Mexico, and Texas. This species winters from California, Texas, Louisiana, South Carolina, and Florida southward. Two individuals were observed in 1994, and this species is considered a rare migrant or winterer of the Station (Hunsaker and Cox 2000).	
34	Short-eared owl (<i>Asio flammeus</i>) Status: CSC Family: Strigidae	The short-eared owls inhabits wide-open spaces, such as grasslands, prairie, agricultural fields, salt marshes, estuaries, mountain meadows, and alpine and Arctic tundra.	This species is distributed throughout much of the world. It was observed during reptile and amphibian surveys, but the location of the sighting/sightings was not discussed.	
35	Long-eared owl (<i>Asio otus</i>) Status: CSC Family: Strigidae	Long-eared owls inhabit open woodlands, forest edges, riparian strips along rivers, hedgerows, juniper thickets, woodlots, and wooded ravines and gullies.	Long-eared owls are widely distributed in North America, Eurasia, and northern Africa. Five to six pairs are known to nest regularly in Sycamore Canyon (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	
36	Western burrowing owl (<i>Athene cunicularia hypugaea</i>) Status: FSC/CSC Family: Strigidae	This species prefers open, level terrain within grassland or desert scrub vegetation (Johnsgard 1988). Farmland and airfields are among the Owl's preferred locations. Burrowing owls typically nest in holes made by ground squirrels and other burrowing animals.	A resident species in California, the breeding range of the burrowing owl includes southwestern Canada and much of the western U.S. into central Mexico. The species is uncommon and rapidly declining in California. One pair of burrowing owls was observed in San Clemente Canyon west of Kearny Villa Road in April 1994 (Ogden 1996). Several burrowing owls were sited on the Station during deer surveys conducted in fall 1997 (South and East Miramar). This species is a fall/spring migrant and an occasional winter resident. It can occur virtually anywhere on the Station; it is most frequently observed just east of Interstate -15 and on ridgetops of East Miramar (T. Conkle, personal communication).	Continued loss and degradation of habitat have resulted in rapidly declining population numbers in California (Remsen 1978). CDFG believes this species is under imminent threat of extirpation in San Diego County. CDFG suggested survey methods, passive relocation guidelines, and mitigation measures are found in the CDFG 1995 <i>Staff Report on Burrowing Owl Mitigation</i> and the Burrowing Owl Consortium's 1992 <i>Burrowing Owl Protocol and Mitigation Guidelines</i> . Effects to burrowing owls will be analyzed during NEPA analyses of proposed actions.

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
37	Vaux's swift (<i>Chautura vauxi</i>) Status: FSC/CSC Family: Trochilidae	This species is often found in coniferous forested regions, but it forages and migrates over open country, rivers, and lakes.	The Vaux's swift breeds from southeastern Alaska, western Canada, northern Idaho, and western Montana, south to central California. It winters in southern portions of its breeding range, central New Mexico, southern Louisiana, and western Florida. It occurs on MCAS Miramar only as a migrant (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	Habitat on Station is unsuitable, with exception of this species possibly utilizing buildings for roosting sites (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).
38	Black swift (<i>Cypseloides niger</i>) Status: FSC/CSC Family: Trochilidae	The black swift is found in areas with rocky cliffs available for nesting, varying from ocean cliffs to mountain ledges, at elevations from sea level to 11,000 feet.	Breeding occurs from southeastern Alaska and western Canada, south to southern California, northwestern Montana, Colorado, Utah, northern New Mexico, and southeastern Arizona. It winters in Mexico and Costa Rica. This species was observed during reptile and amphibian surveys, but the location of the siting/sitings was not identified.	
39	Costa's hummingbird (<i>Calypte costae</i>) Status: FSC Family: Trochilidae	This species frequents southwestern deserts' arid washes, hillsides, and dry chaparral. In California the habitat primarily consists of washes, mesas, and hillsides, particularly where sages, ocotillo, yuccas, and cholla cacti are abundant.	It breeds from central California, southern Nevada, and southwestern Utah southward. It winters in southern California and Mexico. The Costa's hummingbird has been observed commonly in woodlands, chaparral, and coastal sage scrub in central and eastern regions of the Station.	
40	Rufous hummingbird (<i>Selasphorus rufus</i>) Status: FSC Family: Trochilidae	It primarily inhabits chaparral, meadows, forest edges, and riparian thickets of coniferous woodlands. During migration, it can be found in high mountain meadows and Pacific lowlands in open areas where flowers are present.	It is distributed from southern Alaska, southern Yukon, and western and southern British Columbia to western Montana south, primarily in mountains, to northwestern California, eastern Oregon, and central Idaho. It winters in Mexico, southern Texas and the Gulf Coast, and, rarely, in coastal southern California.	
41	Allen's hummingbird (<i>Selasphorus sasin</i>) Status: FSC Family: Trochilidae	Its habitat consists of the Pacific coastal fog belt, meadows, moist canyon bottoms, humid woody or brushy ravines, brushy edges of coniferous forest, and coastal chaparral.	Allen's hummingbirds are found from southern Oregon to southern California. They are residents of southern California and winter in Mexico. This species was observed during reptile and amphibian surveys, but the location of the siting(s) was not discussed. It was also noted in the 2000 Vertebrate Survey, but this sighting was not confirmed.	

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
42	Lewis's woodpecker (<i>Melanerpes lewis</i>) Status: CSC Family: Picidae	It inhabits open forest and woodland, often logged or burned, including oak, coniferous forest, riparian woodland, and orchards.	It breeds from southern British Columbia and Alberta south to central California, northern Arizona, and northern New Mexico. It winters from southern British Columbia and Oregon to Colorado and south to northern Mexico. One individual was sighted in Sycamore Canyon in 1994 (Hunsaker and Cox 2000).	
43	Nuttall's woodpecker (<i>Picoides nuttallii</i>) Status: FSC Family: Picidae	The Nuttall's woodpecker's habitat includes oak woodlands, live oak forests, chaparral, and canyons with sycamores, alders, and cottonwoods.	This species is a resident from northern California south, west of the deserts and the Sierra divide, to Baja California. The Nuttall's woodpecker is a common breeding resident of MCAS Miramar, primarily found in native and eucalyptus woodlands, including willow scrub (Hunsaker and Cox 2000).	
44	Olive-sided flycatcher (<i>Contopus cooperi</i>) Status: FSC Family: Tyrannidae	It inhabits montane and northern coniferous forests up to 10,000 feet. It prefers tall spruces, firs, balsams, and pines; groves of eucalyptus and Monterey cypress; taiga; subalpine coniferous forests; mixed woodlands near edges and clearings; and wooded streams and borders of northern bogs and muskegs.	It is distributed from Alaska to Canada south to southern California across to Texas and east of the Rocky Mountains to North Carolina. It winters in southern California and South America. This species was observed as a migrant in 1994 (Hunsaker and Cox 2000), during the Reptile and Amphibian Survey (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001), and during the 2003 Long-Term Ecosystem Survey (Varanus Biological Services, Inc. and San Diego Natural History Museum 2003).	One individual was observed during the 2000 survey. No details were provided in the 2001 or 2003 reports for numbers of individuals observed or distribution.
45	Willow flycatcher (<i>Empidonax traillii</i>) Status: CE	The willow flycatcher is found in willow thickets and other brushy areas near streams, marshes, or other wetlands and in clear-cuts and other open areas with nearby trees or brush.	This species breeds from southern British Columbia, Alberta, North Dakota, New York, and Maine south to central California, Nevada, Southwest, Arkansas, and Virginia. It winters in the tropics. Flycatchers (unknown species) were observed on Station in 1993 (Hunsaker and Cox 2000), and willow flycatchers were observed on Station during the Reptile and Amphibian Survey (Varanus Biological Services, Inc. and San Diego Natural History Museum 2001).	Willow flycatchers (<i>Empidonax traillii</i>) have been identified on Station, but the southwestern willow flycatcher (<i>Empidonax traillii traillii</i>) subspecies has not been identified.
46	Loggerhead shrike (<i>Lanius ludovicianus</i>) Status: FSC/CSC Family: Laniidae	Loggerhead shrikes occupy a variety of habitats but are most common wherever bushes or trees are scattered on open ground.	The loggerhead shrike has a large distribution that includes much of the western portion of the U.S. Substantial declines in the eastern portion of its range have been observed. This species is known to breed from numerous locations on the Station.	

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
47	Bank swallow (<i>Riparia riparia</i>) Status: FSC/CT Family: Hirundinidae	It prefers grasslands and cultivated fields but uses a variety of open habitats, usually near water and suitable nest sites. It nests in riverbanks, borrow pits, gravel pits, road cuts, sand banks, and other exposed banks of sand, gravel or clay.	It breeds from Alaska across northern Canada south to California, Texas, and Virginia. Wintering occurs in the tropics.	Its distribution on Station is not known.
48	San Diego cactus wren (<i>Camplyorhynchus brunneicapillus sandiegensis</i>) Status: CSC Family: Troglodytidae	San Diego (coastal) cactus wrens may be present in coastal sage scrub, chaparral, and grassland habitats.	This cactus wren is known from coastal areas in southern California. Vagrants may rarely occur on the Station; there is one record in the vicinity of the Station. One pair was a permanent resident in native grassland in the central portion of the Station. This subspecies is no longer known to breed on the Station (Hunsaker and Cox 1997).	One cactus wren was observed during 1999 (Varanus Biological Services, Inc. and San Diego Society of Natural History 2001).
49	California thrasher (<i>Toxostoma redivivum</i>) Status: FSC Family: Mimidae	This species is most abundantly along mountain bases and up to 5,000 feet elevation. It prefers slopes covered with chaparral or early tree stages and in foothills with mixed brush and short trees. It avoids areas with dense tree canopies.	It is a resident in southern California north to Humboldt and Shasta counties (west of the Cascade Mountains-Sierra Nevada and the deserts) and in northwestern Baja California. This species is a common inhabitant of chaparral and woodland habitat throughout MCAS Miramar (Hunsaker and Cox 2000).	
50	Lawrence's goldfinch (<i>Carduelis lawrencei</i>) Status: FSC Family: Fringillidae	The Lawrence's goldfinch inhabits oak woodlands, chaparral, riparian woodlands, pinyon-juniper associations, and weedy areas in arid regions, usually near water.	The breeding distribution is from central California south to southern California, northwestern Baja California, and western Arizona. Wintering occurs from north-central California, central Arizona, southwestern New Mexico, and western Texas south to northern Baja California, southern Arizona, and northern Sonora. Seven individuals were observed in the 2003 LTEM (Varanus Biological Services, Inc. and San Diego Society of Natural History 2003).	
51	Yellow warbler (<i>Dendroica petechia brewsteri</i>) Status: CSC Family: Parulidae	The yellow warbler prefers moist habitats, such as willow- and alder-lined streams and ponds, brushy bogs, and the edges of marshes, swamps, or creeks. It also utilizes dry sites, such as hedgerows, roadside thickets, orchards, farmlands, and forest edges.	This species is distributed from northwestern and north-central Alaska and northern Yukon to northern Ontario, central Quebec, and southern Labrador south to Mexico. This species was sighted four times in May 1999. These sightings may have consisted only of migrants due to the sighting occurring during the normal migration period (Varanus Biological Services, Inc. and San Diego Society of Natural History 2001).	

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
52	Yellow-breasted chat (<i>Icteria virens</i>) Status: CSC Family: Parulidae	This species inhabits ravine or streamside thickets of vines, briars, small trees, tall shrubs, forest edges, hedgerows, overgrown pastures, scrub country, and early successional stages of forest regeneration.	The yellow-breasted chat ranges from southern British Columbia, North Dakota, southern Minnesota, southern Ontario, Vermont, and New Hampshire south through Central America and western Panama. This species is a summer resident in low numbers and localized populations (Varanus Biological Services, Inc. and San Diego Society of Natural History 2001).	
53	Summer tanager (<i>Piranga rebra</i>) Status: CSC Family: Thraupidae	It generally inhabits dry, open woodlands of oaks, pines, hickories, and willow, cottonwood, and streamside vegetation in canyons.	The species ranges from southeastern California and southern Nevada to central Oklahoma, and from southeastern Nebraska to New Jersey south to Mexico to Bolivia. This species was observed during the 2001 Reptile and Amphibian Survey (Varanus Biological Services, Inc. and San Diego Society of Natural History 2001). A description of numbers or distribution was not provided.	
54	Southern California rufous-crowned sparrow (<i>Aimophila ruficeps canescens</i>) Status: CSC Family: Emberizidae	The southern California rufous-crowned sparrow is common in mixed grasslands and coastal sage scrub habitats.	This sparrow is a common but localized inhabitant of southern California. It is known to breed on the Station and is relatively common throughout undisturbed areas. It is especially common in steeper, rocky canyons of coastal sage scrub and chamise chaparral.	
55	Bell's sage sparrow (<i>Amphiza belli belli</i>) Status: FSC/CSC Family: Emberizidae	This species is a localized resident of coastal sage scrub in San Diego County.	Bell's sage sparrow is a subspecies of sage sparrow restricted to the coastal plain and Central Valley (Johnson and Marten 1992). This subspecies is known to breed on MCAS Miramar, especially in chamise chaparral. It is particularly attracted to post-fire, regenerating chamise chaparral with remnant-charred branches. Good breeding sites include G-Parcel, the north side of San Clemente Canyon, the entire area east of Interstate-15, and recovering chaparral areas of the 2,000-acre burn in East Miramar.	
56	Lark sparrow (<i>Chondestes grammacus</i>) Status: FSC Family: Emberizidae	The lark sparrow inhabits grasslands, shrublands, open riparian areas, and agricultural areas.	The lark sparrow is distributed from British Columbia, Saskatchewan, northern Minnesota, and California south to Mexico and El Salvador. This species is fairly common to common and utilizes all major vegetation sites on MCAS Miramar (Hunsaker and Cox 2000).	

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
57	Tricolored blackbird (<i>Agelaius tricolor</i>) Status: FSC/CSC Family: Icteridae	The tricolored blackbird nests in large colonies in marshes and pond edges, edges of fields, and in cattails throughout western California.	The tricolored blackbird ranges from the Central Valley of California, west of the Sierra Nevada Mountains. It is a common but localized resident in San Diego County. San Diego State University biologists have reported this species from Harris Pond, south of MCAS Miramar Way between Kearny Villa Road and the Main Station gate; near the horse stables north of Miramar Way; and in Sycamore Canyon near Santee Lakes (Ogden 1996). They are colonial nesters and are not known to breed at MCAS Miramar (T. Conkle, personal communication).	
Mammals				
58	Mexican long-tongued bat (<i>Choeronycteris mexicana</i>) Status: CSC Family: Phyllostomidae (American leaf-nosed bats)	In the U.S., it is known mainly from desert habitats between 2,000 and 8,000 feet. During daylight hours, this species most commonly uses natural caves, buildings, and old mine shafts for roosting (Nowak 1991).	This species ranges from the southern portions of California and Arizona to Honduras and Guatemala (Hunsaker 1997). It has not been recorded at MCAS Miramar.	This species is known for its long snout and extrudable tongue, which are well adapted to feeding on pollen and nectar of night blooming flowers. In addition to pollen and nectar, its diet is thought to consist of fruit and probably insects.
59	Western small-footed myotis (<i>Myotis ciliolabrum</i>) Status: SSC Family: Vespertilionidae	In California the small-footed myotis prefers arid uplands, where it roosts in rock crevices, buildings, caves, mine tunnels, and underneath loose tree bark. This species typically forages over open water or upland vegetation.	The geographic range of this species includes a large portion of western North America. It is known from southwestern Canada, east to western Oklahoma, and south to central Mexico (Nowak 1991). This species has not been recorded at MCAS Miramar.	The species displays a high tolerance for cold and dry conditions, hibernating in colder and dryer conditions than most other bats.
60	Yuma myotis (<i>Myotis yumanensis</i>) Status: SSC Family: Vespertilionidae	In California, it is most commonly present in areas of southeastern deserts but may be found in grassland, woodland, and riparian communities throughout the state (Hunsaker 1997). Roost sites are typically in buildings, bridges, and hollow trees.	The Yuma myotis range extends from central Mexico and Baja California north to British Columbia and east to Colorado and Texas. This species has been observed roosting on the Station at the abandoned Atlas Missile Testing Facility and an abandoned building on Atlas Road. This has been observed foraging at several locations on the Station (D. Stokes, personal communication).	This species appears to have a stronger association with open water than any other bat species in North America (Hunsaker 1997).

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
61	Townsend's big-eared bat (<i>Plecotus townsendii</i>) Status: SSC/CSC Family: Vespertilionidae	Habitat preference of Townsend's big-eared bat is quite variable. In the Southwest, the species is not abundant in any particular habitat but is decidedly less common in open grasslands and lowland desert areas (<i>i.e.</i> , in southwestern Arizona and southeastern California).	Townsend's big-eared bat is present in western North America from Wisconsin and Wyoming to western South Dakota, and southward to Texas, Arizona, and California. It is also common in the Mexican uplands in southern Mexico. The subspecies is rare in the eastern U.S. but is found throughout California, especially in mesic habitats.	During the day, this species is most likely hanging from open ceilings of caves and mines as they do not use cracks or crevices. They may also roost in buildings and trees (Nowak 1991). At night, they forage for insects above the local vegetation.
62	Pallid bat (<i>Antrozous pallidus</i>) Status: CSC Family: Vespertilionidae	Pallid bats prefer desert areas with rocky outcrops below about 6,000 feet elevation. Colonies are usually found in caves, rock crevices, mines, or hollow trees (Nowak 1991).	This species is known from southern British Columbia and Montana to central Mexico and Cuba (Nowak 1991). Its range encompasses most of the western U.S., including southern coastal California (Burt and Grossenheider 1976).	Colonies of pallid bats vary in size and range to 100 individuals (Nowak 1991).
63	Pocketed free-tailed bat (<i>Nyctinomops femorosaccus</i>) Status: CSC Family: Molossidae	Pocketed free-tailed bats inhabit pinon-juniper woodlands, desert scrub, mixed cacti, riparian woodland, and palm oasis. They are most often found in rocky areas with high cliffs, crevices, or rock outcrops (Hunsaker 1997). Artificial structures are also used for day and night roosts.	This species is known from southern California, Arizona, and New Mexico and south into northern and western Mexico (Nowak 1991). It is also thought to be widely distributed in the Trans-Pecos region of Texas. It is considered rare in California. This species has been observed foraging at several locations at MCAS Miramar but has not been observed roosting (D. Stokes, personal communication).	This species is not considered migratory; however, some populations seasonally migrate locally; some migrate short distances into Mexico; and others over-winter in their summer use areas (Hunsaker 1997, Nowak 1991).
64	Big free-tailed bat (<i>Nyctinomops macrotis</i>) Status: CSC Family: Molossidae	This bat prefers rugged, rocky terrain for its crevice and fissure roost potential. They can be found up to 8,000 feet elevation and have commonly been observed in Douglas-fir, ponderosa pine, pinon-juniper, and desert scrub, usually along rocky cliffs.	The species range extends from north and central Mexico, most of South America, and the Caribbean Islands northward to southwestern U.S. In the fall this bat migrates to southern Arizona and Mexico and is rarely found in California (Nowak 1991).	The big free-tailed bat wanders widely during its fall migration, resulting in observation records out of its normal range. Such observations include those in urban areas of San Diego County and vagrants elsewhere in the state in fall and winter.

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
65	San Diego black-tailed jackrabbit (<i>Lepus californicus bennettii</i>) Status: CSC Family: Leporidae (rabbits and hares)	The San Diego black-tailed jackrabbit prefers open grasslands or open shrublands, usually adjacent to sage scrub or chaparral habitats where it may find cover.	This coastal southern California subspecies occurs from southern Santa Barbara County to Baja California, Mexico. It is relatively common in open areas of San Diego County. It is common in disturbed habitats and grasslands on the western portion of MCAS Miramar and occasionally in ridge-top chamise chaparral areas and open areas of central and easternmost MCAS Miramar (Cox <i>et al.</i> 1994). This taxa is common between the aircraft runways and San Clemente Canyon, and in Rose Canyon (Ogden 1996).	Areas that are unsuitable for the San Diego black-tailed jackrabbit include densely vegetated areas that are overgrown with thick ground cover.
66	Dulzura California pocket mouse (<i>Chaetopidus californicus femoralis</i>) Status: CSC Family: Heteromyidae	The Dulzura California pocket mouse occurs in coastal sage scrub, chaparral, oak woodland, and montane hardwood habitats. It is known from sea level to 7,900 feet.	This pocket mouse's range extends from the coastal slope and mountains of northern San Diego County southward into the mountains of Baja California, Mexico. This subspecies was reported as being observed at MCAS Miramar by Kellogg (1994).	The type specimen was described from the vicinity of Dulzura, San Diego County in 1891. The range of this taxon overlaps with that of the northwestern San Diego pocket mouse (see below); however, the Dulzura pocket mouse is larger and heavier.
67	Northwestern San Diego pocket mouse (<i>Chaetopidus fallax fallax</i>) Status: SSC Family: Heteromyidae	This pocket mouse is associated with open, arid habitats, including coastal sage scrub, annual grassland, and desert habitat.	This subspecies occurs on the coastal slope of southern California from southwest San Bernadino, western Riverside, eastern Los Angeles, and San Diego counties to northern Baja California, Mexico. It was detected in the eastern portion of MCAS Miramar, adjacent to I-15, and is expected to be present in suitable habitat throughout the Station (Ogden 1996).	Population information is lacking for the northwestern San Diego pocket mouse.
68	Southern grasshopper mouse (<i>Onychomys torridus ramona</i>) Status: SSC/CSC Family: Muridae	The southern grasshopper mouse occurs in arid, open country with sandy or gravelly soil; it is associated with grasslands, open sagebrush and chaparral.	This subspecies ranges from northern Los Angeles County along the coastal slope to extreme northwest Baja California, Mexico.	This large mouse is mainly carnivorous, eating insects, scorpions, lizards, and other mice, as well as some seeds (Burt and Grossenheider 1976). It lives in burrows of other rodents, including probably Botta's pocket gopher and California ground squirrel.

No.	Species Name, Status, Family*	Habitat	Rangewide and MCAS Miramar Distribution	Comments
69	San Diego desert woodrat (<i>Neotoma lipida intermedia</i>) Status: CSC Family: Muridae	The San Diego desert woodrat favors xeric and coastal habitats. Preference is given to chaparral and coastal sage scrub, especially in rock outcrops.	This subspecies is restricted to the coastal slope of southern California. It inhabits arid portions of coastal California, mostly on south-facing slopes. Known locations include east of I-15 in the northern portion of the Station, it is expected to be present in suitable habitat throughout MCAS Miramar (Ogden 1996).	A subspecies of the desert woodrat, the San Diego desert woodrat must be trapped to distinguish it from the sympatric dusky-footed woodrat (<i>Neotoma fuscipes</i>). Population data for this species is lacking.

* **Boldface** type indicates species that are known to occur on MCAS Miramar

Species Status Codes

- FSC = Federal Species of Special Concern (Animal or Plant)
- CE = State Endangered (Animal)
- CT = State Threatened (Animal)
- CSC = California "Species of Concern" (Animal)

California State Plant Ranking List

S1 = Less than 6 viable element occurrences (Eos) or less than 1,000 individuals or less than 2,000 acres

S1.1 = very threatened

S1.2 = threatened

S1.3 = no current threats known

S2 = 6 – 20 Eos or 1,000 – 3,000 individuals or 2,000 – 10,000 acres

S2.1 = very threatened

S2.2 = threatened

S2.3 = no current threats known

S3 = 21 – 80 Eos or 3,000 – 10,000 individuals or 10,000 – 50,000 acres

S3.1 = very threatened

S3.2 = threatened

S3.3 = no current threats known

S4 = Apparently secure within California' this rank is clearly lower than S3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.

S5 = Demonstrably secure to ineradicable in California. No threat rank.

California Native Plant Society Ranking List

- List 1B = Rare, threatened, or endangered and eligible for listing under the California Endangered Species Act
- List 2 = Rare and endangered in California, common elsewhere
- List 3 = Taxa about which more information is needed
- List 4 = Rare, but low potential for extinction